Analyses of the Great Moravian Pottery and Clays from the Staré Město Region

LUDĚK GALUŠKA - ZDENĚK KUKLA - ANTONÍN BUCHAL

A lot of studies and relevant chapters of monographic books have been written on the development of Slavonic pottery in the region of the Central Morava River Basin with the centre of the Staré Město agglomeration (e.g. HRUBÝ 1955, 125-151; 1965a, 264-308; 1965b, 37-62; MAREŠOVÁ 1983, 56-76; GALUŠKA 1994, 233-242; 1995, 97-106).

According to the studies, it is obvious, that a big part of the Staré Město pottery production from the 8th to the 10th centuries is created by one large profile group. I called this part of the pottery the First (I) group (GALUŠKA 1994, 107). I gave the so-called Moravian type of pottery to the frames of the First group (GALUŠKA 1995, 97-106; POULÍK 1948, 81-82).

Vessels of the First group were made of clay with dug sorted sand added, which contained iron cement. Firing of the vessels was mostly to very good quality. They were fired to grey, sometimes even brown-red shadows. it is a document on the firing in ceramic two-chamber furnaces. The furnaces of vessels are a little big rough, with a gritty surface. The vessels are characterised by egg and barrel shapes and simple decoration. The decorative motifs were based on a combination of a simple wave and a groove and were convexities of vessels. The first group creates from 60 to 70 % of finds from the total ceramic production of the Staré Město region.

The Second (II) group of the pottery from Staré Město was made of very fine floatable material. The grained sand temper, typical for Staré Město, does not occur here. The decoration is especially limited to 2 to 5 simple bands of circumferences, both deeply and thinly grooved.

Clay marl of dark as well as light grey shadows was used as a basic material for the Third (III) group. The clay colour stayed the same also after firing - it did not change. Two variants were discovered in this group. The firs variant contained a great deal of sand which could be course-grained, the second one was without a sand temper and seems to be floatable. Therefore it is wiped. Source of this raw material do not occur near Staré Město.

The Fourth (IV) group of pottery is created by pottery of the Ancient character. It is different from the Old-Slavonic pottery, but is was produced around the middle of the 9th century in local workshops, as well (HRUBÝ 1965b).

Classification of pottery of the Staré Město region was done on the basis of visual research (GALUŠKA 1993, 107-111; 1994, 240). At first sight it seems, that the basic ceramic raw-material was different for each of the groups mentioned above. For the verification of this hypothesis parts of the ceramic vessels from each group were chosen. The aim of it was to make laboratory analyses, which should determine the phases composition of potsherds. The researched pottery was found in Staré Město, at the U Víta position in features of the production character. The pottery is represented by potsherds of all the four determined groups and can be dated to the second half of the 9th century . The chosen pottery was completed by potsherds from Ostrožská Nová Ves Slavonic settlement. Potsherds from Ostrožská Nová Ves were dated to the firs half of the 9th century (feature No. 2) and to the first half of the 10th century (feature No. 5).

For the verification of the results of the analyses of the potsherds mentioned above we took clays which seemed to be suitable for the pottery production from Staré Město, at the Školní statek position. These clays were very fine wipings and their colours were grey and brown-red. They created a layer of 40 cms thick which was approximately 150-170 cms under the surface level of today.

All the samples of clays and potsherds were researched at the Institution of material engineering at the Technical University of Brno by X-ray diffraction phase analysis.

An automatic X-ray diffractometer D 500 of the Siemens enterprise was used as a test equipment. The X-ray diffraction phase analysis is a method assigned to identify structural phases in crystalline materials. It determines only a phase - not a chemical constitution of material. It is based on a diffraction of X-rays on atoms of crystalline lattice. The gained X-ray diffraction spectrum is then the Fourier image of an electron density distribution in a sample.

Practically, even if not entirely physically correct, the principle of the mentioned method can be described like a wave motion reflection on atom planes (Fig.1) (TAYLOR 1961).

