

FROM RUSSIA WITH ROCKS: THE TOMBSTONE OF NAPOLEON

Jacques Touret¹, Andrey Bulakh²

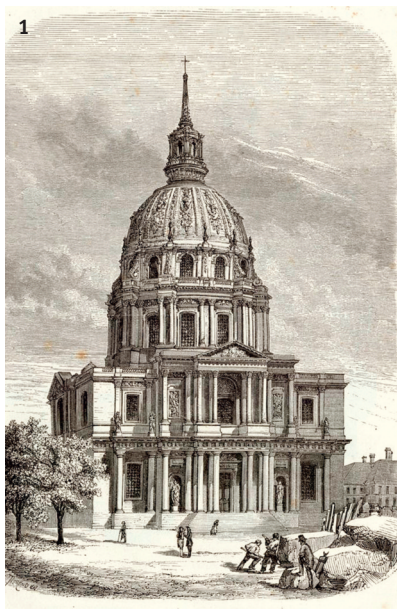
¹ IMPMC (Minéralogie), Université Pierre et Marie Curie, France, ljtouret@orange.fr

² Department of Mineralogy, St-Petersburg State University, Russia, andreyleb@mail.ru

Our readers – collectors or dealers of minerals excellently know and understand how it is difficult to create a masterpiece. It always is a result of complicated “nodus” of genius and sensibility, of intentions and unexpected circumstances. The route from a birth of idea to create a tombstone of Napoleon to its incarnation was long and difficult. Here, we will consider ornamental stones only. A full content of our material with many first-hand documents and description of sometimes dramatic events is disposed on the website of the “Mineralogical Almanac” www.minbook.com/xxxx

(уточнить после загрузки на сайт).

1. The Invalides Dome around 1850, with workers manipulating large blocs of rocks, presumably Shoksha quartzite (A. Lenoir, 1853)



The tombstone of Napoleon in the Dôme des Invalides is one of the most visited monuments in Paris, but the continuous flow of messages on Internet shows that his history is very poorly known. Based on unpublished documents preserved in the French National Archives (Archives Nationales...) and on Russian literature sources (Bulakh, 2015₁; Bulakh, 2015₂, Ziskind, 1989) present paper describes an unique example of exemplary relations between France and Russia during a twenty-year long period (1840–1861) which saw in France three Kings, one Republic and one Emperor, and in Russia – two Empires. Most famous stones from France, Italy, and Russia were used for the decoration of the Dôme des Invalides and the making of the tomb (Fig. 1, 2). Through twenty years after the death of Napoleon in St. Helens, King Louis-Philippe, “*Roi des Français*”, and his prime minister Adolphe Thiers, initiated a big campaign to repatriate the remains of the former emperor in his home country. Firstly, the remains of Napoleon, together with those of two “*Grand Maréchal du Palais*”, the generals Duroc and Bertrand, were rather discreetly placed in a side chapel of the Dôme, waiting for a final tomb which will only be completed twenty years later, in 1861.

The Project of Louis Visconti

Despite severe critics by the opposition, substantial credits of 2.000.000 francs were allowed by the Chamber (a worker at this time did earn 3 to 3.50 francs per day!). A government commission of 12 persons, including well-known painters, sculptors and journalists had to define the main lines of the monument to be erected and organize an open contest to select its architect.

In April 1840 projects by 81 architects were publicly exhibited in the Palais des Beaux-Arts. The Commission had also recommended that all materials be taken on the French territory, a demand enforced by a law voted by the Chamber. Finally and out of concourse the Minister designated two persons, both of Italian origin: the architect Louis Visconti for the monument, and the sculptor Carlo Marochetti for an equestrian statue of Napoleon, in imperial dress, to be placed before the entry of the Dome (that was not made).

