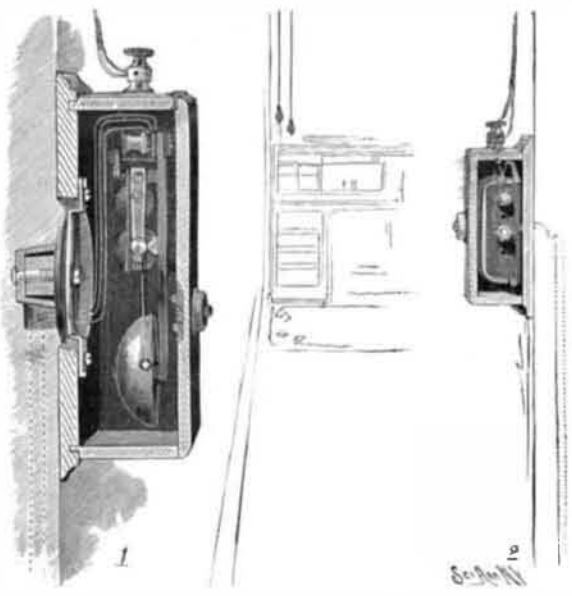
A COMPACT ELECTRIC SIGNALING DEVICE.

The illustration represents a signaling outfit contained in a small box or case, for convenient installation in residences, hotels, or other buildings, either during or after the erection of the buildings, without injury to the walls or woodwork. The improvement has been patented by Mr. James N. Connolly, of No. 452 Madison Avenue, New York City. The case is dust proof, and has an opening in the rear to permit it to be placed over the socket of a bell-pulling outfit, a support over the opening being adapted to receive the center post of the outfit, and a nut screwing upon the center post clamping the box firmly to the wall. The box has a hinged cover, readily thrown open to facilitate making any adjustment which the bell requires, or any desired change in the circuit connections, and the bell is preferably mounted on the cover of the box, which thus serves as a sounding board and intensifies the sound. The circuit wires, also connecting with a suitable battery, are carried in the tubes which extend to the several rooms or a house, after the manner of equipping many large buildings not strictly modern in construction, and a push button or other circuit closer is mounted on the outside of the box. The two binding posts on top are for use when it is desired to ring by means of a flexible cord from different parts of a room, as from a bed, a desk, etc., the cord terminating in a pear-shaped button. By using a buzzer instead of a bell, the case may be made materially smaller, or a buzzer may be placed in circuit and mounted in another part of the room, when either one of the devices may be used, as desired.



CONNOLLY'S ELECTRIC SIGNALING DEVICE.

Peroxide of Hydrogen.

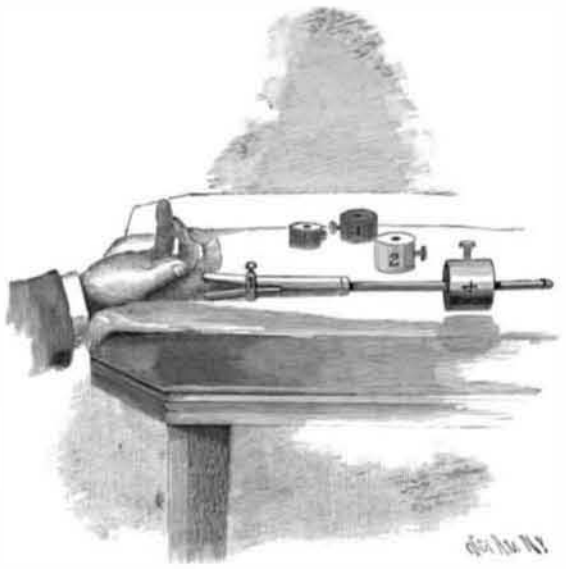
By a process patented in England Dr. Richard Wolffenstein, of Berlin, prepares a more stable and chemically pure peroxide of hydrogen of high percentage. The dilute peroxide solution, which contains perhaps 3 per cent peroxide, is heated at a constant temperature of between 100 deg. and 110 deg. C., with or without the aid of rarefied vessels, until the fluid has a proportion of about 60 per cent peroxide. Then in a vacuum at a moderate temperature the peroxide is distilled over. With gradual rising of the boiling point a watery vapor first passes over until, at 84 deg. C. and a pressure of 24 millimeters, a 99 per cent solution of superoxide distills over. A chemically pure peroxide can be got from this by pouring it into a solvent which does not combine with water, i. e., ether, and dissolving again the pure peroxide out of the ether solution. It is claimed that the product is stable in concentrated solution, and does not decompose even on long keeping. The dilute solution, to begin with, must be entirely free from foreign substances, even from mechanical impurities such as sand.

