ARHEOLOOGILISED VÄLITÖÖD EESTIS

ARCHAEOLOGICAL FIELD WORKS IN ESTONIA

1999

Koostanud ja toimetanud
Ülle Tamla

Muinsuskaitseinspektsioon
Tallinn 2000

Esikaas: rihmajagaja Harjumaalt Harmi kalmest
Cover: strap-divider from Harmi grave in Harjumaa

Tagakaas: kaelavõru fragment Harjumaalt Harmi kalmest
Back cover: fragment of neck-ring from Harmi grave in Harjumaa

Uus 18, Tallinn 10111, Eesti
e-mail: info@muinas.ee

Kujundus ja makett:
Jaana Kool

ISSN 1406-3972

Trükitud AS Pakett trükikojas
Laki 17, Tallinn

TEXTILE FRAGMENT FROM A CHURCH DOOR – FIELDWORK AND LABORATORIAL STUDY

Jüri PEETS
Ajaloo Instituut (Institute of History), Rüütli 6, 10130 Tallinn, Eesti (Estonia)
jyri45@mail.ee

In spring 1999, in the course of restoring the door of the southern entrance of the Tallinn Pühavaimu church, a 5 x 6 cm fragment of bluish green woollen textile (Photo 1) was found beneath a nail. The find is the first of its kind. It is possible that at one time the door of the church was covered with textile on the outside. Because of the unfinished restoration work, the laboratory investigation of the textile fragment was necessary, to obtain more information for dating the portal and about the construction features. The textile-technical analyses were carried out in the laboratory for archaeology and ancient technology of the Institute of History and the dye and element analyses in the restoration centre Kanut by Heige Peets.

