

Exploring the Well of Sklives and the Discovery of the Abandoned Engine

by Erikos Kranidiotis



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Mine divers Erikos Kranidiotis (L) and Stelios Stamatakis (R) preparing to dive, January 17, 2021

HISTORICAL BACKGROUND

In Greece, hundreds of ore-mining wells, most of which remained active through the first post-war decades,¹ form an extensive network that spreads throughout the Lavreotiki mining area, from Cape Sounio to Keratea. Most of the wells, which were used to produce lead, date back to antiquity, and many of them were

widened, deepened, and modernized with new ore drilling techniques and transportation by miners in the 19th and 20th centuries.²

¹ Marmarini, M. 2016. "Exploitation of old mining sites in the Lavreotiki area," (Ph.D. thesis), National Technical University of Athens School of Mining and Metallurgical Engineering, Athens, p. 420.

² Polyzos, G. 1994-1997. "Recording and Evaluation of the Mining Wells of Lavreotiki." TPPL Studies and Projects, p. 138.





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Stelios Stamatakis at the sump, handing the stage tanks to Erikos Kranidiotis, January 17, 2021

Mining wells can be categorized by their purpose: ventilation to ensure the safety of miners, exploration and research, and the extraction of ore. The latter were, of course, also used for ventilation. In ancient Lavrio, the first wells were made to ventilate the galleries, or the underground passages. A well served several galleries, and the entire mining area in some cases. For this reason, the galleries were joined by branches of arcades originally constructed by the ancient Greeks.³

In all eras of Lavrio's mining activities, deep wells were drilled to facilitate ore exploration. A. Kordellas states that he found many ventilation wells 80–110 m (262–361 ft) deep, which he discovered after observing there were no ore estuaries near the entrance to these wells. He discovered that only rocks from the drilling were used to construct the well.⁴

Ancient wells have a rectangular or square cross section. Although the average cross section is approximately 2 m² (21.5 ft²), some reached 4 m² (43 ft²), and A. Kordellas mentions a cross section of 3.4 m² (36.6 ft²). The depths of the wells vary greatly, depending on the location of the deposits in the contacts, or the point at which two different types of rocks meet. In the area of Kamariza, in the third deepest contact, the depths of the wells reach 110 m (361 ft). To the east, near the Aegean Sea, the wells have a shallow depth of about 30 m (100 ft).⁵

³ Konofagos, K. 1980. "Ancient Lavrio and the Greek technique of silver production." Athens. [This explains to a large extent the labyrinth of galleries in the ancient underground works.]

⁴ Kordellas, A. 1993. "Le Laurium." Marseille, 1869. Translated by Kanatouris, A. Library of the Lavreotiki Research Company (EMEL), no. 6. Lavrio.

⁵ Konofagos, K. 1980. "Ancient Lavrio and the Greek technique of silver production." Athens.

In Lavrio, wells known as twins were situated close to each other, separated by only a few meters. Usually, one of the two had a smaller cross section. It is believed that the second (twin) well was constructed to ventilate the first well during the excavation process.

In ore-extraction wells, removal could only be done in two ways. The first was by stairs, where people either climbed and carried the buckets with the ore, or where people were situated on the stairs and passed the buckets to each other. The second involved lifting buckets with a rope, either by hand or assisted by a machine, such as a pulley or a winch. An extraction well fitted with a lifting mechanism always had ladders for the movement of workers, placed in such a way so as not to impede the extraction process. Following this, the ore transportation from the respective wells was either done by hand, horse-drawn winch, locomotive, or later, by electric motor, as was done at the central wells of Serpieri, Hilarion, Louisa, and others.

At the end of the 19th century, the French Mining Company of Lavrio began to support mining activity by exploiting the huge network of ancient wells. Apart from the exploitation of the ancient slags that amounted to about 1.5 million tons, when I.V. Serpieri came to Lavrio, the ancient wells served as the starting point for discovering new ore. Started in 1875, the company aimed to continue the mining work where the ancient miners had left off. The ancient galleries and wells were thus enlarged and expanded.

An extensive railway system was constructed to transport the ore, connecting the wells and galleries with the processing plants in Lavrio and the loading docks at the port. The first railway to



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The ore cart was discovered close to the engine at a depth of 20 m (66 ft).

transport such ores was built in Kamariza in 1869. The ore transport bridge and the iron water tank of the train have been preserved and can still be seen today.

