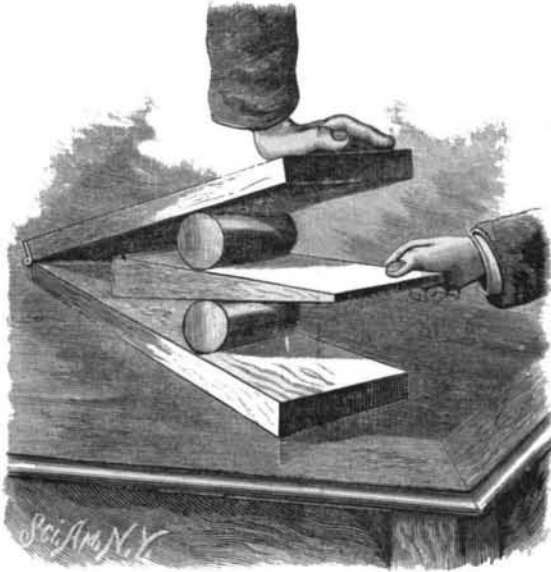


**VOLCANIC ERUPTIONS IN NEW ZEALAND.**

The details of the terrible eruption in New Zealand during the month of June, which have just been received, show it to have been one of the most disastrous on record. The volcanic disturbances were confined to North Island or New Ulster. This has an area of about 44,000 square miles, or almost equal to that of the State of New York. It is the second largest of the group. About one-tenth of the surface is covered by mountains, the highest peaks of which are either active or extinct volcanoes. The northern part of the island is noted for the extreme beauty of its scenery, the Auckland lake district being a favorite resort for tourists. The greatest volcanic activity seems to have



**WEDGE PARADOX.**

been felt in this part of the island. At Tauranga, on the Bay of Plenty, violent earthquakes followed each other in rapid succession on the morning of the 9th of June, and were accompanied by showers of fine dust. In the neighborhood of Rona, the severity of the shocks was such that many believed the island would sink into the sea.

The sensation experienced is said to have been fearful beyond description. After the first shock, the inhabitants rushed frantically about in all directions. With the second shock the entire country was illuminated by the volcanic fires. Mount Terrawerra, on the shore of the beautiful lake of that name, was the first crater to break forth, but in a short time the entire Paersa range was in a state of active eruption, hurling lava and stones over the surrounding country. The extinct volcano of Ruapehn, which rises to a height of 9,100 feet near the center of the island, resumed its activity for the first time in tradition. The scene was

two days, turning day into night and totally destroying a large number of native villages. Wairoa was covered to a depth of ten feet with dust and ashes.

The loss of life was considerable, and included a number of English residents. Those of the natives who escaped were driven frantic with terror. Many were burned alive by the volcanic dust and scoriae. An old Maori chief had a remarkable escape. He is stated to have been dug out alive after an imprisonment of 104 hours. The destruction of the pasture by the dust and mud was so extensive that many cattle have been starved, and great distress exists throughout the entire lake district. Nearly all vegetation has been blasted by the poisonous vapors, dust, and the mud of blue clay ejected from the volcanoes. The aspect of the country has been changed, and several of the lakes been transformed into mud baths. Many of the buildings which escaped being buried have been crushed by the weight of the falling mud.

The effects of the eruption were felt for some distance at sea. The steamship Southern Cross, bound for Auckland, experienced an almost fatal downfall of dust on the morning of June 10, the day following the earthquakes. From 5 to 10 o'clock there was complete darkness, and balls of fire constantly played around the mastheads. The men being unable to stand the blinding showers of dust, the vessel was put about and stood away to the north, but it was not until 11 o'clock on the following morning that the dust was left behind.

