

The great crater of Vesuvius, which Prof. Malladra and a companion descended for the purpose of making a scientific exploration of its bottom.

Prof. Malladra's Descent Into the Crater of Vesuvius

Exploring the Interior of a Volcano Amid Choking Sulphur Fumes

Illustrated With Photographs by Prof. Alessandro Malladra

By Maurice Magnus

IMMEDIATELY after American newspapers had published brief statements to the effect that Prof. Malladra had actually descended the crater of Vesuvius and explored the bottom, the Editor cabled to his Italian representative and asked him to obtain a personal interview with the man who had performed an heroic task in the interest of science. It is much too early to publish a strictly scientific account of the results of the Professor's daring explorations. That must come later. In the meantime, we publish the following account by our Italian representative in which the difficulties of the descent are set forth.—EDITOR.]

Prof. Alessandro Malladra, of the Royal Observatory of Vesuvius, succeeded on May 14th in descending into the crater of Vesuvius after many attempts. Prof. Malladra was accompanied by an old servant of the Observatory, Andrea Varvazzo. Starting from the brink facing Pompeii, and with their first rope of 450 feet length, they mastered walls formed like gigantic precipitous terraces alternating with steep inclines. A wide, sloping ledge of lava was reached, that plunged precipitously to a depth of more than 350 feet. The explorers turned on this ledge toward the south until they came to an incline with a 90 per cent downward gradient. With the aid of a 350-foot rope they slid down the incline and reached a huge mass that had tumbled down as the result of the upheaval of March 12th, 1911.

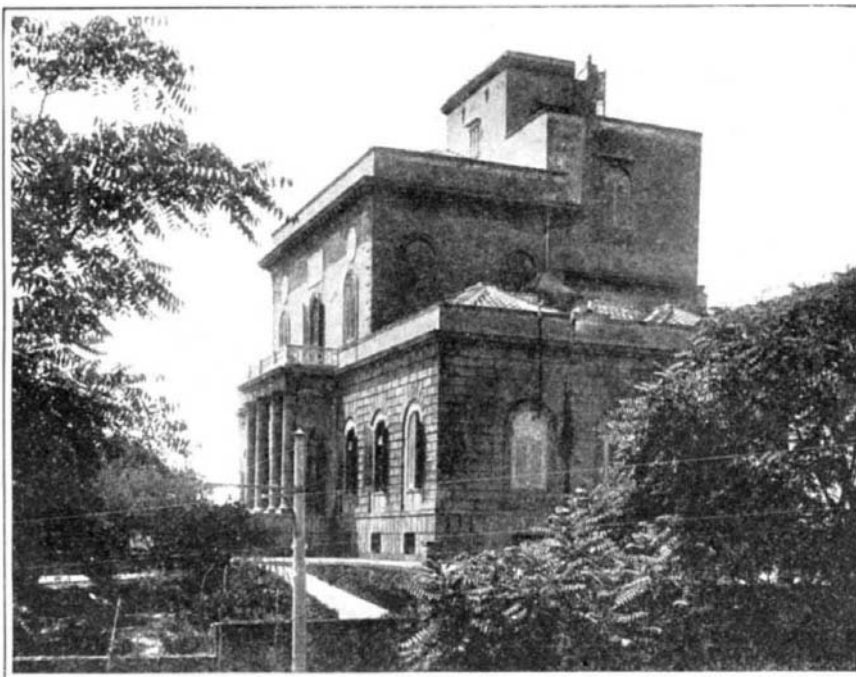
Prof. Malladra remained on the bottom for about two hours, studying every square foot almost and taking constant instrumental readings. Everywhere the thermometer registered the incredible temperature of 187 to 200 degrees. The depth of the crater is about 300 meters (984 feet).

From the south of the crater a small dark moving rectangle can be seen. There is an unbearable smell of sulphur. The fumaroles are numerous, some very close together, proof that smothered fire is present. At the bottom of the crater Prof. Malladra fixed a flag in the rocks.

The bottom of the crater is flat or at the most a little inclined, very irregular



The Batteria Mercalli—a large group of fumaroles at the bottom of the crater. A thermometer dropped within any of them registers about 500 deg. Fahrenheit.