Louis Visconti at Work

Almost untouched since the time of Louis XIV, the interior of the Dome was in a very poor state. The only real pieces of interest were magnificent marble mosaics on the floor (Fig. 3). They were also badly damaged and needed extensive restoration. By mid-1843, Visconti composed a project – that was simple, innovative and technically risky. The core of the project is a monumental sarcophagus, which occupies the center of the crypt and can be seen from two galleries, above and below. The



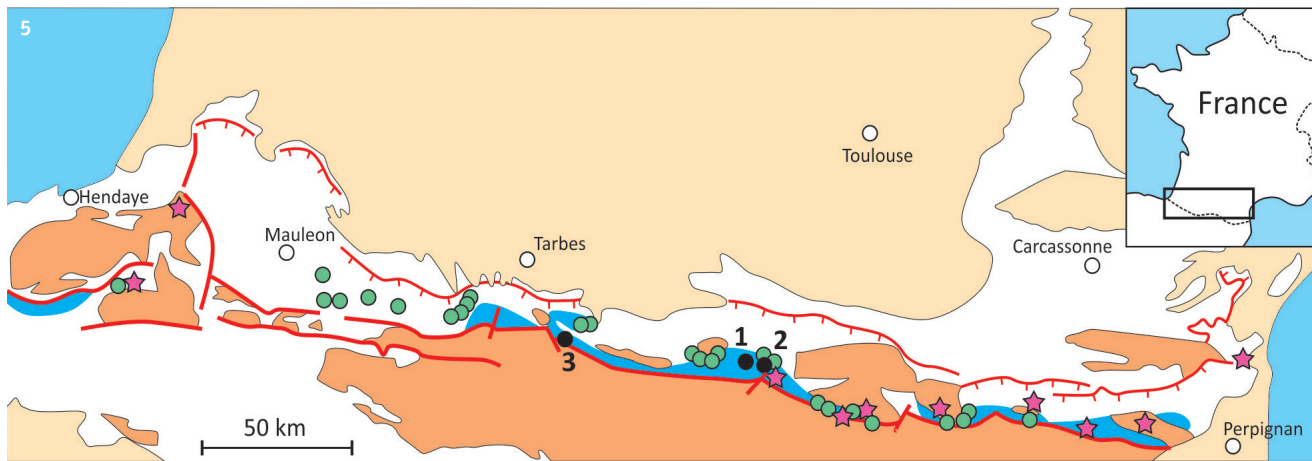
2. The sarcophagus of Napoleon seen from the floor of the Dome. The red rock of the sarcophagus is Shoksha quartzite, its base of green Ternuay andesit, and the bright colors of the mosaics on the floor are white marble (Carrara) incrustated (or covered) with bright colors enamels. Photo: Alexey I. Brusnitsyn.



3. Mosaic ordered by Louvois (17th century) on the floor of the Dome. Photo: Jacques Touret.

4. Twisted columns (Colonne torse, length: 8 m) in "Grand Antique", base of the columns and altar in "Brèche Napoléon". Photo: Jacques Touret.





5. Geological setting of Northern Pyrenees (after Lagabrielle *et al.*, 2010), with the emplacement of the marble quarries mentioned in the text (1 to 3). Red line : North Pyrenean Fault, green circles : granulite-occurrences, pink stars : lherzolite-occurrences, Blue : North Pyrenean metamorphism (thermal). Emplacement of marble quarries: 1) Aubert ("Grand Antique"), 2) Saint-Béat (White marble), 3) Sérancolin (colorful marbles).

base of the crypt is adorned by star-like mosaics with bright colors (yellow, to look like the sun, green, blue or violin) (Fig. 2). For these, Visconti developed an entirely new technique called to a bright future, namely incrusting small enamel plates on solid marble. Outer walls of the lower galleries are also covered with bas-reliefs. The base of the crypt is connected to the floor of the upper gallery by a large staircase, also in marble (limestone), opening on a monumental door in green marble, flanked by two bronze statues. Above the door is a black marble plate bearing the famous words that Napoleon wrote in his Memories: "*I desire my ashes be on the bank of the Seine, within this French people that I loved so much*" (free translation!).