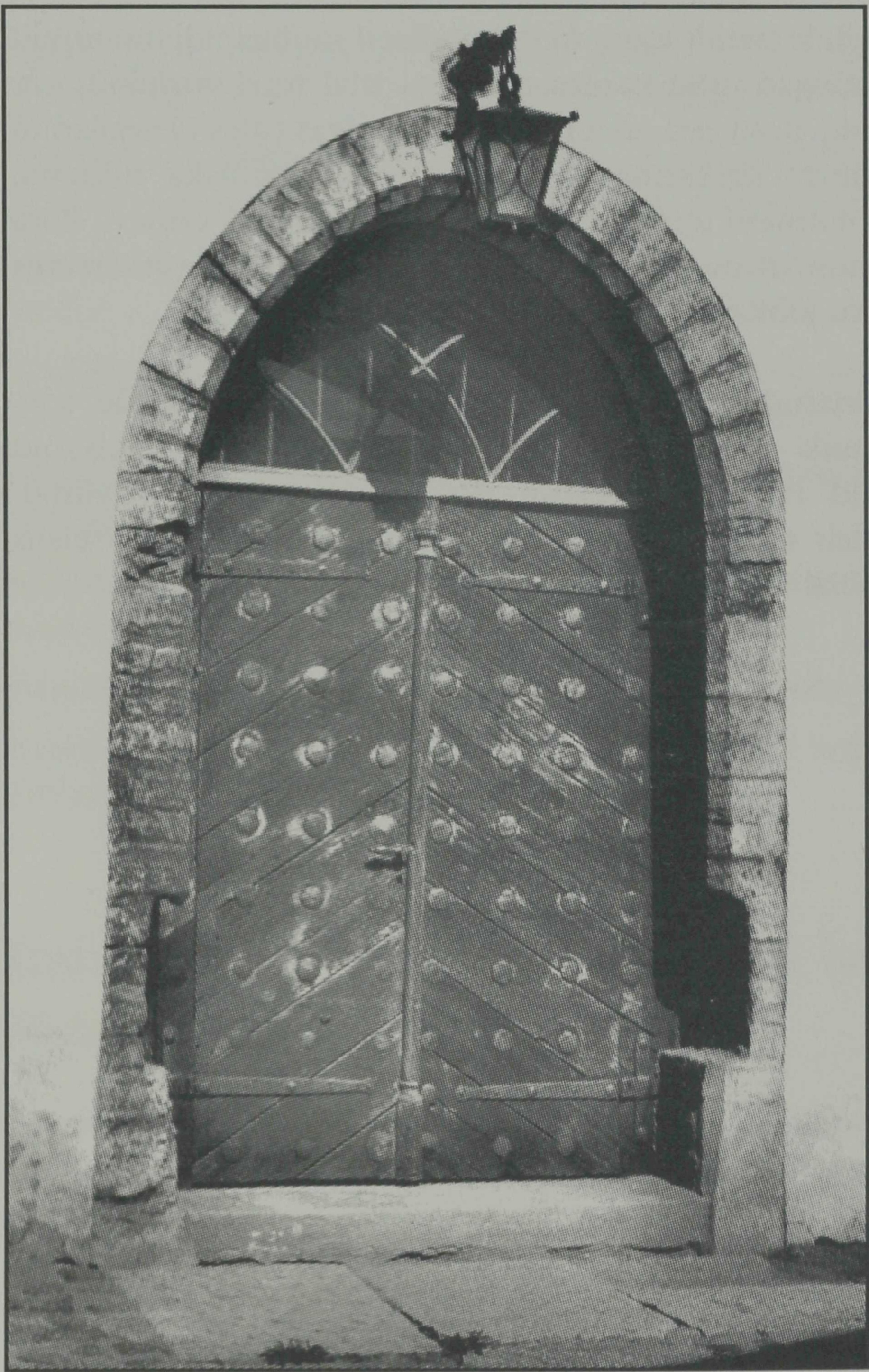

Photo 1. The southern portal of the Tallinn Pühavaimu Church.
Foto 1. Tallinna Pühavaimu kiriku lõunaportaal.

The edges of the preserved textile fragment were heavily impregnated with iron salts. Sporadically, iron oxides carried sand grains, probably from the street dust blown there by the wind (Photos 2 and 3). The edges of the textile fragment were darkened, hence the presence of tar was checked. Since the soaking in toluene did not reveal any traces of organic resin, the darkening of the textile fragment was evidently caused by iron salts. Neither can thermal damage (heat of fire) be excluded.

The textile fragment is a relatively thick woollen cloth of good quality (14–16 yarns in warp and 8–10 yarns in weft per cm). The surface of the cloth has been carefully teaselled, so the weft can be observed only sporadically at the edges of the fragment. The cloth is woven in three-shaft twill technique (1/3d), the yarn used is of different spin: warp is Z-spun and weft is S-spun, respectively 0.5 and 1 mm in diameter. The yarn is spun of high-quality lamb wool, carefully carded, which is indicated both by its low dispersion coefficient (31% in weft and 24% in warp) and relatively small average diameter (27 µm in weft and 28 µm in warp) of the fibres. The dispersion coefficient characterises the difference in the diameter of the wool fibres. The smaller the dispersion coefficient and the average diameter of the wool fibres, the higher is the quality of the yarn. This is the reason why stock breeding is aimed at developing sheep with as fine, even and long wool fibre as possible. To determine the quality parameters of the wool, a diameter of 100 fibres from both weft and warp yarn were measured, using a biological microscope *BIOLAM* with a micrometer at the magnification 150 x. The results are given numerically as well as graphically (Fig.). To calcu-

Photo 2. The cloth fragment from the door.
Foto 2. Riidefragment ukselt.