X-ray beam falls on series atom planes which are spaced regularly at the distance d_{hkl} apart, at the q angle. If the Bragg equation are fulfilled

$$n \,.\, \lambda = 2 \,.\, d_{hkl} \,.\, \sin\theta$$

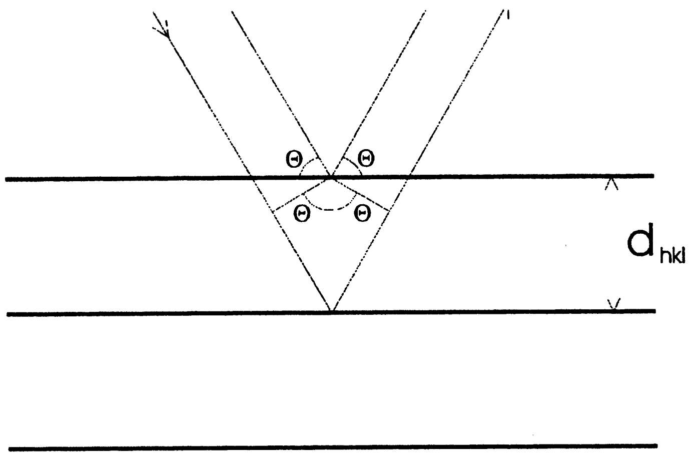

Fig. 1. Derivation of Bragg law

there will be a constructive interference of adjoining waves consequently to a reflection radiation. If these conditions are not fulfilled, there will be a total burn out of the reflection as a result of phase differences at the reflection on a great number of planes. The D 500 diffractometer records reflections of individual atom planes. These reflections present themselves as a local increase of a registered radiation intensity in dependence on the 2θ diffraction angle. Because we know the wavelength of the radiation used, we are able to calculate appurtenant spacing d_{hkl},with the aid of the Bragg equation from individual diffraction angles. Each crystalline phase is unique because of its structure and is therefore unambiguously characterised by a succession of d_{hkl} distances. In a mixture of a greater number of phases each phase creates its own diffraction spots. To the resulting diffraction spectrum the most probable phase components are adjoined to individual phases with the aid of a computer and a database of d_{hkl} successions (KRAUS 1985).

Before the measuring itself, a small part was broken off each sample of the pottery. The small parts were crushed to soft flour in order to get an average phase composition for each sample, not influenced by the surface layer, as well as to avoid possible influences of texture of material. On the basis of measured results the samples can be divided to two groups.

The 1st group was created by following samples:
1. Staré Město U Víta position, feature No. 59 - grey pottery belonging to the 3rd group of the pottery division in the Staré město region, according to L. GALUŠKA, made of a middle fine material.
2. Staré Město U Víta position, feature No. 55 - grey-fired pottery (3rd group).
3. Ostrožská Nová Ves, Oráčiny position, feature No. 2 - brown-fired pottery (1st group).
4. Ostrožská Nová Ves, Oráčiny position, feature No. 11 - red-fired pottery (1st group).
5. Staré Město U Víta position, Feature No. 50.

Spectra of all these samples are almost the same. A typical spectrum of pottery of this group is pictured in the Figure 2. It means that all these samples have in practical terms corresponding phase composition. They are created by common minerals, such as Quartz, Montmorillonite, Muscovite and

Albite. Only one sample (feature No. 59) has a little reduced content of Albite, which could have been removed by floating. It is, therefore, probable that for all these types of pottery one ceramic material was used in the Staré Město and Ostrožská Nová Ves regions.

The second group is created by samples of the so-called pottery of ancient shapes.

If we again compare individual spectra, it is obvious, that they are identical.

If we compare these spectra to the spectrum of the pottery from 1st group (Fig. 2, 3) we can notice the fact, that they distinguished only by the presence of certain amount of Kalcit. Therefore, it is possible, that for the production of them the same basic material as for the pottery from the 1st group was used, however, mixed together with a certain amount of limestone.

We made an analysis of a sample of river-clay as well, because in the mentioned region a lot of river-clay occur. This river-clay could have been used as a ceramic material. We analysed it in its natural state and after the annealing at 800 centigrates of Celsium for 1 hour - with the aid of which we simulated a certain degree of firing.

From the spectra enclosed it is obvious at first sight, that they differ from the spectra of the both types of pottery (pottery - Fig. 2, 3, clay - Fig. 4, 5). According to this fact, we are able to say, that this clay is not the material from which the samples were produced. Nevertheless, according to its phase composition - especially according to the content of Kaolinite and Illite, we can admit, that this clay is good ceramic material. We cannot exclude that it was used for some other purposes - for example bricks.

References

BÉREŠ, J.

- 1985: Keramika na tzv. avarských pohrebiskách a sídliskách zo 7.-8. stor. na Slovensku (Keramik aus den sog. awarischen Gräberfeldern und Siedlungen des 7. und 8. Jahrhunderts in der Slowakei). Slovenská Arch. 33/1, 15-70.

BUDINSKÝ-KRIČKA, V.