Modern wells featured metal superstructures called the “Gavries,” with elevators for the ore as well as a series of auxiliary buildings, including machine shops, staff quarters, warehouses, stables, and administration buildings, and even houses for workers and employees; some of these buildings can also still be found around wells.⁶

The ten most important wells in the area are:

- Bertzekos-Hilarion Well, southeast of Kamariza
- John the Baptist Well, in the settlement of Kamariza
- Serpieri (No. 1) Well, in the settlement of Kamariza
- Synterini Well, northwest of the settlement of Kamariza
- Villia Well, northeast of the settlement of Plaka
- Louiza Well, in the settlement of Plaka
- Sklives Well, southeast of the settlement of Plaka
- Soureza Well, southeast of the settlement of Kamariza
- The Elafos and Mportsari Wells, in the core of Sounio National Park
- The 3 km Well, west of the facilities of the French Company of Lavrio

THE EXPLORATION

Our involvement with the exploration of the Sklives Well began in Mine 80, more than a year ago, on Saturday, October 12, 2019. This was the fourth mine the addicted2h2o diving team visited, having already explored Hilarion, Mine 145, and Adami mine.

Vasilis Stergiou, a local mine researcher for over thirty years and an inhabitant of Lavrio, had heard several stories from ex-miners, many of whom are not alive today, that an engine used to transport ore, various other equipment, and ore transport bins had been left in place when work ceased and the mine was finally abandoned. We were not entirely sure if these stories were myth or reality, but after exploring three other mines in the preceding months and bringing to light never-before-seen images of flooded mines in Greece, we were eager to locate machinery, artifacts, or other evidence of mine activity in what were now completely flooded sections. Using old maps from the French Mining Company of Lavrio and information obtained by Vasilis, we began our investigation to identify in which flooded sections the engine could be located. It would be a long shot, and indeed, despite several tiring hours of diving three different flooded sections, our exploration was fruitless. We did, however, film our efforts to explore the flooded sections of Mine 80, both above and underwater; it remains one of the most difficult and challenging dives to date.

A year later, in September 2020, fellow mine diver Stelios Stamatakis and I embarked on a new mission to locate the engine, this time at Sklives Well. The drilling work had begun there between 1920 and 1930. The miners eventually reached the third metalliferous contact, and partial mine exploitation was done before the galleries were abandoned. In the 1970s, drilling in the area surrounding the well led to the discovery of new rich ore deposits. Upon this discovery in 1973, a large passage connecting the central Mine 80 with the well at Sklives was opened. This mine operated for four more years, until 1977, before it was abandoned. This information was shared with the team by Kostas Papathanasiou, who was an engineer and worked at these mines. He also shared that the engine

⁶ Kerestentzi S. “The Ore Well J.B. Serpieri in Kamariza.” p. 135.





Mine divers Erikos Kranidiotis (L) and Stelios Stamatakis (R) after a successful dive locating the Well of Sklives underwater, February 27, 2021

used to extract the ore on large wagons and various other mining tools were left in place when the aquifer started to rise, eventually flooding and sealing the mine. This meant that our initial efforts to locate the engine at Mine 80 were not totally unfounded, but we had missed the important detail of the work that was carried out in the 1970s to connect this central mine to the galleries at Sklives. The engine would have traveled underground between these two sites to transport the ore to the well, to then be extracted to the surface. Thanks to Kostas, who contacted us with this valuable piece of information, we were able to refocus our exploration efforts.

On September 7, 2020, the team descended three levels into the mine to search for the abandoned engine. We entered via Mine 80 and traversed 450 m (1,476 ft) before reaching the old electric station. We then turned right and headed east for another 150 m (492 ft). At that point, we had to descend at a very steep slope to reach our objective.

The well at Sklives mine reaches a maximum depth of 180 m (590 ft), while the flooded section we reached begins 155 m (508 ft) below ground level. The sump lies approximately 700 m (2,300 ft) from the mine entrance, and access to this lower level is extremely difficult, as most of the distance to the flooded section is on a steep slope. In addition to the challenge of transporting dive gear, gear setup and donning was tricky when we reached the dive site. The entrance to the flooded section is also situated at the bottom of a slippery slope, so all the gear had to be prepped on stable ground before being carefully transported to us one by one before we could begin our underwater exploration.

Initially, I entered the water and observed the opening from the surface. Immediately, I noticed an underwater passage that appeared to continue straight ahead. After Stelios and I both prepared and completed our pre-dive checks, we secured a cave line and commenced diving.