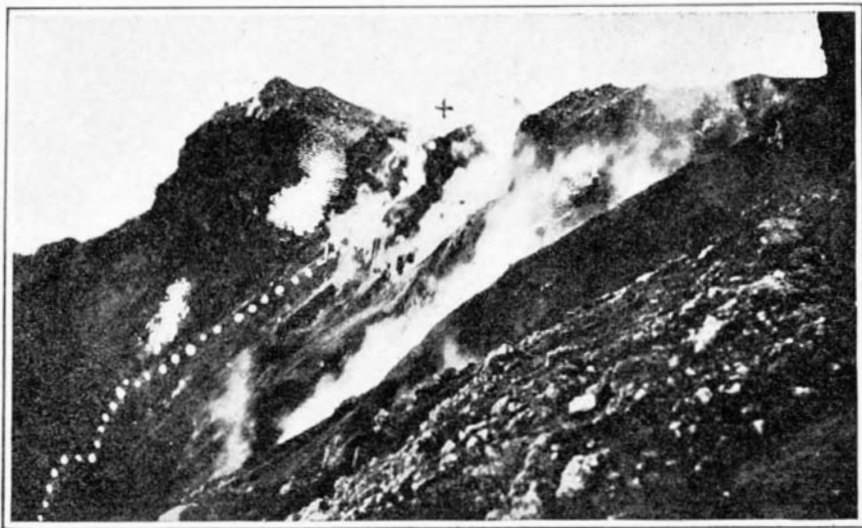


The Royal Observatory of Vesuvius where seismological and volcanic studies are made, year in and year out.

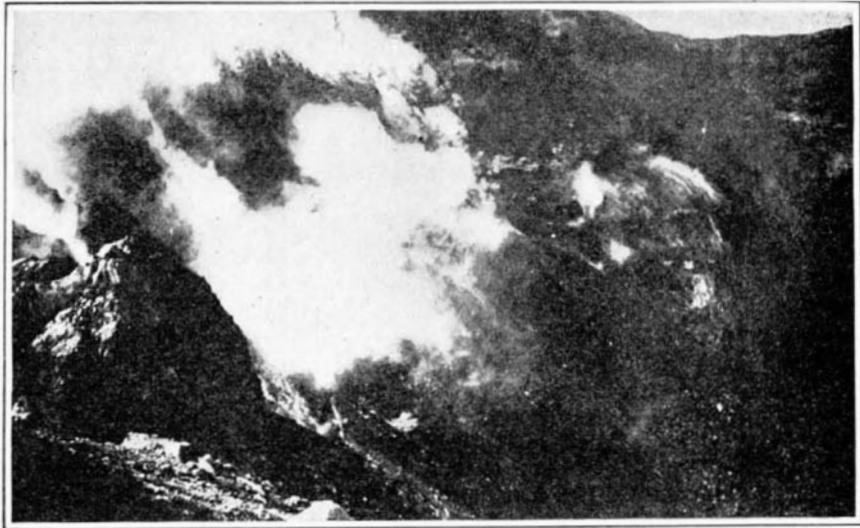
and filled with fallen masses. Prof. Malladra's descent to the bottom of the crater is not the first, for last September Dr. Corrado Cappello, with the help of the same guide, Varvazzo, succeeded in reaching the bottom. On October 16th Prof. Malladra was called from the Observatory of Domodossola by Prof. Marcalli to become a member of the staff of the Observatory of Vesuvius.

It was impossible to follow the path taken by Dr. Cappello, for on the 21st of January last a wall of the funnel-like crater tumbled in, leaving a huge cavity behind. It was necessary, therefore, for Prof. Malladra to find another path. He was bound to accomplish the descent so as to furnish the Observatory and the scientific world with more recent information than was available. Prof. Malladra also wanted to make this descent to study the entire eruptive period from the beginning to the last phase. Prof. Malladra and Varvazzo attempted their first descent about a month ago. They lowered themselves at the northwest side and descended for about 200 feet when, meeting a perpendicular wall of 120 feet, they were prevented from continuing. They tried again after five days, following the way taken by Prof. Corrado Cappello, but after having uncoiled a 150-foot rope they saw that owing to the crumbling which took place on the 21st of January, this path was also impossible. These two vain attempts did not discourage Prof. Malladra. Every day he went to the crater, studying its mouth and its walls, until he found a way which seemed practicable.