History of the Barometer.

In the Meteorologische Zeitschrift for December last, Prof. G. Hellmann gives a very interesting account of the invention of the barometer, which has now been in use 250 years. Torricelli, who died at the early age of thirty-nine years, was too busily engaged in mathematical studies to publish an account of his discovery, but on June 11, 1644, he wrote a description of it to his friend Ricci. This letter, and Ricci's objections to the experiment, were published in 1663 by C. Dati, a friend of Torricelli's, and as this work is now exceedingly scarce, Prof. Hellmann has reprinted the correspondence, in the original Italian, in the above-mentioned journal. Some of the paragraphs, says Nature, are noteworthy, especially those in which Torricelli states that it was not merely a question of producing a vacuum, but of making an instrument which would indicate the changes of the atmosphere. The first continuous barometrical observations appear to have been made in France. In England they were first taken by Robert Boyle, about the year 1659, to whom we owe the invention of the word "barometer."

A FINGER EXERCISING DEVICE.

An extremely simple device to facilitate the development of muscular strength in the fingers is represented in the accompanying illustration. It is designed to be of especial benefit to violin players, piano players, etc., or may be used by a surgeon to develop a contracted cord or muscle of the fingers, hand, or arm, being also of utility to penmen, telegraph operators, typewriters, and all who require finger dexterity. It has been patented by Mr. Frank E. Osterhout, Oneida Castle, N. Y. It consists of a tube or sleeve with longitudinal side slits at one end to permit the convenient insertion of the finger, while from the other end extends a rod on which a weight is adjustably held at the desired distance by means of a set screw. The sleeve at its split end is fastened on the finger by a clamp consisting of an elongated slotted ring passing around the sleeve, and a clamping plate slidable vertically in the ring, and engaged by a set screw at the top. The exercise is made more or less severe, not only by moving the weight out or in on the rod, but weights of different sizes are employed, as may be deemed most advantageous.