- 1956: Pohrebisko z neskorej doby avarskej v Žitavskej Tôni na Slovensku (Ein Gräberfeld aus der späten Awarenzeit in Žitavská Tôň in der Slowakei). Slovenská Arch. 4/1, 5-131.
- 1959: Slovanské mohyly ve Skalici (Slawische Hügelgräber in Skalica). Bratislava.

DOSTÁL, B.

- 1966: Slovanská pohřebiště ze střední doby hradištní na Moravě (Slawische Begräbnisstätten der mittleren Burgwallzeit in Mähren). Praha.
- 1975: Břeclav-Pohansko. Velkomoravský velmožský dvorec (Břeclav-Pohansko. Grossmährischer Herrenhof). Brno.
- 1985 : Břeclav-Pohansko. Časně slovanské osídlení (Břeclav-Pohansko. Frühslawische Besiedlung). Brno
- 1993: K sídlištní keramice blatnicko-mikulčického horizontu (Zur Siedlungskeramik des Blatnica-Mikulčice-Horizontes). Sborník Prací Fil. Fak. Brno E 38, 59-90.

EISNER, J.

- 1952: Devínska Nová Ves. Slovanské pohrebisko (Begräbnisstätte aus dem VII. und VIII. Jahrhundert in Devínska Nová Ves bei Bratislava in der Slowakei). Bratislava.
- 1966: Rukověť slovanské archeologie. Praha.

GALUŠKA, L.

- 1987: K výzdobě vnitřních stran okrajů slovanských nádob (Zur dekoration der Innenseiten der Ränder von slawischen Gefässen). Časopis Moravského Muz. Vědy Společenské 72, 75-87.
- 1989: Výrobní areál velkomoravských klenotníků ze Starého Města - Uherského Hradiště (Das Erzeugungsareal der großmährischen Juweliere aus Staré Město - Uherské Hradiště). Pam. Arch. 80, 405-454.
- 1989a: Plastická lišta na středohradištní keramice ze starého Města (Plastische Leiste der mittelburgwallzeitlichen Gefäße in Staré Město). Časopis Moravského Muz. Vědy Společenské 74, 121-135.
- 1993: Slovanská keramika v oblasti staroměstské aglomerace od konce 8. do poloviny 10. století (Die slawische Keramik im Bereich der Agglomeration von Staré Město vom ausgehenden 8. bis zur Mitte des 10. Jahrhunders). Slovácko 35, 101-113.
- 1994: The development of Slavonic pottery in the Staré Město Region from the End of the 8th up to the Middle of the 10th Centuries. In: Č. STAŇA (Hrsg.): Slawische Keramik in Mitteleuropa vom 8. bis zum 11. Jahrhundert. ITM I. Brno, 233-242.
- 1995: Keramik des Marchtyps. In: L. POLÁČEK (Hrsg.): Slawische Keramik in Mitteleuropa vom 8. bis zum 11. Jahrhundert. Terminologie und Beschreibung. ITM II. Brno, 97-106.

GUINIERE, A.

- 1956: Theorie et Technique de la radiocristallographie. Paris.

HRUBÝ, V.

- 1955: Staré Město. Velkomoravsné pohřebiště Na valách (Staré Město. Die großmährische Begräbnisstätte Na valách). Praha.

- 1964: Staré Město - Velehrad, ústředí z doby Velkomoravské říše (Staré Město, ein Siedlungszentrum aus der Zeit des Großmährischen Reiches). Praha.
- 1965: Staré Město. Velkomoravský Velehrad (Staré Město. Ein Zentrum des Großmährischen Reiches). Praha.

KLANICA, Z.
- 1970: Pokus o třídění keramiky z Mikulčic (Ein Gliederungsversuch der Keramik aus Mikulčice). In: Sborník AÚ Brno V, Josefu Poulíkovi k šedesátinám. Brno, 103-114.
-1986: Počátky slovanského osídlení našich zemí (Die Anfänge der slawischen Besiedlung unserer Länder). Praha.

KRAUS, I.
- 1985: Úvod do strukturní rentgenografie. Praha.

MAREŠOVÁ, K.
- 1983: Uherské Hradiště - Sady. Staroslovanské pohřebiště na Horních Kotvicích (Altslawische Begräbnisstäte in Uherské Hradiště - Sady). Brno.
- 1985: Uherské Hradiště - Sady. Staroslovanské sídliště na Dolních Kotvicích (Altslawische Siedlung in Uherské Hradiště - Sady). Brno - Uherské Hradiště.

