

**THE VOLCANO OF KLUCHI OR KLUCHEFSKAYA, KAMSCHATKA.**

Kojerevsky—a village of ten huts and sixty-three inhabitants—lies at the foot of Uskovska, a mountain of nearly 13,000 feet, whose summit from this aspect presents the appearance of a uniformly rounded dome of snow. It is in reality twenty-three miles off as the crow flies, but the giant scale on which nature works in these regions belittles space to an extent that is inconceivable until the hard facts of actual measurement are before one. A little farther to the south and east is Kluchi, whose sharp peak rises to a vertical height of 3½ miles above the river, guarded on the right by Kojerevskaya, which is inferior to it in altitude by 1,500 feet.

The sun was setting as we rounded a corner and came in sight of the village of Kluchi, its smoke hanging as a blue haze in the still evening air. To our left, the Harchinska Mountains, furrowed with deep gorges, looked almost black against the amber sky. The huge cone of Kluchi caught the last rays of the sun and flushed a pale pink, while at the lip of the crater a fleecy puff of smoke hovered for an instant as if in doubt, and then floated out a long thin streamer to the east. Around his shoulders hung a thick belt of cloud, gathering rapidly with the fast approaching night, and beneath, slope after slope rose steadily up to meet the pyramid above.

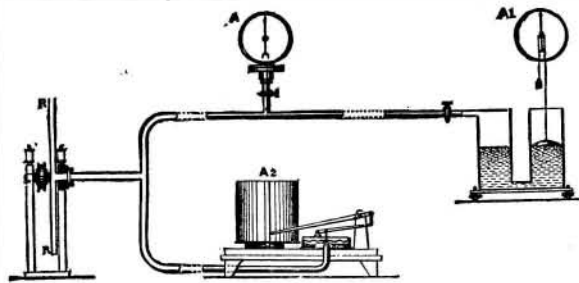
The morning of September 13 broke with hardly a cloud, and the view of the mountains, which now lay nearly due south of us, was magnificent. The even slopes of ruddy vegetation rise smoothly upward till, at the height of two or three thousand feet, the snow is reached. The outline of the mighty volcano was as perfect here as before, and its exquisitely graceful slope as unbroken. Near the summit, on the side immediately facing us, a deep furrow, as yet untouched by the rays of the morning sun, showed the remains of some past eruption—a huge scar which the snows of many winters had done their best to obliterate. From the crater light puffs of smoke drifted slowly away to the east, far whiter than the snow which lay below, for on all sides, and especially near the summit, a sprinkling of ashes had dulled its purity almost to a gray. The rounded half dome of Uskovska to the west showed a vast field of unbroken snow, and on the side toward Kluchefskaya appeared to have been completely blown away by some great eruption in past years, leaving a huge open crater, the western walls of which alone were standing. The upper part of these, which was all that we were able to see, seemed to be almost vertical upon the inner face. Between the two mountains was a lesser cone, which, like Uskovska, appeared extinct.

We had an excellent opportunity for taking observations on the heights, the river forming a good base. We accordingly took advantage of it, and from the results of this and other work the following may be given as fairly accurate altitudes for the four chief volcanoes lying to the south of the lower part of the Kamschatka River: Kluchi or Kluchefskaya, 16,988 feet; Uskovska, 12,508 feet; Kojerevskaya, 15,400 feet; Tolbatchinska, 11,700 feet.

We were informed that an eruption of Kluchi had occurred in 1879. The mountain is always more or less in a state of activity, but on the morning of August 14 dense clouds of smoke appeared above the crater, and at midday the sky was as dark as night. Before long ashes began falling, and in a few hours the ground was covered with them to the depth of three inches. There was no earthquake, but on the following morning a small stream of lava poured from the lip of the crater on the north side. It descended but a short distance, however, and, shortly after, the mountain returned to its usual state of threatening quiescence. With this exception there have been no eruptions within the memory of man, or at least none of any magnitude. A few ashes often fall, and had done so not long before our visit, but the recent falls of snow had done much to hide them.

Kluchi appears to have been still more active in the middle of the last century. Krasheninikov says that "it throws out ashes twice or thrice yearly, and sometimes in such quantities that for 300 versts around the earth is covered with them to the depth of a vershoke (nearly two inches). From the year 1727 to 1731 the inhabitants observed that it burnt almost without interruption, but they were not under such apprehensions as in

the last conflagration in the year 1737. This terrible conflagration began the 25th of September, and lasted one week, with such violence that to the people who were fishing at sea near the mountain it appeared one red hot rock, and the flames which burst through several openings sometimes showed like rivers of fire, with a shocking noise."



RUNG'S PNEUMATIC SPEED INDICATOR.