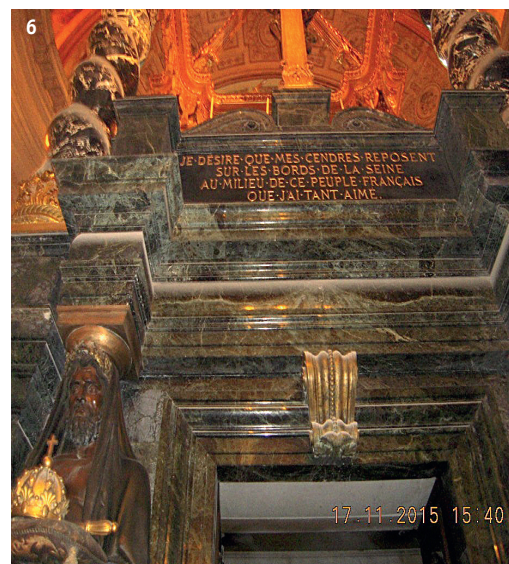
Finding Suitable Materials

The Marbles

Visconti devoted much energy – and much money- to select the best possible materials. Else in 1810, the administration of Napoleon made an inventory of all quarries active on the French territory (Héricart de Thury, 1823), a possibility opened to anyone by the newly erected "*Code Minier*". The inventory was published in 1823 in the "*Annales des Mines*" (Série 1, vol. 8). It served as a basis to send letters to Prefects of all departments, asking them if they could find on their territory any rock, which could be used for the monument. The quest was successful for colorful marbles (1 on Fig. 5). Two varieties were selected by L. Visconti to make the altar and the entry to the crypt. The first one is a spectacular white and black breccia called "*Marbre Grand Antique*" (Fig. 5). In 1844, the remarkable amount of about 50 m³ of "*Grand Antique*", from the Aubert quarry, located in the Pyrénées along the valley of the river Lez near Saint Girons, Department of Ariège, was sent to Paris.

This marble was widely used in Roman times, then it was lost, and rediscovered in the Central Pyrenees at the beginning of the 19th century. The 4 monumental columns supporting the baldachin, a great number of tables and pilasters (72 in total), as well as the tombstones of two generals of Napoleon, Bertrand and Duroc in side chapels are cut of this striking white and black marble breccia.

The other important colorful "marble" is the so-called "*Vert des Alpes*", also a breccia (Brèche). Approximately 47 m³ were delivered between 1841 and 1844 from the Ceillac quarry, at the end of the upper valley of Cristillan (Queyras, French Western Alps). This Brèche can be found in many places within the Dôme: body and walls of the altar, base of the "*Grand Antique*" columns, entry of the door to the crypt, floor decora-



6. Top of the door to the crypt: Brèche Napoléon. Above the door, the plate with Napoleon's words (*I desire my ashes be on the bank of the Seine, within this French people that I have loved so much*) is in black marble of Ste Luce, Isère. Photo: J. Touret.



7. Prospectus of the Varelle factory at the time of its splendor (circa 1880). Old post-card.



8. Abandoned granite columns lying in the forest near the old Varelle factory. Standing : Jean-Paul Gremilliet (Terrae Genesis). Photo: C. Delangle.

tion in the lower gallery, and so on. As a matter of fact, it is a soft, strongly brecciated and serpentinized ultrabasic rock of initial mantle origin (ophicalcite), occurring in a whole complex being called ophiolites. Close examination show many interesting details (Fig. 9).

