

The Observatory

Di Tom Gidwitz

By the time Perret arrived in 1904, Cook had built a new railway which could whisk 1,800 passengers a day to the funicular in less than an hour. And, if they wished, a lucky few could stay overnight at the Eremo Hotel, Cook's new twenty-five room guest house.



Perret stayed there frequently as the volcano grew more fretful, a steady figure in the visiting stream, staring, watching, thinking, transfixed. He devised an ingenious pocket-sized diagram that allowed him -- in a matter of seconds -- to make a detailed record of the volcano's symptoms in a form that could be interpreted at a glance. He called it the Perret System, and described each card as "a symposium of volcanic phenomena." As the eruption gained strength he could flip through the cards and watch the lines he traced stretch outward like a starburst, then blossom like a flower.

His own body stood in for the scientific instruments he was too poor to buy. He sniffed for sulfur's tang and detected carbon dioxide by the torpor it induced in his brain. He measured the power and direction of

earthquakes by how they rumbled through his body. Nowadays, when volcanologists analyze volcanoes, they call on satellites, laboratories, oceans of data and teams of collaborators. Perret was a one man band.

Perret saw that the volcano worked in a regular pattern. Intense bursts preceded days of calm that were interrupted by yet more powerful blasts. He realized Vesuvius was a container for a column of intensely hot, molten rock, thousands of feet tall, pushing up from deep within the earth. As the magma accumulated inside the volcano, the column grew heavier and heavier, weighing down more liquid rock struggling to rise. Pressure would build until this liquid load was somehow lightened - until the cone cracked and some lava drained out or an earthquake jiggled the heavy, stagnant column. Then suddenly its pent up gases would boil out of solution, the water trapped in the red hot rock would flash to steam, and this deadly froth would burst out of the crater like a jet of champagne from a bottle. A calm would follow each "paroxysmal gaseous outburst," as Perret called them, until more magma rose and the cycle repeated.



Perret's eye was exceptionally acute, and he brought a new instrument to the field - the mass market folding Kodak 3A camera. Small enough to fit in his pocket, loaded with film readily available in Naples where he now lived, he carried it with him constantly and began the world's first long term, consistent photographic record of a volcano. The pictures -

processed in his apartment with homemade developer, stored in his files or sold to tourists, magazines, and scientific journals to pay his bills - not only form a superb pictorial diary of the angry mountain, but are infused with an unfailing sense of design. For one sequence he returned for months to the same spot on Monte Somma, capturing Vesuvius's progression from a peaceful cone to a battered hulk, framing the view not only to take in the mountain, but

also, in the foreground, an old rough wall of weathered lava and a single stone sentinel that lends the pictures balance, scale, and grace.

Inevitably, Perret was drawn to the Vesuvius Observatory, two thousand feet up the volcano's western side. The Observatory was the inspiration of Ferdinand II (1810-1859), Bourbon King of the Two Sicilies, who was intent on turning Naples, his kingdom's capital, into a center of science and technology that would benefit all mankind. He lavished money on museums, an astronomical observatory, and the city university.

In 1841 the king created an observatory to study Vesuvius's influence on the earth's magnetic field and weather.



Three-quarters up the cone, on a crest that split the intermittent lava flows like a rock in a river, was the Colle del Salvatore (Savior's Hill), a holy spot long the site of a hermitage and church. There, a mere mile and a half from the crater, King Ferdinand built a scientific citadel strong enough to withstand Vesuvian bombardments. Its stately front steps and doric columns leant it pomp; Palladian windows and an observation tower gave it unmatched views of the peak, and its brick walls, hewn from the Neapolitan yellow tuff, were thick enough to withstand showers of Vesuvian boulders. Observatory construction was complete in 1848, but the observatory's research immediately ran into trouble: Ferdinand himself.

Considered magnanimous when he assumed the throne in 1830, by 1848 Ferdinand was battling to preserve his power. He fought to evict Austrian troops from the Piedmont, quashed a rebellion that swept across Sicily, reneged on the liberal constitution he had granted his subjects, and smashed a rebellion in Naples. By the end of the summer Ferdinand was triumphant. Now dubbed



"King Bomb" after the way his troops flattened Sicilian cities, Ferdinand sacked the Observatory's first director, Macedonio Melloni, for his antimonarchical views.

The Observatory lay dormant until 1852 when physicist Luigi Palmieri was appointed chief. His specialty was atmospheric energy - infrared radiation, lightning, the earth's magnetic field. At Vesuvius he noticed that small earthquakes almost always preceded eruptions, and he redirected the Observatory's priorities to the study of Vesuvius itself. By 1856 he had invented and installed the world's first seismograph. It was an ingenious and intricate four-foot tall mechanism that used mercury - set dancing by the trembling earth - to engage electronic switches to measure the up, down, and sideways motions of quakes. It also jiggled a weight that bounced a spring that stopped a clock and pushed a pencil against an unrolling paper spool. The length of the resulting line measured the shakings' duration; the stopped clock recorded its time.

Palmieri manned the observatory during eruptions in 1858, 1861, and 1868. In 1872, during an eruption in which an explosive lava flow killed two dozen tourists, Vesuvius isolated Palmieri on the slopes, broke all the



building's windows, and repeatedly set it on fire. When the mountain calmed, Palmieri installed a telegraph line to communicate with the city authorities below.