We entered the flooded section and swam straight ahead for several meters before reaching a small ladder with six or seven steps. At this point, the tunnel proceeded downwards, and in contrast to other mine dives, the depth progressively increased. After only 10 m (33 ft), we were already 8 m (26 ft) deep. This was strange, as all previous dives were at a constant depth between 7 and 10 m (23 and 33 ft). We later discovered that we had swum down another two levels in the mine during our descent. We noticed a lot of debris on the floor, such as old pipes, tools, and timber, and progressed further through a narrow opening at approximately 12 m (39 ft) deep and followed another sloped passage until we came across a second ladder, which was much larger than the first. This one had fifteen to twenty steps and descended vertically into an immense gallery.

At this point, we quickly deliberated on which direction to follow. The depth at this part of the mine was 20 m (66 ft). Stelios, who was at the bottom of the ladder securing the line, asked me if we should go east or west. I quickly scanned both sides, and my instincts told me to follow the route that appeared to have the most debris scattered on the floor, at the very least to see what we would find. I signaled to Stelios to go east, which he did while laying the line; I followed suit, filming behind him. Approximately 20 m (66 ft) later, we came across an ore cart. It was the first time since we started to explore the underwater portions of Lavrio's mines more than a year ago that we had finally managed to locate and film a wagon. I was ecstatic. Just as I began filming the wagon as Stelios secured the line, he frantically signaled to me: the engine had been found!

Just around the corner from the large ore cart, we discovered the engine that had lain idle since it was shut off for the last time almost fifty years ago. I filmed the engine and was in awe—not so much at the engine itself, but for finally finding a piece of history after a year of grueling effort. The people who no longer lived but who used to work at these mines and passed on their stories also echoed in my mind as I savored the moment.

After spending several minutes at the engine, we continued our eastern route, which revealed rail tracks through a huge gallery. Having achieved our primary objective of locating the engine, and mindful of our gas supply, we secured the line and returned towards the exit (ladder). Back at the ladder, we then traveled farther west, quickly exploring one of the two other tunnels we had discovered until we used up all our line. In total, the line placed during this dive was 130 m (427 ft), and the maximum depth reached during the dive was 20 m (66 ft). The main gallery and several tunnels that branch out are all situated at this depth. Exiting the last narrow section was done in zero visibility, and we soon made our way out, eager to share the great news with our fellow team members who waited for us.





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The engine discovered at a depth of 20 m (66 ft) during the first dive, September 2020

On October 30, 2020, we visited the mine with the company Landmark Loutridis to conduct a 3D mapping of the dry section. The entire route was mapped, from the entrance of the mine to the beginning of the water that leads to the flooded sections of the mine. Subsequently, on December 27, 2020, we revisited the mine and conducted a dive, heading west this time, opposite to where we found the engine. This dive confirmed our initial thoughts after our first dive here in September 2020; this mine is a large complex of multi-level galleries that extend many meters in both length and depth. We laid another 250 m (820 ft) of cave line, and the furthest point we reached was a junction where the rail tracks separated, following east and southeast routes.

We look forward to more exploration of this area and what secrets it can reveal about its mining history and the people that conducted it.

THANKS

I would like to thank Vasilis Stergiou, Hercules Katsaros, Akis Palis, and Kostas Efthimiadis, who supported us in our dives and were paramount to the success of our exploration project, and Yiannis Psaltakis and Landmark Company for conducting the 3D mapping; this was the second mapping of a mine after Hilarion. Additional thanks to XDEEP and 3D3real.be for supporting the Lavrio Mines exploration project since we began in 2019. A film about the mines explored in 2019 and 2020 has just been completed and includes an overview of the entire project, including the planning, preparation, and a firsthand account of the many challenges faced by our team in organizing highly demanding dives in extreme environments. We plan to present it at Dive Expo in Belgium in October 2021 and later at TekDive USA as soon as it is deemed safe to reschedule.



Erikos Kranidiotis was born in 1977 in Athens. He is half Greek half British and spent many years living in Bournemouth, U.K. He completed his studies, obtaining a bachelor's and master's degree in international business administration, and worked for five years in the banking sector prior to returning to Greece in early 2006. Upon his return, he completed his military service, and since 2008, he works as a customer success manager for a large Fintech company. Erikos began scuba diving in early 2011 and immediately fell in love with the sport. Over the years, he has completed his training in technical, trimix, and cave diving. Early in his diving career, he discovered a true passion for cave diving and underwater filming. Since May of 2019, as a member of the addicted2h2o team, he has participated in the underwater exploration of the Greek mines in Lavrio. He has successfully explored ten different mine sites and captured the first underwater images from a mine in Greece.