POULÍK, J.
- 1948: Staroslovanská Morava (Moravia in Old Slavonic period). Praha.
- 1985: Svědectví výzkumů a pramenů archeologických o Velké Moravě. In: Velká Morava a počátky československé státnosti. Praha-Bratislava, 9-80.
- 1989-1990: Po létech opět o blučínském typu (Nach Jahren nochmals zum Blučina typ). Sborník Prací Fil. Fak. Brno E 34-35, 27-39.

SNÁŠIL, R - PROCHÁZKA, R.
- 1981: Příspěvek k poznání velkomoravkého střediska severní části Dolnomoravského úvalu (Ein Beitrag zur Erkenntnis des großmährischen Zentrum in nördlichen Talkessels). Slovácko 23, 9-58.

TAYLOR, A.
- 1961: X-Ray metallography. New York - London.

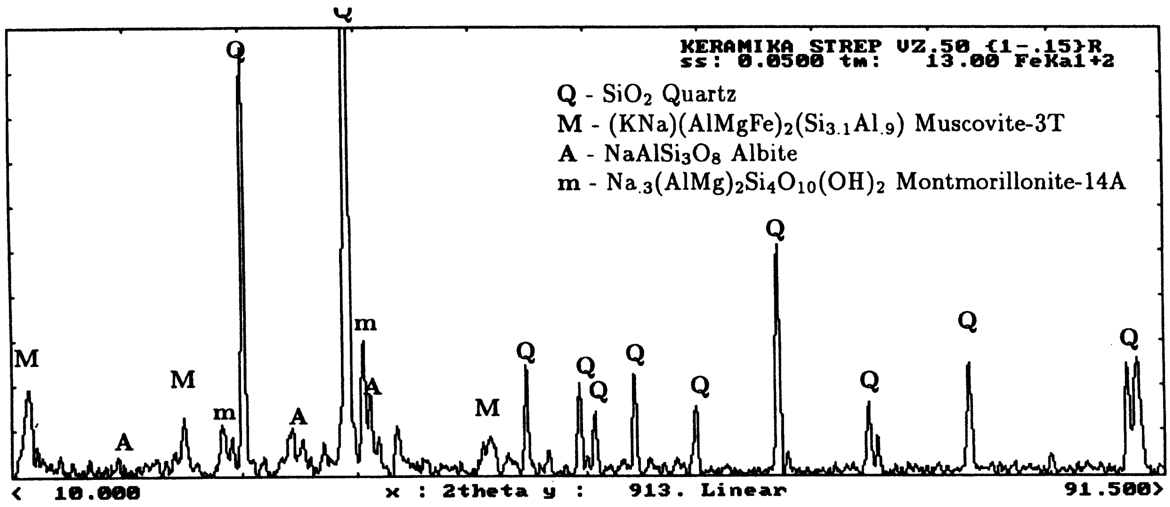

Fig. 2. Typical diffraction spectrum of first group of ceramics.

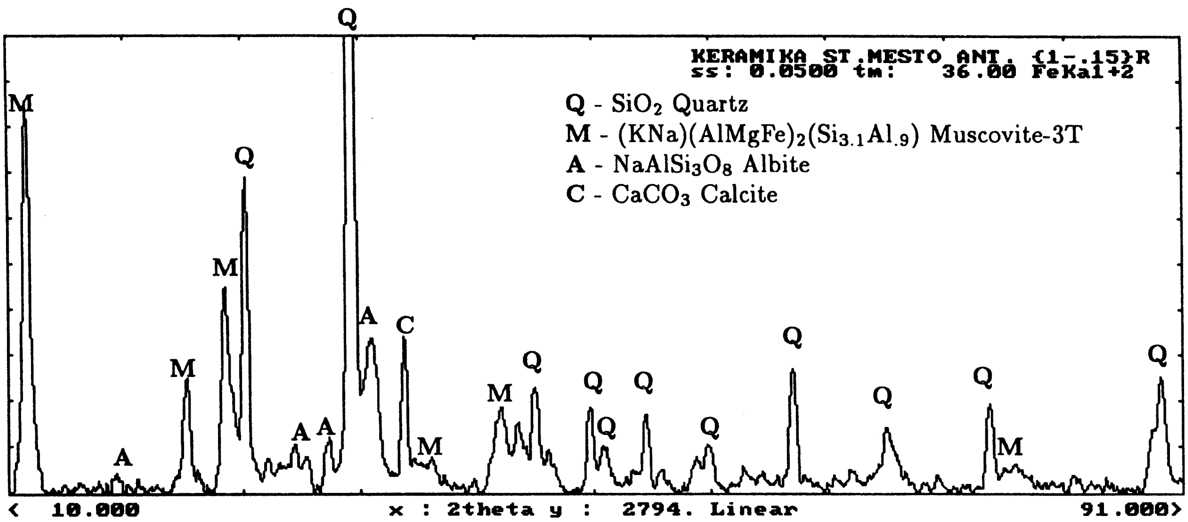

Fig. 3. Typical diffraction spectrum of second group of ceramics.