**WEDGE PARADOX AND FALLING AND PROJECTED BALL.**

T. O'CONNOR SLOANE, PH.D.

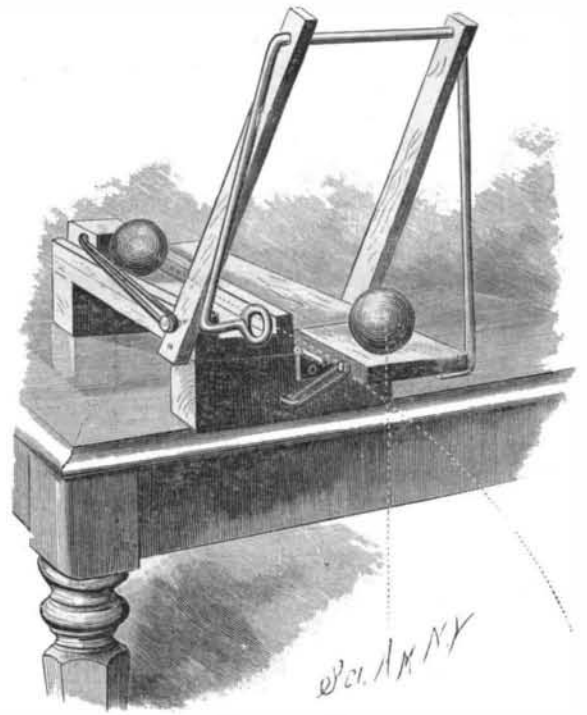
The general action of a wedge is well known. It forces apart surfaces between which it is driven. If, on the other hand, it has smooth sides, the reciprocal action may take place. When placed between two opposing faces that are pressed together by a constant force, and left to itself, it may, by their action, be violently expelled. The schoolboy's trick of shooting an orange seed from between his finger and thumb by compressing it violently, so that it flies out, is a good, though not very refined, illustration of this principle. The slippery sides of the seed help the action. Holmes also alludes to it in describing the toughness of the "settler's elm":

"The wedges flew from between its lips,  
Their blunt ends frizzled like celery tips."

The reciprocal has come to be as well recognized as its original.

If, however, a wedge is placed between two surfaces that constantly tend to approach each other, and the conditions are so arranged that when the wedge moves apparently the wrong way the surfaces will come closer together, then the wedge will act in this paradoxical manner.