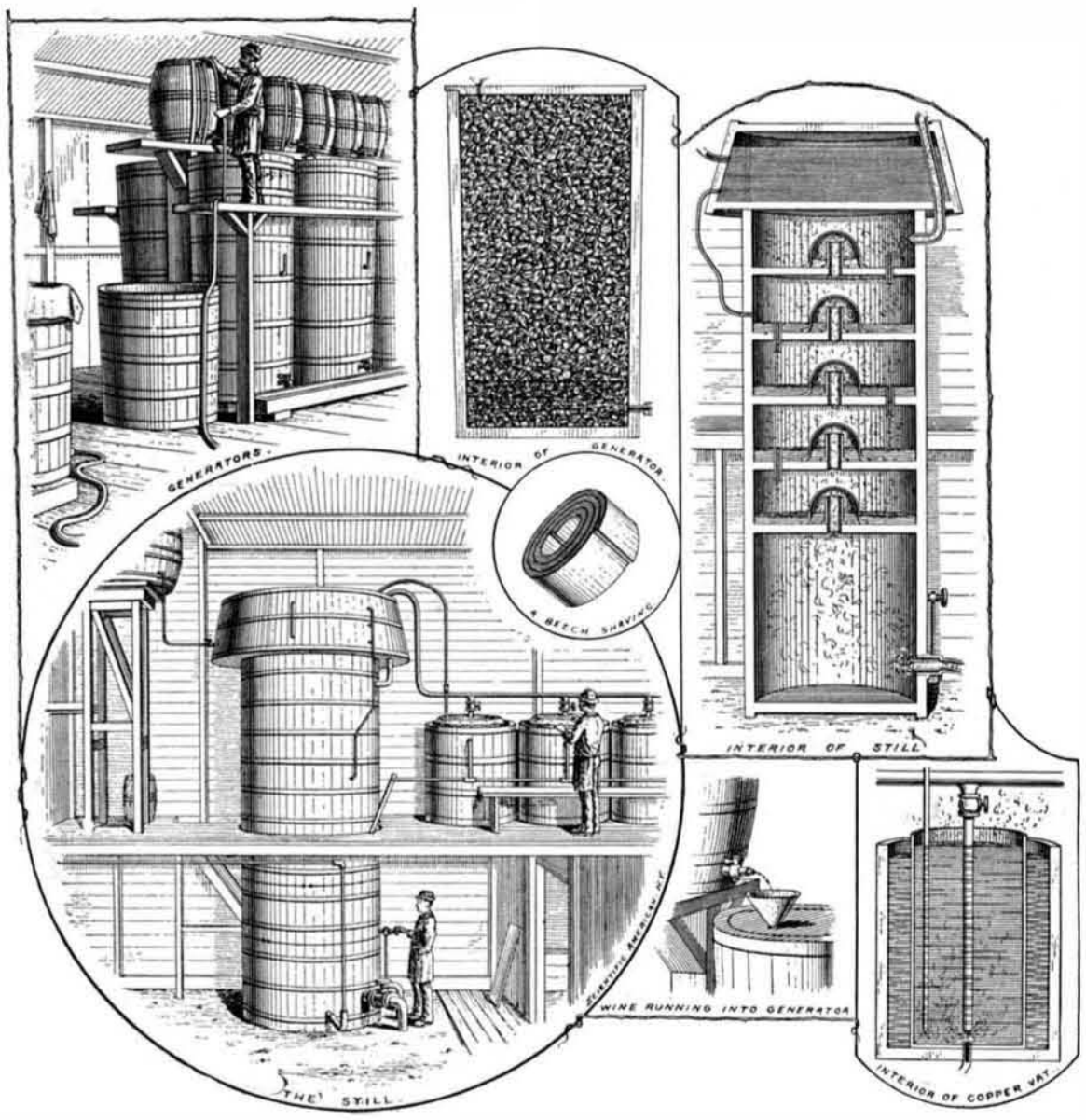


OSTERHOUT'S FINGER EXERCISING DEVICE.

MANUFACTURE OF WHITE VINEGAR.

White vinegar can be manufactured from molasses, corn, etc., or from almost any substance that will ferment. The material is first passed through a fermenting and distilling process which turns the liquid into what is called a low wine. This wine is then allowed to trickle slowly into generators filled with beechwood shavings, where it works and becomes sour. The material used principally by the manufacturers is molasses. The casks or hogsheads of molasses are first emptied into an underground reservoir and thinned down with water. It is then pumped up through a rubber hose into a 1,000 gallon fermenting tank, where it is allowed to stand for about two days and ferment. After fermenting it is forced up into another reservoir, from which by means of pipes the liquid passes down into a wooden mash tub connected to the top of the still. This mash tub is about 3 feet in height and about 7 feet in diameter, and holds about 600 gallons. The still is circular in shape and is about 20 feet in height, about 6 feet in diameter and made of ash. The interior is divided off into five compartments. The partitions or headings are made of wood about 6 inches in thickness and about 2 feet apart. Running through the center of each heading is a copper pipe or tube about 14 inches in height and about 8 inches in diameter. Directly over the top of each pipe is a circular copper head 18 inches in height, the bottom of which connects to the flooring of the headings by means of a number of arms. Through each heading midway between the copper heads and sides of still is a 3 inch drop pipe which projects above and below the partition about 6 inches. Attached to the side of mash tub is a small 1¼ inch copper pipe which connects with the second compartment in the still. The liquid passes down this pipe on to the floor of this heading. As soon as it reaches to the depth of 6 inches it begins to run down the drop pipe to the next heading. When the liquid again reaches to the top of the pipe it drops down again in the same manner to the next heading below. The steam is turned on from the bottom of the still and passes up through the center and drop pipes and underneath the copper head of the first heading.