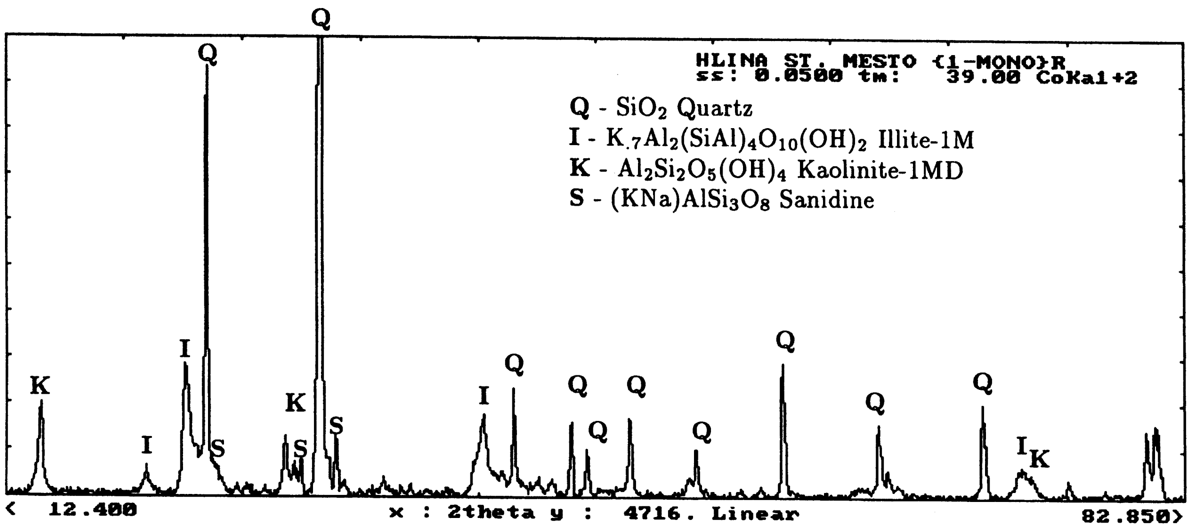

Fig. 4. Diffraction spectrum of river-clay.

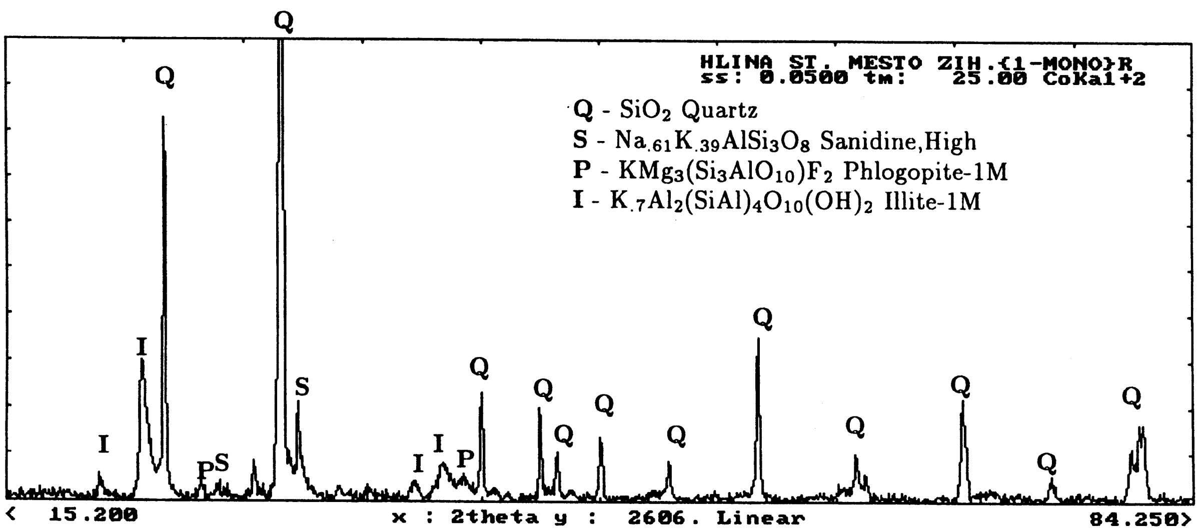

Fig. 5. Diffraction spectrum of annealing river-clay.

