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NOTE ON THE RESTORING OF THE LIBER PATER STATUE FROM APULUM

Immediately after the discovery, in November 1989, the first 10 fragments of the Liber Pater statue were brought to the Regional Restoring Laboratory of the Cluj Museum (see Fig.1). They consisted of:

1. The head of Liber Pater
2. The torso with parts of the legs and the tree trunk used as support
3. The top of the *thyrsos*
4. Fragment of the *thyrsos* with left hand and forearm (put together on the site)

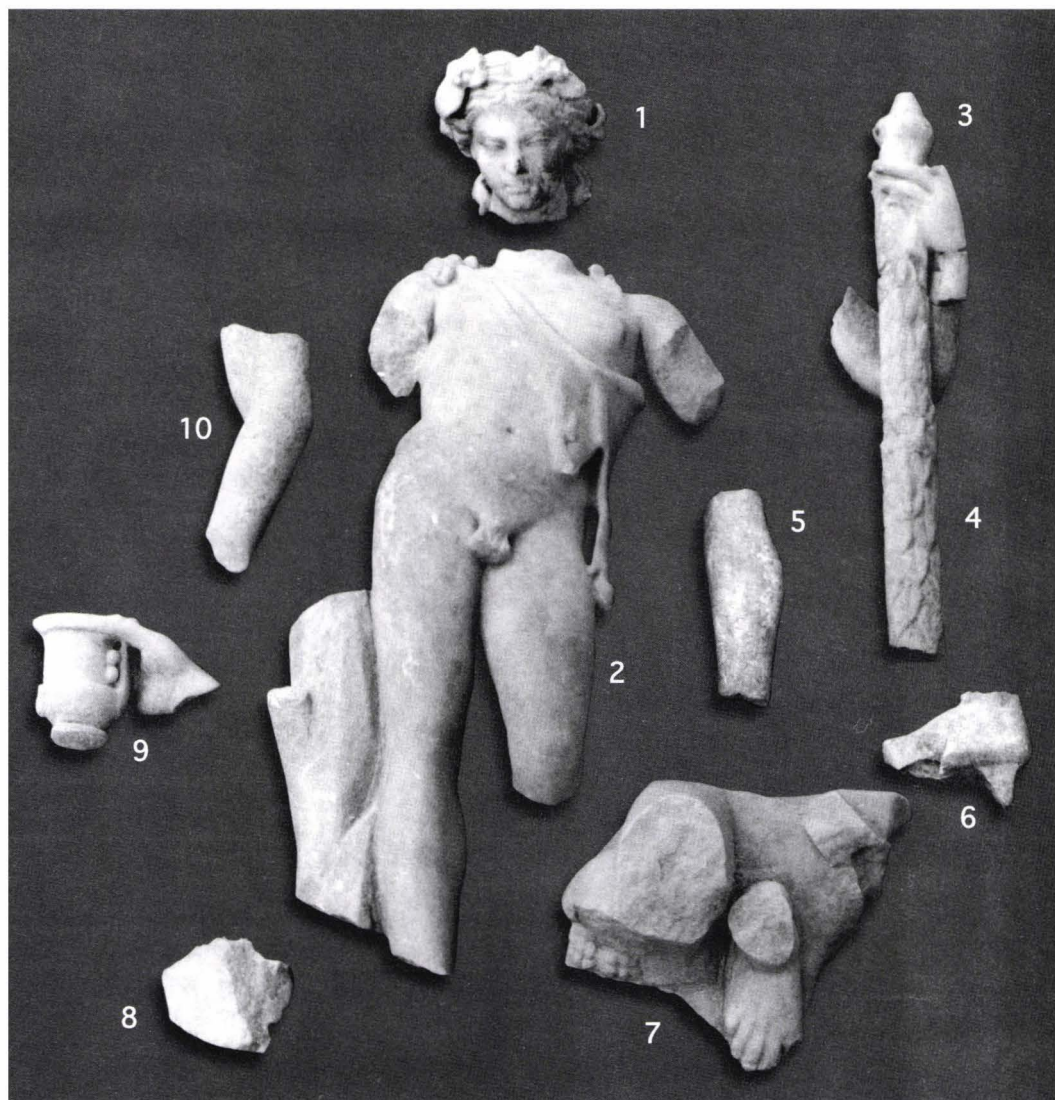


Fig. 1. The first bulk of fragments brought to the laboratory in 1989

5. Left shank
6. Fragment of the left foot
7. Fragment of the plinth with right foot and lower tree trunk
8. Another fragment of the plinth
9. Right hand holding the *kantharos*
10. Fragment of right arm and forearm of the god.