From the first heading it passes upward through the different compartments in the same manner, heating and steaming up the liquid, which passes off at the top of the still in the form of vapor through a 4 inch pipe to a number of copper vats below. The vats are about 5 feet in height and about 3½ feet in diameter. Running into each vat within 2 inches of the bottom is a pipe which connects with the still pipe. About 120 gallons of water is placed in each vat through which the vapor passes, mixing itself with the water. Each vat rests in a wood tub containing about 300 gallons of cold water. After about 120 gallons of the vapor has been thoroughly mixed with the 120 gallons of water, it is then allowed to cool. After cooling, which takes about 24 hours, the material is drawn off from the bottom and run into a receiving tank. From the receiving tank it is pumped into casks and left to stand for about 12 hours. To make the low wine work quickly in the generators, a quantity of strong vinegar is mixed with it, the proportions being about ½ gallon



MANUFACTURE OF WHITE VINEGAR.

of vinegar to 1 gallon of low wine. After mixing, the liquid is pumped into small 30 gallon casks, where it passes out through a small glass tube. The stream of wine, which is about the size of a thread, runs down through a funnel in the top of the generators.

The generators are made of ash and are about 8 feet in height and about 4 feet in diameter and filled with beechwood shavings, each generator holding about 25 bushels. These shavings are circular in shape and are about ⅛ of an inch in thickness, about 1 inch in width and about 2 inches in diameter. When stretched out they measure from 13 to 15 inches in length. They cost about from 25 to 30 cents per bushel and will last from 30 to 35 years. As the fine stream of low wine trickles down slowly through these shavings the air inside acts on the liquid, causing it to work and turn into vinegar. The thread-like stream runs continuously into the generators. Vinegar to the depth of a foot collects at the bottom of the generators, which are drawn off morning and evening. From the generators the vinegar passes into large tanks and then runs off into small casks holding from 10 to 50 gallons, for the market. The loss of low wine by evaporation amounts to about 1 gallon to the barrel. The molasses used costs about from 8 to 10 cents per gallon. The vinegar is sold by the cask from 8 to 10 cents per gallon. It is used principally by grocers pickle houses, etc.

The sketches were taken from the plant of Edward Reinecke's Sons, Hoboken, N. J., who turn out about 1,000 gallons per day.

Armored Trains for Coast Defense.

A few months ago an interesting test of an armored train took place at Newhaven, England. The idea of an armored train is not new, such trains having been used in our civil war, in the Franco-Prussian war and in the Egyptian campaign of 1882; but the arrangement of these trains was such that the guns could shoot only in the direction along the rails, unless the car were propped up to prevent it from being derailed by the recoil. The car was designed by Colonel Boxhall, of the First Regiment of Volunteer Artillery of Sussex, and was constructed at the shops of the South Coast Railway Company. The car is made of steel, with a vertical armored wall all around it to protect the artillerymen. Inside the car is a 40 pounder cannon mounted on a platform so that it can be turned in any direction. It is moved by geared wheels and cranks. Underneath the car are arranged extensible beams which may be pushed out on one or both sides of the car, and are arranged to abut against the ground by means of vertical screws at their extremities, so that in case of a fire at right angles to the track they transfer the shock of the recoil beyond the rails. Beneath the car are also clamps which grip the rails and prevent the car from being derailed. In the old style of armored train the guns could shoot only in the direction of the rails, unless the car were propped up as already stated. In the new style of train the cars can be anchored in a moment and can shoot in any direction.

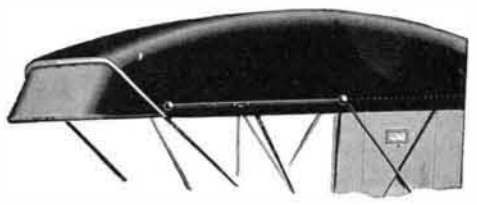
The trial of the armored train took place in the presence of a number of military men. Twelve shots with service charges were fired in a direction at right angles to the track at a target moored out at sea. Neither the car nor the rails showed any effects of the recoil, which was absorbed by the turning platform and the beams. Some shots were fired without clamping it to the rails. Of course the target offered to the enemy by the sides of the cars is of considerable size, and Lord Beresford thinks that the car should be concealed as much as possible and that thin iron plates would be a sufficient protection for the cannoneers from the light projectiles of the enemy. Lord Beresford considers it preferable to arm the car with a few small rapid-fire guns. The value of such trains for sea coast defense is very great.

Bicycles in State Militia Drill.