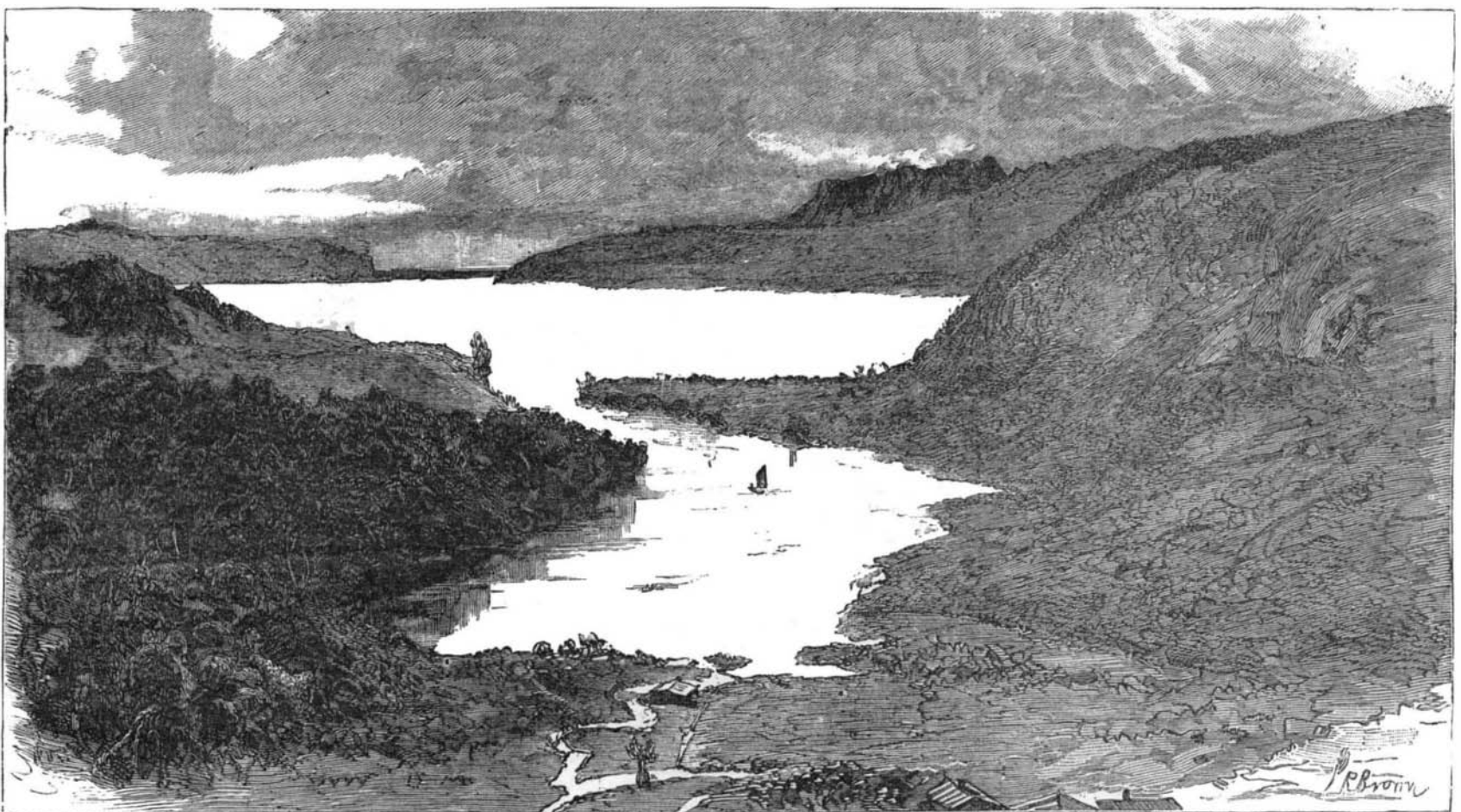
drawing must be provided, and also two cylinders or rollers. Cotton spools, or even two pencils, may be used as rollers. The apparatus is now put together as shown in the illustration. The wedge is introduced between the hinged boards, a roller being placed above and below it. It is placed so far within their opening that the angle that the boards make with each other is greater, or of more degrees, than is the angle of the



**FALLING AND PROJECTED BALL.**

wedge. The thin end of the wedge, supported in one hand, projects outward from the opened boards, and pressure is applied to the uppermost one. In accordance with general rules, this, it would seem, should draw the wedge inward. But, on the contrary, it will be found that it drives it outward, in opposition to the normal movement. The latter is forced outward, so that its thicker parts are brought between the rollers.

The ordinary action of the wedge is complicated by the inclination of the boards to each other, and by the rollers. If the angle included between the boards is greater than that between the sides of the wedge, then the boards will approach more by the rollers moving outward, than the wedge in corresponding movement can drive them apart. The consequence is that the rollers move outward, carrying with them the wedge, and, until the angles become equal, the motion continues, the algebraic sum of the wedge and roller action indicating an approach of the opposing faces.



**TERRAWERRA LAKE AND MOUNTAIN, THE SCENE OF THE RECENT VOLCANIC ERUPTION IN NEW ZEALAND.**

one of awful grandeur. The land for an extent of 120 miles in length by 20 in breadth was one mass of flame and hot crumbling soil. Dense volumes of smoke made luminous by the reflection from the fiery craters hung heavily in the air. Showers of dust, having a strong sulphurous odor, continued to fall for nearly

The conditions may be obtained by the arrangement shown in the cut. Two pieces of wood are hinged together, so as to open and shut like a book. A strip of leather answers as well as a hinge. These are to represent the surfaces that tend to approach each other. A wedge of about the proportions of the one in the

When the angles become equal, the conditions of repose are reached.

This action of the wedge when seen appears most curious. It is a good illustration of the short road to truth that is often afforded by experiments.

The other cut shows a simple apparatus for exhibiting