Finally he communicated to Varvazzo his intention of attempting a descent. After having gone about 150 feet they were obliged to return. The point chosen in this case at the south southeast side was also unfortunate. Prof. Malladra then tried another road more toward the east. This was on the same day. The two descended for about 200 feet. To their great delight they found that this was a good road. But it was already 3 o'clock in the afternoon—too late to continue the descent. They were obliged to



A cluster of fumaroles near the arch of the crater toward the south. The cross marks the spot where Prof. Malladra began his descent. The course which he took for the first 350 feet is indicated by white dots.



A battery of fumaroles toward the southwest. The picture was taken about 320 feet within the crater on the south wall. To the right appears the "devil who laughs"—a large face that appears in the rock amid fumes.

come up again, leaving their ropes in the crater, held by three wooden posts, so that they could continue the next morning.

That night Prof. Malladra told me he was so excited that he could not sleep. He had found a way to descend to the very bottom of the crater. He was so nervous that he could not calm himself.

The next morning the professor and the servant started with food to be consumed 950 feet beneath the mouth of the crater, 70 pounds of Manila and flax rope (950 feet in length), a barometer, a thermometer, and a camera. Prof. Malladra had also brought along several fusible wires of different metals to measure temperatures higher than those that could be recorded a temperature higher than that for which the thermometers were graduated. They were also provided with a magnetic needle (compass), a hatchet, a stick and plummets.

The first big wall was descended—a wall formed by the remains of the different eruptions—and this was followed by a descent over red lava from which several fumaroles opened. The temperature of these fumaroles registered 187 deg. Fahr. At this point a side wall descended for about 160 feet and presented the first obstacle. Wherever the two courageous men placed their feet, new fumaroles opened, from which sulphur vapors poured. When the descent of this wall was accomplished there was a second gigantic perpendicular one of lava followed by a *talos*, or cone covered by a bank of lava. There was a continual breaking and crumbling of ground difficult to escape from. Isolated masses fell with tremendous noise, bounding to the bottom, filling the air with dust and fine ashes. Prof. Malladra's hands were frequently cut. A big stone fell on the brim of his hat. Varvazzo was struck on the head but was so slightly injured that he could continue the descent. After a while the two explorers discovered another perfectly perpendicular wall completely bare, with no projections or crevices of any kind. After some moments of uncertainty Prof. Malladra was able to find a passage between two ridges of lava. At this moment he became aware that he had no more rope. One hundred and fifty feet had been left at the top, for he had not thought that it would be needed. Besides, he was left with more freedom of action.

There was still another 350-foot wall to be overcome, absolutely bare of any projection. No rope could be of assistance. The explorers, notwithstanding the stones, pebbles and land-slides, abandoned themselves to the slope, clinging to the smallest projections, till they reached the bottom of the crater, bruised and exhausted. Prof. Malladra and Varvazzo were nearly suffocated by the exhalations of sulphur. The two men crawled over the bottom of the crater, which measures in diameter 1,500 feet, bravely took photographs, made observations, collected salts and minerals, heroically bearing a frightful temperature.

At the bottom of the crater there are

little hills and valleys, all irregular and not discernible from the top.

At about 2 P. M. Prof. Malladra and Varvazzo commenced the ascent, struggling with all their might. At 4 o'clock they reached the mouth of the crater.

Fish Culture in Germany

THE industry of raising fish for the market is rapidly growing to large proportions, especially in Germany. There the tanks and ponds used for this culture number some fifty thousand, and cover

an area of about 247,000 acres. The fish chiefly cultivated is the carp.

Tanks and ponds of different sizes are used, according to the age of the fish. The fresh spawn is placed in shallow basins, about twelve inches deep. The ponds and tanks are frequently emptied and cleaned, to remove animal parasites which might injure or kill the fish. After the fifth day, the young fry is placed in larger tanks for growing. The loss at this stage amounts to as much as from thirty to fifty per cent.

At the end of the first summer the small fish weigh from two-thirds of an ounce to two ounces. The fish are now placed in small ponds for the winter, and are again transferred in the spring to growing ponds for the second year. At this stage they are placed in the water at the rate of about 200 to the acre, and are kept here until they attain a weight of about one pound each. During the third year they are fattened up to three pounds on a special food prepared chiefly from the seed of the yellow lupine and corn, and they are thinned out to about sixty to the acre. The yield for the market varies from about twenty-five to one hundred and fifty pounds to the acre. The haul is made by means of nets, and by the draining of the ponds each winter.