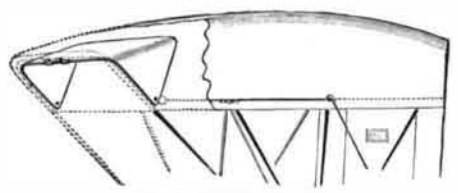
The New York Seventh Regiment has organized a bicycle corps, which had its first drill in the regimental armory March 13, superintended by a U. S. Army officer expert in the newly adopted bicycle tactics. The men were arranged in fours, six feet between wheels and eighteen feet between sets of four. Stress was laid on preserving the intervals between the bicycles and on the riders assuming a military position on their wheels. The commands, "Stand to cycle!" "Cycles front!" "Cycles rear!" Prepare to mount!" and "Mount!" were explained, and the men went through several infantry movements on foot, pushing their bicycles. Afterward they mounted and went through the evolutions on their bicycles. Around the armory the riders wheeled, fours right and fours left in column of fours, by twos, in company front, making wide turns and narrow ones, and going through all the movements as would a company of infantry, while the military spectators looked on approvingly. The members of the corps were in uniform and presented an attractive appearance as they wheeled around with soldierly precision.

AN ADJUSTABLE STORM AND SUN HOOD FOR CARRIAGES.

The illustration represents the application of a simple form of hood readily fitted to any vehicle top, and let down, as shown in one of the figures, as a protection during a rain storm or when driving in the face of the sun. When thrown back, as shown in the skeleton cut, it is completely out of the way and out of sight, or it may be without any trouble taken out entirely and left at home or placed under the seat. It is thrown into or out of position for use instantly with one hand. It is manufactured by the Wilbur H. Murray Mfg. Co., of Cincinnati, Ohio. The frame is made of spring steel and it is covered with greenback rubber drill, unlined. Parties ordering this hood for old vehicles should state distance between front bow sockets at bottom of quarters.



HOOD IN USE.



HOOD THROWN BACK.

MURRAY ADJUSTABLE STORM AND SUN HOOD.

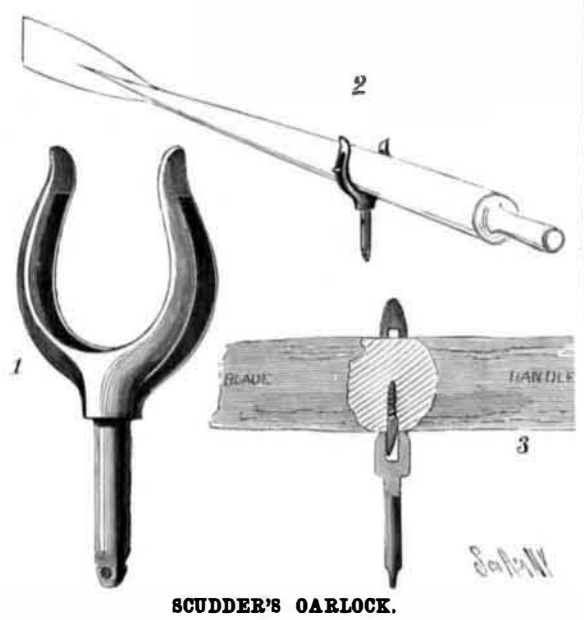
Reflection of Light.

The following table, showing the amount of light reflected from various substances as compared with that which falls upon their surfaces, is given by Dr. Sumpner, and will be found of interest:

White blotting paper	82 per cent.
White cartridge paper	80 "
White tracing cloth	35 "
White tracing paper	22 "
Ordinary foolscap	70 "
Newspapers	50 to 70 "
Yellow wall paper	40 "
Blue paper	25 "
Dark brown paper	13 "
Dark chocolate paper	4 "
Planed deal, clean	40 to 50 "
Planed deal, dirty	20 "
Yellow painted wall, dirty	20 "

AN IMPROVED OARLOCK.

The extremely simple device represented in the illustration is intended as an improvement on the swivel oarlocks of boats employed for fishing and hunting purposes on lakes and rivers, and is especially adapted for steering and sculling boats and for use in shells. It has been patented by Mr. L. K. Scudder, No. 181 Broadway, New York City. Fig. 1 represents the oar-holder, formed integral with the pintle, and with vertical slots extending through its opposite curved arms, there being also a channel of equal depth transversely through the shoulder at the top of the pintle. Fig. 2 shows the holder locked on an oar by means of a screw having one side of its shank beveled, as shown in Fig. 3, the beveled side being turned toward the inboard end of the oar. By this means the oar may be moved and turned freely as desired, and is yet securely locked in position. The feathering of the oar is in no way interfered with. The device is designed ordinarily to remain attached to the oar when the latter is removed from the boat, but may readily be detached therefrom by unscrewing the pin.