The black marble for the plate above the door to the crypt (bearing the words of Napoleon), came from the Sainte Luce quarry (Isère). Few other types of colorful marbles or more common limestones are also found in various places in the Dôme, but in small quantities or service areas, e.g. Sérancolin (2 on Fig. 5), Campan (Pyrenees) nodular marble or red marble from Languedoc, Tertiary fresh-water limestone from Chateau-Landon, or the “Lunel” limestone from Boulogne sur Mer in Northern France, the place where Napoléon had installed a base camp to invade England (this never happened) . Finally, all colorful marbles could be found on the French territory. But white marbles, by far the most abundant in volume, both for covering the walls and making the statues, were another question. White marbles are not rare in France, notably in the Pyrénées (e.g. Saint-Béat, 2 on Fig. 5) but Visconti thought that nothing would replace the Carrara marbles, especially for making statues (“statuary marble”). In 1845–1852, more than 500 m³ of white marbles for the Napoleon tombstone and crypt were transported from Italy, the greatest quantity from Carrara, the rest from Seravezza (Tuscany).

Hard Rocks: Granit and Porphyres

A key point in L. Visconti’s project was that the sarcophagus would be in “granite” (“granit” in French), to make the con-

trast with the surrounding marbles. More precisely, Visconti thought to the most prestigious types of ancient “Granits”, porphyries, either red (Porfiro Rosso Antico) for the sarcophagi, or green (Porfiro Verde Antico) for its base.

Green Porphyry at the Base: Ternuay Andesite

Real Porfiro Verde (Greece) were not available, but a green rock that Visconti found an acceptable substitute was discovered in the province of the Vosges (Eastern France). Visconti asked his master of work, Seguin, to go to go to Vosges and evaluate the work done there by various groups and companies. After having eliminated the Northern part of the Vosges, Seguin went to the Southern part of the province, and he stopped his attention at quarries owned by Jean-François Varelle. Varelle had a very good reputation, and the great advantage to live near the place where Vosgian porphyries do occur (Figs. 7, 8).

The rock is known in the geological literature as the diorite (or andesite) of Ternuay. H. Rosenbusch described it in the classical “Mikroskopische Physiographie der petrographisch wichtigen Mineralien”, first published in 1873 (Touret, Nijland, 2016). He had mentioned that amphibole together with epidote gives the overall greenish color to the rock. Its general appearance is somewhat different from the original Greek Porfiro Verde Antico, from clearer shade of the matrix.

The Sarcophagus

Once that the question of the basement of the sarcophagus had been solved, a major problem remained, namely how to find for the sarcophagus itself a red porphyry which could match the

Geologists and « grand public » may use the same words with a different meaning. For the first ones, granite is a magmatic rock containing quartz, feldspar and mica, and marble a metamorphic limestone. But for the second, the only difference is in the hardness and the ability to be worked out with steel tools : possible for the marbles , not for the granites. The french language makes a difference between these two meanings in the spelling : granite for the geologists, granit (without final e) for the rest of the world.



9. Detail of «Brèche Napoléon» (under twisted columns, Fig. 4): Harzburgite or Iherzolite dyke (darker) within more greenish ophicalcite. Photo: Jacques Touret.

“*Porfiro Rosso Antico*”. Different varieties of red porphyries were found in one of the best collection of the times, (by Marquis de Drée, brother in law of Dolomieu), but this information did not help. Search in Italy and Greece was again in vain. After about two years, L. Visconti was seriously thinking to modify his project, when few samples of a beautiful red rock came to Paris, sent from Russia. The rock was said to be “*Antique Red Porphyry*”, coming from a place named “Shoksha” (English spelling), in French “Chokcha”. The person who sent the rock is not known. Documents in the National Archives say simply “an engineer”. It can be speculated that the most Russian of French architects, Auguste Ricard de Montferrand (1786–1858), could have played a role, because both he and Visconti were students at the same time in the Ecole Spéciale d’Architecture de Paris.

One of his masterworks was the Cathedral St. Isaac in Saint Petersburg, decorated by a great number of granite and marbles varieties from all over Russia, Italy and France. Beautiful polished slabs of the red Shoksha rock make the base of pilasters and frieze along walls (Bondarchuk, 2005; Filippova, 2013), as well steps to a famous iconostas. The latter is decorated with bronze columns with gilded capitals and bases, and covered with malachite and lazurite. It is the most spectacular ornamentation in the Cathedral.