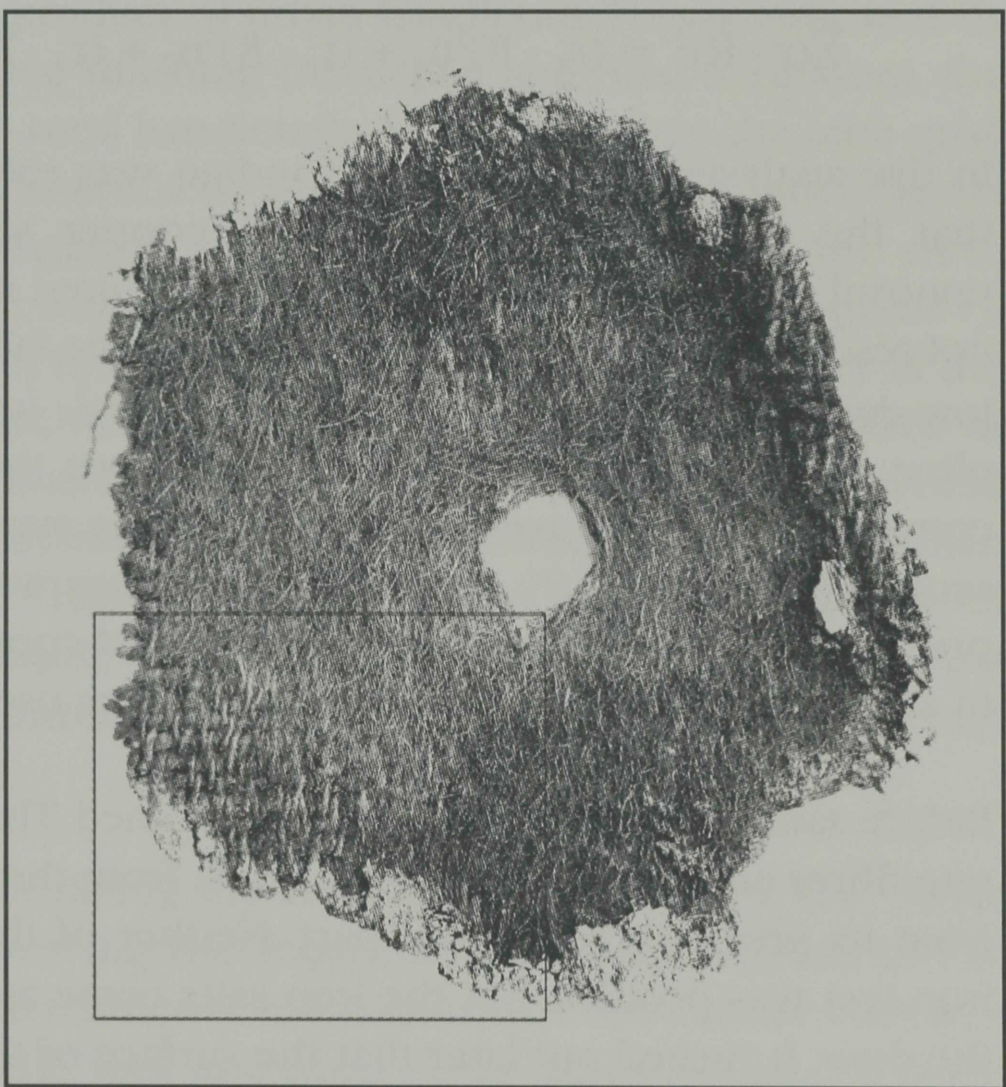

Photo 3. Detail of the cloth fragment. At the edge iron rust with sand grains.
Foto 3. Detail riidefragmendist. Selle ääres rauarooste ja liivaosakesed.

late the average diameter of the fibre ® and the dispersion coefficient (V) the following formulae were used:

R - the average diameter of the fibre
N - the number of measurments ($n_1 + n_2 + n_3 + \ldots + n_n$)
$n_1 - n_n$ - the number of fibres in the thickness rank
r - diameter of a single fibre
$r_1 - r_n$ - the average diameter of fibres in the thickness rank

$$R = \frac{\sum(r\,n)}{N}$$

$$\sum(r\,n) = n_1 r_1 + n_2 r_2 + n_3 r_3 + \ldots + n_n r_n$$

V - the dispersion coefficient

$$V = \sqrt{\frac{\sum(r - R)^2}{N}} \times 100 : R\ (\%)$$

$$\sum(r - R)^2 = (r_1 - R)^2 n_1 + (r_2 - R)^2 n_2 + (r_3 - R)^2 n_3 + \ldots + (r_n - R)^2 n_n$$

In dye analyses, the presence of indigo was established, and so the presumtion that the fabric was polluted with copper salts, appeared unfounded. After removal of the indigo the wool fibres acquired a yellowish-brown tint which did not resolve in different solvents. Evidently the fabric was first dyed with some yellow dye, most likely the dyer's rocket (*Reseda luteola*), the agent of which is luteoline, and after that with indigo (to achieve the green hue). Such method was common for dyeing green fabric before the synthetic dyes came into use in the second half of the 19th century. The analyses were carried out to determine the presence of possible mordants (tin (Sn) and copper (Cu) salts). Classical methods of semimicro-, micro- and dye analyses' were used.

Before sampling, the textile was not cleaned. The samples for the analyses (separate fibres and bits of yarn) were taken from the edge of the textile fragment and from its green-tinted central part. Neither of the elements was discovered. The iron test was positive, but the iron salts come apparently from the iron details of the door. It turned out later that the surface of the door had been cleaned with a hot-air pistol, hence the thermal damages to the textile.