The ivy crown on the head was damaged during the excavation, and the left arm holding the *thyrsos* (9 fragments) was provisionally put together by the archaeologists immediately after the discovery. The pieces have been washed with current water and an attempt of cleaning the surface on the left cheek was made. Other 7 fragments were brought later the same year:

1. Fragment of the body of the panther
- 2-6. Fragments from the plinth.

After the next campaign, from spring 1990, other 7 fragments were found:

1. Head of panther
2. Upper part of Pan
3. Lower part of Pan
- 4-7. Other fragments of the plinth.

In all 33 pieces.

The estate of preservation of the fragments differed from one piece to the other. Some kept their original well polished surface, others were slightly corroded and the rest were covered by a rough deposit of yellowish grey precipitate of calcium bicarbonate with a silky aspect. Underneath there was a hard crust of calcite, some 3 mm thick, with excrescences and small craters, which was very adherent to the marble surface. It must have resulted from the combination of the silky deposits in the soil and the degraded

marble surface, which resulted after a long exposure of the rock to a wet environment. Marble is a porous stone, which can be progressively degraded by carbon dioxide dissolved in water and by the action of soluble salts¹. The result is calcium bicarbonate which, once vaporized, turns into stable, insoluble calcite, which is crystallized into a trigonal rhombohedral system. The yellowish color of the crust was given by iron oxides and hydroxides from the soil and by the fine silk which penetrated into the pores. The parts which were face down suffered considerably more than those above them. Thus the whole right side of the head (Fig. 2) was in a good state, while the left side was covered by the rough deposit of precipitate, under which the hard crust of calcite was revealed by the already mentioned cleaning attempt on the site.



Fig. 2. Head of Liber Pater before cleaning

¹ Our investigation revealed the presence of chlorides, sulphates, ferrum ions (Fe^{3+}) and gypsum.

After consulting the archaeologists, we decided that the best solution was to clean the rough surfaces and remove the calcite crust in order to give back to this statuette the glamour it once had. The idea of keeping uncleaned surfaces in order to show the authenticity of the statue was rejected, because it would have damaged the aspect of this real work of art. Since it came from a regular excavation and was to be displayed in a state museum, any reticence or concerns pertaining to art dealers and collectors of antiques, such as leaving the surface half cleaned, could be abandoned.

Under these circumstances, our main concern became to avoid any damage to the original surface by an inappropriate intervention. In this respect, the first step must be „to establish the diagnosis of the stone“². For this purpose, a detailed chemical investigation was carried out, aiming to determine the exact nature and composition of the crust, by specific microchemical qualitative analysis³. For chlorine ions (Cl^-) we used a solution of silver nitrate (0.1 N) and dissolve nitric acid. For sulphur ions (SO_4^{2-}) we used a solution of barium hydrochlorate (0.5 N) and dissolve hydrochloric acid. For the ferrum ions (Fe^{3+}) we used a solution of ammonium sulphocyanide (0.5 N).

Insoluble salts and ferrum oxides from the crust were identified as ferrum ions (Fe^{3+}) after treating the samples with a solution of hydrochloric acid (10%), by the means of the same reagent, ammonium sulphocyanide (0.5 N).

The presence of gypsum was proven by color test with chinalizarine, a solution of $2.5 \times 10^{-2}\%$, in the presence of potassium hydroxide 2N^4 .

On some fragments, such as the right foot, the head of the *thyrsos*, and several pieces of the plinth, traces of rust were identified (the plinth was fixed in a niche or on some pedestal by means of three iron studs). In their vicinity the marble was coloured reddish-brown to a depth of 1-3 mm. The cause is the ferric hydroxide, $\text{Fe}(\text{OH})_3$, which penetrates into the pores of the rock.

While examining under the microscope the well preserved parts, in order to establish the degree of the original polishing, traces of ancient paint were identified. Red pigment was found on the lips and reddish-brown paint was discovered on the head of the *thyrsos* and on some of the curls. Here the colour was visible with the bare eye and was first interpreted as traces of rust. In all these cases, the paint was proven to be of mineral origin, actually the same ferrum oxide mixed with aluminum silicates, silicates and limestone. Pliny the Elder mentions it as „simopsis“ or „rubrica“, but it is known also under the name of „terra di Siena“, or „terra di Pozzuoli“.