This rock was investigated by the best specialist in Paris, Pierre-Louis-Antoine Cordier (1777–1861, the mineral cordierite is named after him), professor of geology at the Museum d’Histoire Naturelle. He found rapidly that the rock was not a porphyry, but metamorphosed sandstone, and he stressed that: “*this sandstone is very hard, made of very fine grains of equal size. This gives a homogeneous, somewhat translucent mass. Its fine grain and supreme hardness give sharp edges and perfect polish*”. Few words could be changed to his description today, except the

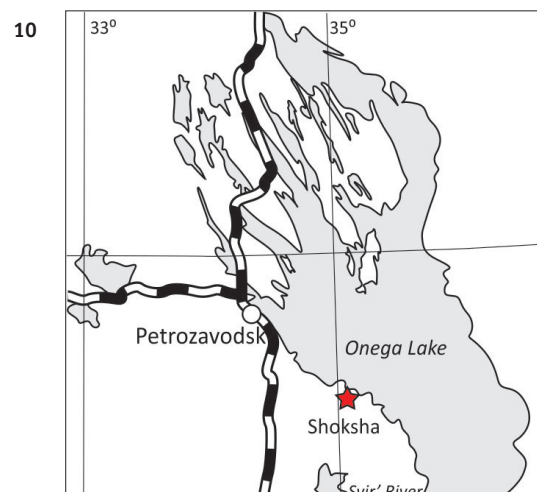
age of the rock: not Silurian (about 400 Ma) as Cordier thought, but much older, slightly less than 2 billion years (2 Ga).

Very delicate sedimentary features, such as graded or cross bedding, are well visible of the polished faces of the sarcophagus on a masterful photo by Professor Alexey I. Brusnitsyn (St.-Petersburg) (Fig. 2). They indicate sedimentation in sub-aerial conditions, close or at the shoreline, on a nearly flat surface covered by rapidly changing stream currents. The red color and abundance of hematite point to oxidizing conditions, in an oxygen-bearing atmosphere, which was not strikingly different from to day.

Comforted by Cordier study, Louis Visconti decided to send to Russia a mission headed by Louis Antoine Léouzon Le Duc (1815–1889), by profession a journalist and “*homme de lettres*” who was supposed to know quite well Finland and Russia. In the book that he wrote few years after his return, he tries to convince that he is the sole discoverer of the occurrence of the Shoksha quartzite. The reality is more simple: this rock, as well as the place where it occurs, was already well known in Russia

The address of the occurrence, as indicated by Léouzon Le Duc, was thus: Russia: the Olonetz government, village of Shoksha at the Onega Lake. The locality was then private property of the Tsar. The Shoksha quartzite was used since the beginning of the 19th century for the decoration of cathedrals and prestigious monuments. The deposit was studied by Russian miners and described in many details in monographs by Russian academic V.M. Severgin in 1804, and by professor J.G. Zembnitzkiy, the director of the Emperor Saint-Petersburg mineralogical society in 1834.

The first (in 1800) use was for a frieze in the southern facade of St.-Michael Castle, a residence of the Emperor Paul I. Next (in 1810–1811) use in St.-Petersburg was by Architect Andrei Voronikhin in the Cathedral of Our Lady of Kazan. The floors of the Cathedral display a beautiful ornamentation made of vari-



10. The location of Shoksha occurrence (*).



11. Shoksha quarry (modern), showing the strong foliation of the rock (sedimentary bedding), and the relations on the outcrop of the raspberry and pink types. Photo: Anatoly A. Zolotarev.

ous marbles from the vicinity of Ladoga Lake: white — and greenish-yellow marbles from the South, multicolor rose marbles and black slates from the North. The red Shoksha quartzite of Lake Onega brings a beautiful complement to the geometrical pattern of the mosaic. Since 1816, all production was reserved for the construction of the St. Isaac Cathedral, which will only be completed in 1858.