In 1904, at Perret's first visit, the director was geologist Raffaele Vittorio Matteucci, a burly, affable man with a ruddy face, a bristling silver gray moustache, and an operatic passion for Vesuvius.

He had taken office in 1898 as the Observatory's fourth chief. "I love my mountain," he told *Cosmopolitan Magazine* in 1905. "I could not leave her. She and I dwell together in a solitude mysterious and terrible. The luster of her awful brow lights up the night far out at sea; her moods are many and various - a mistress most imperious whose wrath is more terrible than an army with banners."

Matteucci was fearless. In 1902 he camped on the crater's edge for three days as lava boiled 260 feet below and enormous blocks of stone and ash clouds lofted into the air. At one point, when a huge, hot boulder shot high and landed yards away,



Matteucci did not run. Instead he had calmly taken out his stopwatch and counted its 17 seconds of flight. Afterwards, weighing the stone and deducing its speed at 300 feet per second, he calculated his beloved had launched the stone with a 608,000 horsepower cough - nearly three times the power of a Boeing 747.

"I could not leave her. I am wedded to her forever; my few friends say that her breath will scorch and wither my poor life one of these days; that she will bury my house in streams of liquid metal or raze it to its very foundations. Already she has hurt me, has injured me sorely, yet I forgive her, I wait upon her, I am hers always."

In 1900 Matteucci was watching the action from the crater's edge when a premonition sent him running. As he tried to dash away, he



became bogged down in deep ash and had gone no more than 60 feet when scalding stones began showering down. As he shielded himself, a rock smashed his camera; bending to pick up the shattered lens he slipped into the scalding ash. In agony, he gathered up the camera "for it contained so many very valuable films" and crawled down the mountainside. Only later did he realize he had been beaten, bruised, and burned. He recuperated for months in bed.

Matteucci lived a hermitic life at the observatory, rising at dawn to breakfast on a crust of bread and cheese. "How can I, when my beloved volcano is in eruption, and I should be counting the number of explosions per minute, occupy my mind with thoughts of mere food?"

For Perret, such a life was heaven. And the Observatory itself seemed to dwell amongst both the mystical and the mechanical at once. On the ceiling were paintings of Minerva crowning Prometheus, Aeolus commanding the winds, Vulcan inspecting armor from the forge, a volcanic plume, a waterspout, and telescopes, lenses, and chemical flasks borne aloft by cherubs. In the octagonal library, beneath its three-story dome, hallowed names of Italian science - Galileo, Volta, Dell Porta, Galvani - joined Archimedes on the walls. Paces away was the Colle del Salvatore ancient chapel. Two hunks of glassy lava flanked its door, molded when molten to record the ascent of Saint Pius X in December, 1899, and memorial plaques for Vesuvius's victims.

The observatory had collections of countless vials of volcanic ash and shelves of contorted volcanic rocks, and carefully crafted, polished brass instruments that could measure the earth's movements and the mountain's changing shape, track magnetism and aerial electricity. But Perret was surprised to learn from Matteucci that the Italian government gave the observatory a pittance in support. When Perret worked at Edison's laboratory, money was unlimited, and here, in the volcano's shadow, the stakes of ignorance were far, far, higher.

Perret had much to learn from the professor, and they watched together as the explosions that thundered across the Bay of Naples changed the two-chambered crater that he had seen the year before into a wide open round funnel, thirty stories deep. At the bottom a vent assiduously coughed out lava and ash, building a conelet on the crater floor. Sometimes it would produce what volcanologists call strombolian explosions (named for the common activity at the Italian volcanic island Stromboli) - brightly luminous clots or jets of lava and salmon-colored steam. At other times it would yield vulcanian blasts (named for the Vulcano, the volcanic island that the Roman's thought was home to the god Vulcan) - dark ash-filled clouds, formed when portions of the cone would collapse into the vent to be expelled in blasts that showered powder over Naples.

Slowly the conelet grew, climbing in height, widening, filling the crater funnel. It puffed giant whirling smoke rings, and in the pall of summit snowstorms glowed red and crackled with blue-white lightning. In mid-April the cone's tip poked above the crater's lip for the first time, and by May had almost completely filled the crater and sat atop the volcano like a great restrictive nozzle that nearly pinched the crater shut.



The cone's tip was now 4,380 feet high, and it allowed the column of magma within Vesuvius to build to an unprecedented size, a gigantic slug of melted rock weighing down the increasing load of gas and vapors building up from below. "With such conditions as these," Perret wrote later, "in a volcano of this type, a great eruption surely impended."



For the next six months the lava column rose and fell within Vesuvius like a blood pressure cuff's bobbing mercury. It would spill from the summit or burst from vents lower down the mountain, leaving a filigree of orange lace over the cone at night, or steaming white vapors

rising from the fresh black rock during the day. This lava was in a state he had never seen before: superheated, charged with gas, spattering and flowing swiftly, hissing with acidic sulfur dioxide gas. And after each pressure release, the mountain would fill up again with lava hot enough to melt the mountain itself. In early June, 1905, Perret was standing with a group of students on the crater rim when the rock beneath them began to burn their feet. No sooner had they scampered away when the six-foot patch of ground where they had stood glowed bright, bulged, then liquefied into a small stream of lava that flowed down slope.

Perret's dedication, intuition, and inventiveness impressed Matteucci, and at the end of 1905 he offered Perret the unpaid position of "Honorary Assistant to the Royal Observatory."

"Realizing that important events were impending," Perret recalled later, he eagerly accepted.

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