Clay soils are found to be the most suitable as sites for the fish ponds. This agrees with the experience in other countries. When the ponds are made in sandy or granitic soil, the fish reproduce abundantly, but do not fatten up satisfactorily. When the ponds are emptied, advantage is taken of the exposure of the bottom to add lime and other fertilizers. The wintering tanks are emptied in the summer.

The carp and the tench, like most other fresh-water fish, become passive when the temperature goes below about 37 deg. Fahr. The loss sustained by the fish cultivators on account of the wintering is from one to ten per cent.

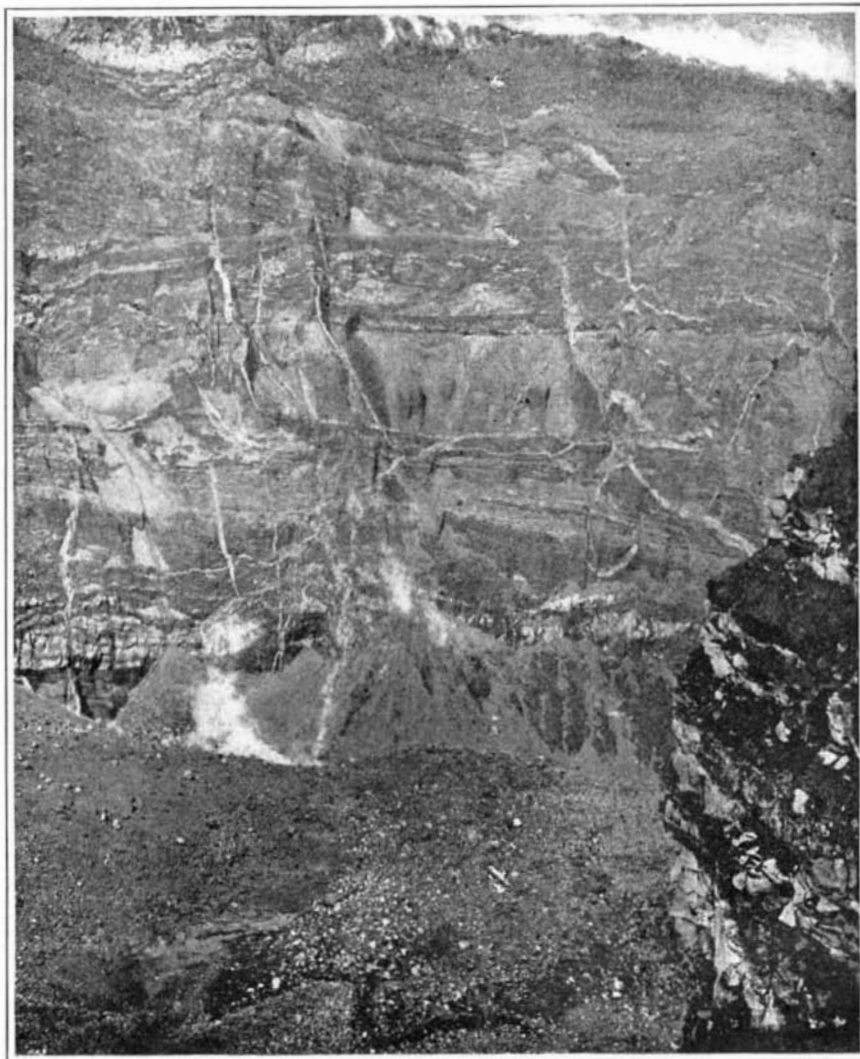
At three years of age the German carp weigh about three times as much as the French. The fish raised under artificial conditions present a nearly uniform size; this is an important factor in determining their market value.

The History of Lead-burning

IT is not generally known that the operation of soldering lead pipes with lead (the "lead-burning" of to-day) was known and practised in the middle ages. Reference to this matter is made in one of the books of Vincent de Beauvais (a reader of the court of Louis IX of France) who died in 1264. Following is the passage in question, taken from an essay on tin (vol. viii, part i): "If tin is exposed to a moist atmosphere, it will corrode; but human ingenuity has of late invented useful improvements by which it is possible to unite leaden subterranean water pipes with the aid of molten lead instead of soldering with tin. Pipes soldered with the latter metal never lasted long, but if lead is used it will last for all time."



A great slide on the west-southwest side which occurred on March 12th, 1911. To the right appears a group of fumaroles, emitting strong sulphurous vapors.



The famous "yellow" fumarole, so called on account of its strong yellow color. The fumarole is the cone in the center of the picture.