August de Montferrand and Peter Clodt von Jürgensburg (1805–1867) designed the famous equestrian statue in honor of Nicolay I, a technical masterpiece with the horse attached by only two points (rear legs) on a basement made of Shoksha quartzite. This rock as since been considered one of the prime decorative stone in Russia, extensively used e.g. in Lenin’s mausoleum in the Red Square, Moscow, or the Grave of Unknown Soldier and monument to Heroic Cities in the Alexander garden near the Moscow Kremlin, and in many other places and cities also.

In St.-Petersburg, Léouzon Le Duc took the service of an Italian engineer, Jean (or Jean-François) Bujatti, established since a long time in Russia. It is possible that Bujatti was the man who sent first the sample of Shoksha quartzite to Paris. But we could not find any proof, either in the writings of Léouzon le Duc or in the hundred’s documents kept in France National Archives. Bujatti was a very competent man; he found in Shoksha a convenient place to open a new quarry, but he had strong opposition from local authorities. L. Léouzon Le Duc understood rapidly that the only way to obtain the permission to open a new quarry would be given by the Tsar Nicoy I in person.

Nicolay answered the request with a great respect to Napoleon (Léouzon Le Duc even noted in his memories that Nicolay was a great admirer of Napoleon). Not only he granted the permission, but also he exempted the products of the quarry from all rights, taxes, payment for stone blocks, all together for a value to about



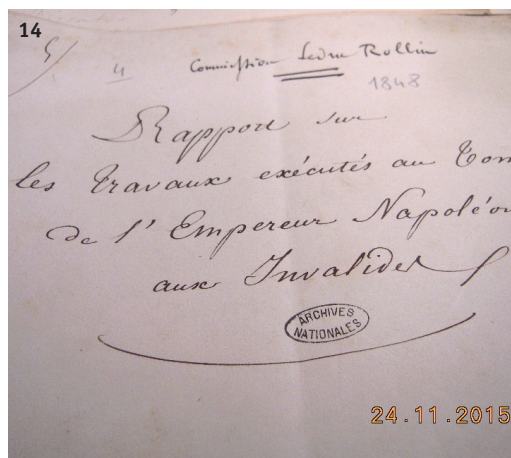
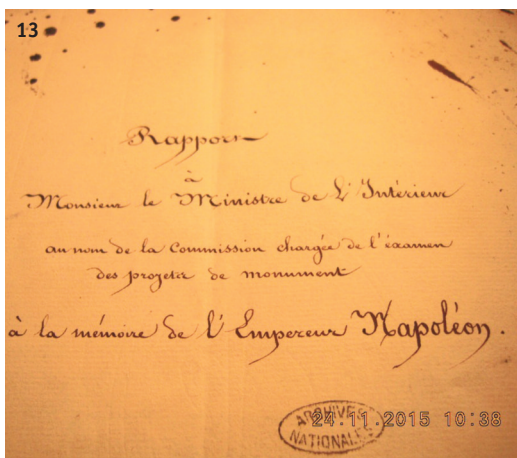
12. Another quarry, with an accumulation of blocs, which must recall the landscape as left by Bujatti. Photo: Anatoly A. Zolotarev.

68.000 f. But the French supported all expenses for opening the quarry and moving the blocs, for a total of about 200.000 f.

The support of the Tsar lifted all administrative problems, and Bujatti could start working on a large scale. He finally selected 29 blocs to be sent to Paris, for a total volume of 38 m³, whereas the quantity requested by L. Visconti was 24 m³. The largest bloc of 4.6 x 2.9 x 1.06 m in size (original measures in old foot: 15.1 x 7.2 x 3.2), that he called the “monolith”, was reserved for the cover of the sarcophagus.