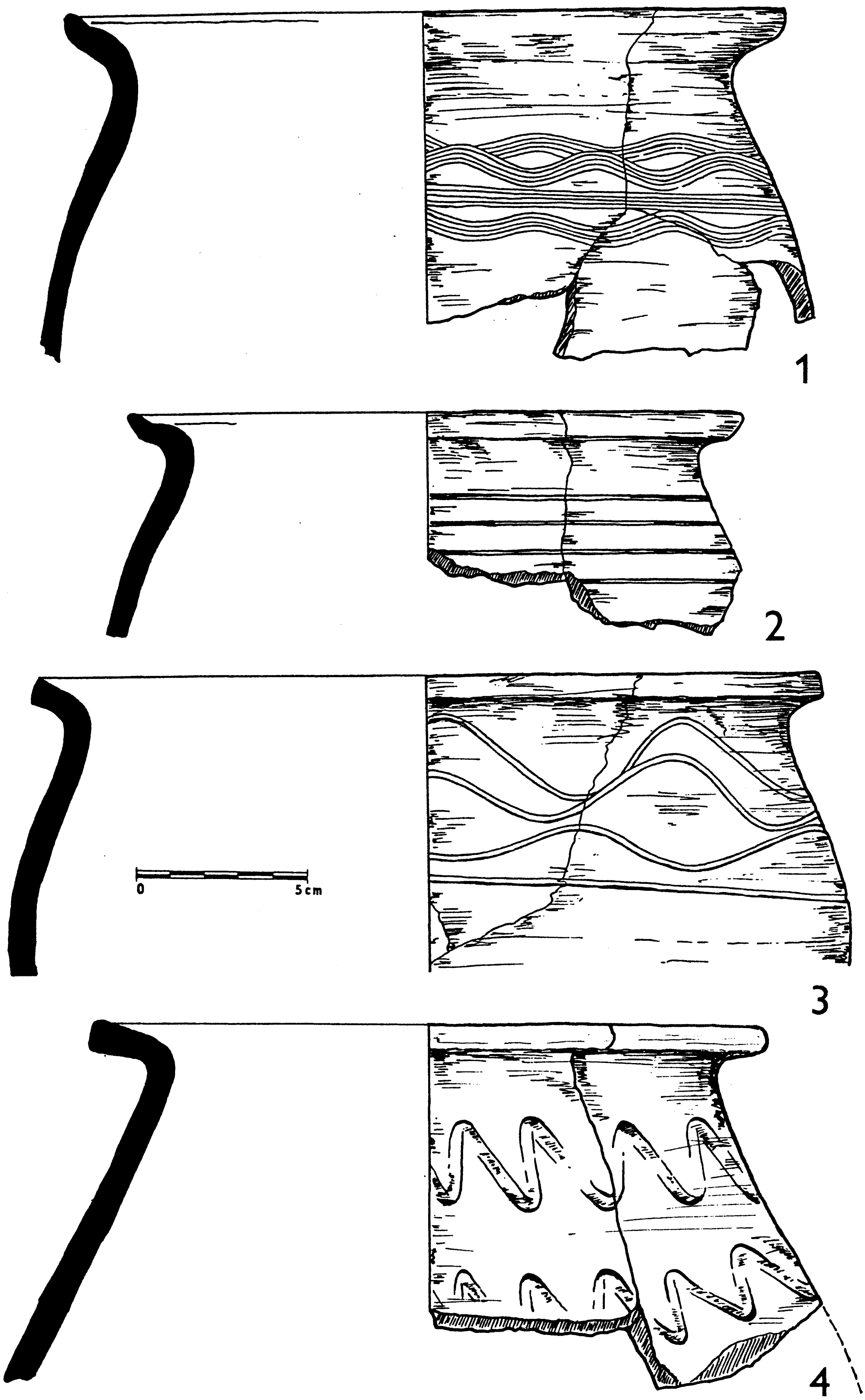

Fig. 6. Parts of vessels which were used for the resear work. 1-3 Staré Město U Víta position, 4 - Ostr. Nová Ves Oráčiny position.