SCUDDER'S OARLOCK.

Correspondence.

The Mechanical Color Test.

To the Editor of the SCIENTIFIC AMERICAN:

I regret extremely that anything in my recent article under the above caption should have seemed to have done injustice to editor-in-chief of the Standard Dictionary. Certainly that was not my intention or desire. The statment, "Early in 1894, the question of the possibility of analyzing various colors and shades in terms of certain standards having been referred to the present writer," does not conflict with the statements of the Funk & Wagnalls Company. At the time mentioned, i. e., 1894, all previous attempts to obtain a satisfactory scheme having failed, the matter was referred to me, and the plan then developed by me and adopted was based on the very able and lucid exposition of the subject entitled "On a Color System," by Professor Ogden N. Rood, that was read before the National Academy of Sciences on November 12, 1891. That the ideas expressed in this paper in any way infringed on the original conception of the plan by Dr. Isaac K. Funk is news to me, and was certainly never expressed by him to me in the many conversations that we had on the subject. Moreover, the Milton Bradley Company, of Springfield, Mass., have had a similar plan in active operation for many years, ordering colored papers from their factory by methods similar to those described by me. A popular exposition of these ideas can in no sense violate the copyright of a dictionary, which from its very nature is a compilation of the ideas of others.

In conclusion, if I have written aught that deprives Dr. Funk of one iota of credit for the plan for a standard for colors conceived in 1891 by him, then it was done unwittingly. MARCUS BENJAMIN.

A New Armor Test.

Tests of armor plates now occur with great frequency, but the interest of the general public in these tests remains undiminished. The test of a nickel-steel Harveyized plate eighteen inches thick occurred at the Indian Head proving ground, near Washington, on March 11. This test was the first of a series which will take place between now and June, by which time nearly all the armor contracted for under the Whitney agreement, amounting in all to about $11,000,000, will have been manufactured and delivered to the government. This includes armor for ships now nearing completion and those on the ways. The success of the trial amply demonstrates the wisdom of the Russian government in having armor plates made in the United States. The ballistic trials of our government are very severe, as the gun is pointed at right angles to the plate, while in actual battle the elevation of the gun necessarily for accurate aim and allowance for "drop" of the projectile, taken with the angle of the ship's sides, especially when rolling, will prevent a normal impact, so that the government trials are unfair to the plate, as every advantage is given to gun and projectile.

The plate weighed thirty-eight tons and cost $20,000. It measured 17 by 7½ feet. A 12 inch rifle was used, which was placed 290 feet from the target.

The first shot fired was a Carpenter projectile, propelled by 295 pounds of powder. The shell entered about 4 inches, where the point was welded to the plate, so as to almost close the aperture. The body of the projectile was shattered, but an examination of the plate failed to show any radial fracture. In the second shot the charge was increased to 395 pounds, giving an initial velocity of 1,956 feet per second. The projectile penetrated 7 inches, and the top was welded as before, while the base of the projectile was completely shattered. A long vertical crack was produced; it extended from the top to the bottom, but there was no longitudinal crack. The crack was so narrow that it was difficult to see how far it extended. Capt. Sampson, head of the Ordnance Bureau, considered the test entirely successful.

The test showed that nothing short of a 13 inch rifle would pierce this armor at a fighting distance of 2,000 yards, which naval experts consider the probable range of the fleet action when in battle. In the battle of the Yalu River the distance between the opposing fleets was greater and the armor was thinner.

Orizaba in Eruption.

The peak of Orizaba is in a state of eruption. The signs of disturbance began to manifest themselves on the 10th inst., and have increased in force constantly since that time. It is vomiting poisonous gases and thick volumes of smoke are emitted from 100 apertures. The earth for 100 miles around is shaken periodically with subterranean vibrations.

The Governor of the State of Vera Cruz will shortly name a commission of scientific men to make an investigation into the eruption, and to make recommendations looking to the protection of the inhabitants of the neighboring villages. The present eruption is in the heart of the best improved coffee districts in Mexico, where many Americans live.