Crisis in Paris

While Léouzon Le Duc and especially Bujatti were busily searching for a porphyry substitute in Russia, the situation suddenly deteriorated in Paris, to the point that Visconti was very close to be replaced. The credit of 2 millions that Visconti had received in 1841 had been exhausted for a long time. He had engaged an additional amount of about 600.000f without official permission, not a major problem under the permissive administration of King Louis-Philippe. In 1847, he had presented an additional request for a fund of 3 millions francs to have the debt covered and the monument fully completed. But the revolution that occurred on the following year, leading to the Second Republic regime, changed completely the situation. The new minister of interior was Alexandre Ledru-Rollin (1807–1874), not a great admirer of Napoleon. He appointed a commission, asked to evaluate the state of the work and, above all, propose drastic cost reductions. The report of the commission was very critical (Fig. 13), and Visconti had to make a detailed answer (Fig. 14). Finally, after long and dramatic discussions, the commission Ledru-Rollin granted to Louis Visconti a credit of 2.139.000 f. A budget cut by about 1/3, which permitted to Visconti to continue his work, but on a minimal scale. The equestrian statue by Marochetti, notably,



13. Front page of report issued by the Ledru-Rollin commission, very critical against the work of L. Visconti.

14. The hand written answer by L. Visconti, addressed to the Commission Ledru-Rollin.

(on page 87):

15. End of the support letter by Héricart de Thury: "I reiterate you, my Friend, the very sincere assurance of the feelings of your old and affectionate Director."

was abandoned (it was made few years later in London, in honor of the exiled King Louis Philippe!).

The Shoksha Quartzite Arrives in Paris: Unexpected Problems

After the departure of Léouzon le Duc, Bujatti organized the difficult transportation to Paris, and himself went there in the hope to be immediately paid and return without delay to St. Petersburg. But the operation turned out to be far more difficult. The Revolution of 1848 had emptied financial reserves, and the government was in a drastic need of money. Bujatti had extreme difficulties to be paid back (described in detail in the materials on the Internet site), but finally enough suitable material was at the disposal of Visconti and his workers.

When the quest for the best possible material was over, L. Visconti suddenly realized that there were no rocks from Corsica, the beloved island of Napoléon. Sharp critics had been written in a local journal against the Shoksha "porphyry", local people offering freely Corsican granite. In order to answer the critics, Visconti used some plates of this granite .. inside the sarcophagus, only to be seen if its cover is removed.

Nothing like this had been done since Ancient Egyptians

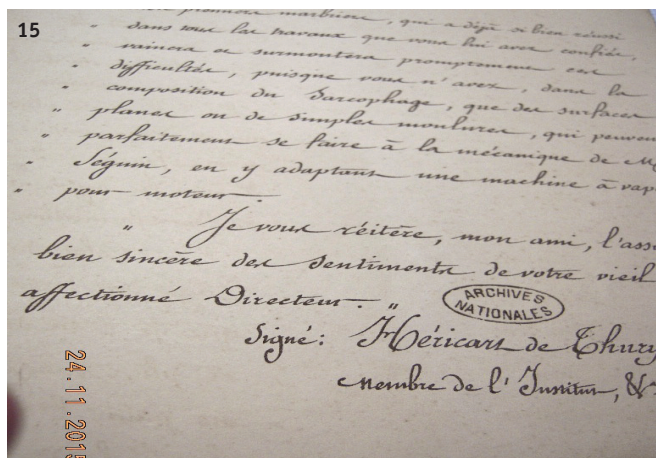
On December 10, 1848, Louis-Napoléon Bonaparte was elected president of the Second Republic. For the monument, the rocks were there, the Chamber had reluctantly voted additional funding, and everything was now ready for it being finalized. The major problem was evidently to make the sarcophagus, which by the size of the blocs and hardness of the rocks exceeded anything having been done previously. Only the Ancient Egyptians and, to a lesser extent, the Romans had cut and polished granites of comparable dimensions.