After establishing the diagnosis, we proceeded to the cleaning⁵. The crust could not be simply dissolved, because it contained a high proportion of calcium carbonate and the process would have damaged the marble as well. So it was first softened and then removed mechanically (Fig. 3). The pieces were immersed in water which was previously treated with a neutral detergent 3-5%, ammonia 1% and EDTA

² G. Torraca, *Trattamento della pietra nei monumenti. Principi e metodi*, 1975.

³ Gr. Popa, A. Paralescu, *Chimie analitică*, București 1977.

⁴ In this respect the sample was covered with resin (UHU) and carefully polished. Then it was submerged for 30 minutes in a chinalizarine solution, then washed with distilled water and examined under the microscope. The marble preserved its colour, as well as the other components of the crust, with the exception of the gypsum, which gained a violet-blue colour.

⁵ For the general principles of this activity see G. Torraca, *Treatment of Stone*, in *Monuments, a Review of principles and processes*, Bologna, 1981, p. 297-316, and C. Beltini, A. Villa, *Description of a Method for Cleaning Tombstones*, in *The Conservation of the Stone*, Bologna 1981, p. 523-534.



Fig. 3. Detail of the thyrsoi, half cleaned

solutions with PH modified (between 6-9%). They were also packed in absorbent compresses⁶. During the process, a strict control of chloride ions, sulphate ions and ferrum ions and of the PH of the solutions used for softening and washing was observed. For the removal of the spots of rust, special compresses for ferrum salts were used (*i. e.* a solution of water 10%, natrium hydrosulphite and EDTA in 1:1 proportion, all mixed with paper paste)⁷.

The most difficult and time-consuming process was the cleaning of the broken surfaces, where the crust had to be removed without breaking any pieces which would later enable the fragments to match together. Once this part done, we proceeded to the reconstruction of the statuary group⁸. The fragments were fixed together with studs of stainless steel, 2-5 cm in diameter. The holes were slightly larger than the studs, in order to enable the glue to penetrate well. The studs were notched for the same purpose. For sticking the pieces together, we used a synthetic resin, Araldite M strengthened with HY 956, produced by the Italian company Eigenmann & Veronell.

In the end, the following parts of the statuary group were completed with a mixture of Araldite M strengthened with HY 956

(4:1), colloidal quartz, marble silk and white pigment:

1. Left leg of Pan
2. Right leg of panther
3. Handle of the kantharos and the tree branch supporting it
4. Fingers of left hand and parts of left forearm of Liber Pater
5. Most of the left foot of Liber Pater
6. Ivy leaves from the crown of Liber Pater

Upper lip and nose, which were partly damaged, were not completed, although their present state differs from the original aspect. The right hand of Pan was also left uncompleted, because its exact position remains doubtful. The right leg of the panther and the left forearm and hand of Pan, which had been restored in ancient times and were not found during the excavation, were left uncompleted too, for the same reasons of avoiding any modern misinterpretation.

Before display, the surfaces were once more cleaned with a wet cotton cloth and slightly polished with a fine felt and marble powder. The protective coating consists of „Silicon dry film 104“, dissolved in a 5% solution of tricoloretilene.

On December 1st 1990, the statuary group of Liber Pater with Pan and the panther was displayed in the Alba Iulia Museum.

⁶The most efficient were proven to be the basic jellies type AB57 (see O. Nonfarmale, *Metodi di intervento - Jacopo della Quercia e la facciata di San Petronio a Bologna*, Bologna 1982, p. 281). We tried also with absorbing clay of Attapulgit and Sepiolite type (see L. Lazzarini, *La pulitura dei materiali lapidei de costruzione e scultura*, Padova 1981, p. 76; K. Hempel, *Sepiolite for Stone Cleaning*, in *Conservation of Sculpture, Stone, Marble and Terracotta*, Victoria and Albert Museum 1968), but the results were unsatisfactory.

⁷J. L. Plenderleith, *La conservation des Antiquités et des Oeuvres d'art*, Paris 1966, p. 326.

⁸I owe special thanks to Iosif Korody, senior restorer, whose experience and help were essential in putting the pieces back together.