On the 6th of October there was an earthquake of tremendous violence in the Avatcha district and the southern point of Kamschatka, regions which, it should be observed, lie in a direct line between Kluchi and the volcanic chain of the Kuril Islands. An enormous tidal wave occurred, "overflowing the shore 200 feet high," and killing many of the inhabitants; but the country in the immediate neighborhood of the volcano did not appear to suffer much, although a violent earthquake was experienced at Nischni Kamschatka on the 23d of the same month.

In 1762 and 1767 outbursts again occurred, though of very much less severity, but subsequent to that time no accounts of other eruptions have, as far as I am aware, been published, with the exception of that of Professor Adolph Erman, who, in 1829, found the peak "in picturesque and sublime activity, and approached the burning lava, which poured forth a continuous stream," till he reached the height of 8,000 feet above the sea.—*Dr. F. H. Guillemand, Cruise of the Marchesa.*

MRS. HARDWICKE, widow of the founder of "Science

**PNEUMATIC SPEED INDICATOR.**

This indicator is the invention of Captain G. Rung, of the Danish artillery, and has already been in use for about a year and a half in the Danish navy, where it seems to have given great satisfaction. The principal merit of this invention lies in its extreme simplicity and consequent cheapness and non-liability to get out of order. The apparatus consists, first, of a rotating tube acting as a centrifugal exhauster. This is connected with a pipe leading to an indicator, by which the air pressure within the pipe is made to exhibit the number of revolutions per minute of the exhauster. Several different forms of indicator are made, and in the adjoining illustration three independent methods are shown. In this figure, R R is the rotary tube, which is driven from the shaft of the dynamo or other machine. A is an indicator, constructed precisely on the principle of the aneroid barometer, and of which, therefore, no further description is necessary. The scale is calibrated, so as to be read directly in revolutions per minute. Another form is indicated at A<sub>1</sub>, in which a U tube containing water is employed, one branch being connected with the rotating exhauster and the other remaining open to the atmosphere. The difference of pressure in the two limbs, which is proportional to the speed, is indicated, as in the ordinary mercurial barometer, by means of a float attached to a cord passing over a pulley carrying an index hand, and which is counterbalanced by a weight. This is a very sensitive and also a very accurate arrangement. Evaporation is compensated for by means of a small plunger, not shown in the figure, by adjusting the position of which the needle may be set to zero at any time. A<sub>2</sub> represents a recording arrangement, in which the point of a bent lever traces a line upon a sheet of paper wrapped on a cylinder, which is rotated by clockwork. The position of the lever is determined by the degree of exhaustion in an aneroid chamber.

In addition to the advantages already named, there are two important features which may be said to be almost peculiar to this system. It permits of an accurate indication of the speed of any class of machinery at any distance from the machine itself. And a single indicator may be applied successively to any number of rotators. It is usually sufficient to have only one indicator connected with a common reservoir, to which the pipes from the rotators can enter through stop cocks. The latter feature is of course an admirable one from the economical standpoint.—*The Electrician (London).*

**Electrolytic Inlaid Work.**

This class of work in metal decoration can be executed by aid of the electric current in the following way: The plate of copper which is to receive the inlaid design is dipped into melted wax, so as to receive a thin coat of it, and the design is drawn through the wax, so as to leave the copper perfectly exposed in the lines. The plate is now connected with the positive pole of a battery, and a second copper plate is connected with the negative pole, and both plates are suspended in a solution of sulphate of copper. Under the action of the current, the copper of the first plate is attacked and dissolved where the lines were drawn through the wax, so as to produce an etching of the design on the surface, while an equivalent of the copper is deposited upon the other plate. When the design has been etched about 1 mm. (one twenty-fifth inch) in depth, the plates are removed from the bath, by a few drops of hydrochloric acid the sulphate of copper solution adhering to the lines is removed, and the plate is washed in pure water. Next, the same plate is connected to the negative pole of the battery, to whose positive pole a plate of platinum is connected, and the plates are suspended in close proximity to each other in a nickel or silver bath. The reverse process now takes place. According to the solution employed, metallic silver or nickel is deposited in the lines etched in the copper following the design inscribed in the wax, and this operation is prolonged until the lines are perfectly



KLUCHI OR KLUCHEFSKAYA, VOLCANO, 16,988 FT., KAMSCHATKA.

Gossip," preserves eggs by carefully oiling them with a soft brush all over and packing them in jars with plenty of bran between each layer. A thick brown paper should be tied over the mouth of the jar when it is full. "When eaten at three months old," she says, "you could not tell them from fresh eggs."

filled up. The wax coating is readily removed by a wooden scraper and by washing with alcohol. This gives upon the copper surface a design in inlaid metal, either silver or nickel, which in beauty and durability surpasses any produced in other ways.—*Centralblatt fur Opt. und Mech.*