The technique had practically not changed since their time. A rough outline was obtained by removing small chips by chisel (pointes) and hammer, knowing that it would be almost impossible to repair a broken chip below the reference line. Then the surface was patiently dressed with a paste of sand and water, before final polishing by rubbing for hours a flat mass of metal, either soft iron or lead. It was possible to saw along straight lines with a steel blade under a stream of sand and water, with eventually some emery added, the "schmirgel" of German authors. But as both the sawing tools and rocks had almost the same hardness, the process was extremely slow. In the "Traité théorique et pratique de l'art de bâtir", published in 1802, J. Rondelet says that a saw weighing 12 pounds, working with sand (grès) and water, descends in 4 hours of about 45 "lignes" (about 9 cm) in marble, less than 4 lignes in granite. The porphyry is harder than the granite, making the work even more difficult.

In 1850, Seguin, now entirely responsible for all marble and granite work, was stated that the sarcophagus should be completed by the end of 1852. Being paid by the task, Seguin made a very detailed estimate of the work to be done.

7 blocs were finally retained for the sarcophagus, the largest (cover) of 4.43 x 1.25 x 5.54 m, for a weight of 3213 kgs. The six other blocs, for the base and the body, had a length between 2 and 3 m, total volume of 27.345 m³. Sawing length = 77.92 m, surfaces to be polished = 218.13 m² (flat) and 87.35 m² (curved), these requiring to remove by chisel and hammer 4.705 m³ of rock. The 4 sculptures (rosaces) at the corners of the cover (excessively difficult work, adds Seguin) had to be done by special tools.

Seguin made his calculations, and he discovered rapidly that it would be completely impossible to maintain the delay by conventional techniques: "the preparation of a flat surface of 3.91 m² requires 115 worker days and reforging 3103 tool heads. A rosace (corner sculpture) only barely indicated (a peine ébauchée), of a



diameter of 64 cm needs 45 days of a most experienced worker (*habile ouvrier*) and reforging of 6000 heads”.

Seguin proposed to install in the workshop a steam “machine equivalent to 6 or 7 horses”. Finally, a total of 3 steam machines will be completed (for the total power of 60HP, a remarkable power for the time) and will work at the entire satisfaction of Seguin and Visconti.

The use of steam machine for granite workings was a true technological revolution, and more resistant granites will progressively replace marbles for the ornamentation of large edifices or funeral monuments. About one century later, a new technological and marketing revolution took place, namely the widespread use of diamond tools.

Epilogue

It took about two years to make the sarcophagus, a true masterpiece of granite working. After 130 years, the polish is still almost perfect and the rock unchanged. By the end of 1853 it was almost finished, ready to receive the remains of Napoléon and his seven coffins. Yet the official ceremony took only place 8 years later, on April 2, 1861, twenty years after the initiation of the project. One reason is the sudden death of Louis Visconti from heart attack on Dec. 2, 1853, just after having been elected at the Académie des Beaux-Arts. The official reason for the delay was the time spent on the enamel mosaïques of the floor of the crypt and, above all, on the marble statues and bas-relief of the lower galleries. The most important sculptor, James Pradier, died also prematurely in 1852, before that he could terminate the monumental Caryatide statues. All statuary work for the tombstone of Napoleon will then be completed by Pierre-Charles Simart, who took years to finish his “bas-reliefs”, 12 in total. At the time of the inauguration, one was still not finished; it had to be replaced in great hurry by a model in plaster.

But the real reason of such a delay is elsewhere. Napoleon III was not satisfied, either by the location or by the monument

itself. He wanted to establish his dynasty by burying his entire lineage in the Basilique of Saint-Denis, like the kings of France.

The official ceremony of April 1861 was minimal, led by the Archbishop of Paris in the only presence of Napoleon III and his family. No Corps Diplomatique, no representative of Russia Alexander II, successor of Nicolay I, came to Paris in 1867, at the occasion of a Universal Exhibition. But he had hardly the time to visit the tombstone of Napoléon, being wounded in Longchamp in company of Napoleon III. **Only Alexander III, at the occasion of the inauguration of the magnificent bridge bearing his name in 1900, could have a look to the monument and admire a red rock** which is a kind of symbol of the tradition of friendship between France and Russia, despite all political difficulties.

The Tombeau de Napoléon has survived all threat during two World Wars; it remains one of the most visited monuments in Paris today.

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