Considering the aforesaid we may conclude that the cloth used for the covering

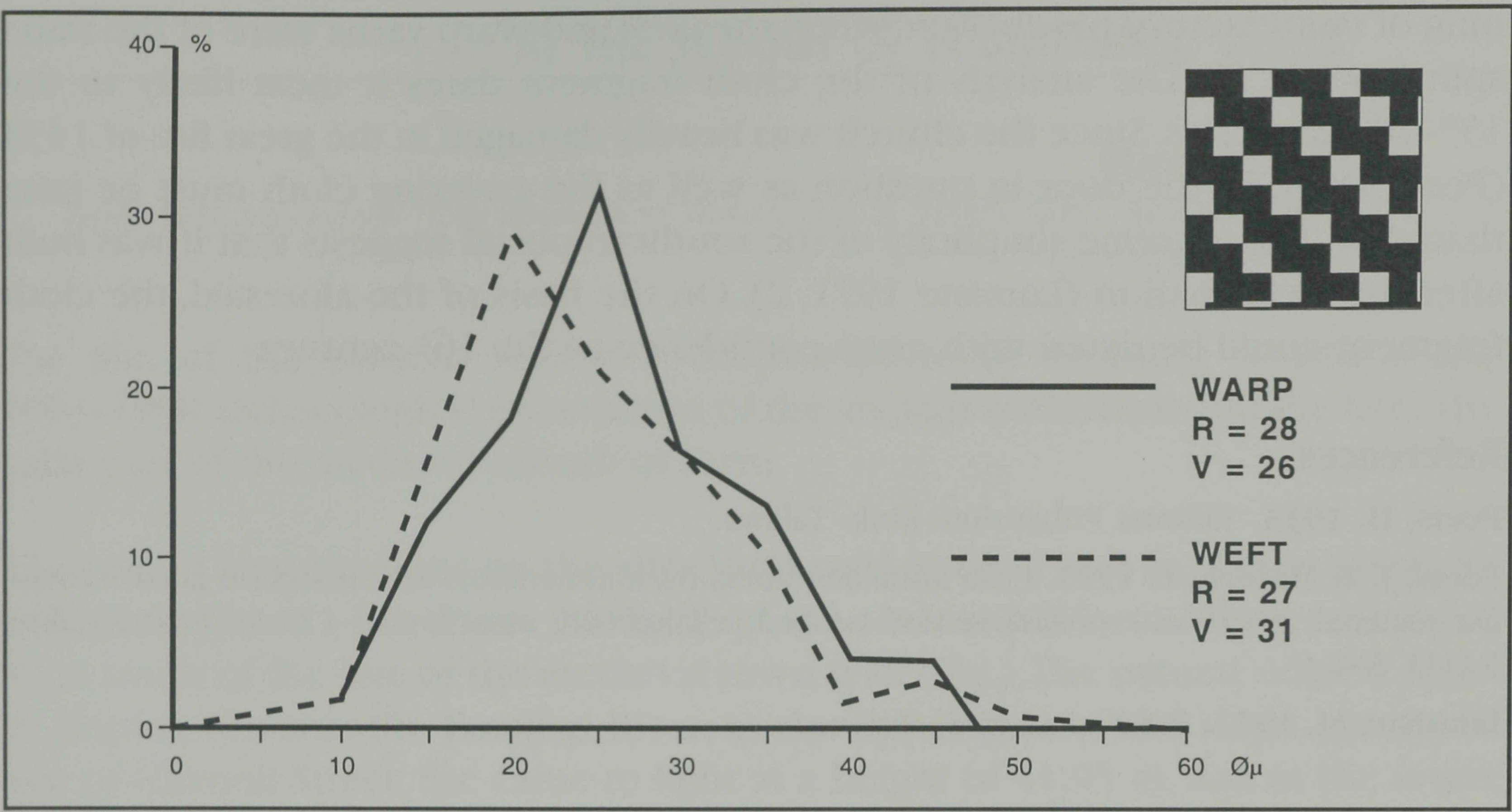

Fig. *The weaving pattern of the cloth (1) and the quality diagram of wool (2).*
Joon. *Riidefragmendi koeskeem (1) ja villa kvaliteedidiagramm (2).*

of the door was most likely the product of urban handicraft. This is indicated by the quality of weaving and surface finishing (teaselling and hard shrinking), the techniques that were not used in rural handicrafts. At the same time the high quality of the wool (low dispersion coefficient and average diameter), much better than the wool of local sheep, suggests its foreign origin. Most likely the cloth comes from some West-European manufacturing centre (Netherlands, England ?), where woollen cloth was made of fine or semifine wool, with the diameter of the fibres up to 25μm and 26–30μm, respectively. To the cloth-weaving centres of Netherlands, wool was brought mainly from Spain (merino), and England, where sheep with fine wool were bred since the 12^{th}–13^{th} centuries already. Estonian sheep were mainly, up to the 2^{nd} half of the 19^{th} century, with semi-thick wool (average diameter of fibres 31–40μm; dispersion coefficient 34–52 %). Only then the sheep with fine wool were introduced in local estates, in farms it happened still later (Peets & Maldre 1995).

Unfortunately the possibilities for dating the cloth fragment are poor. The three-shaft twill technique, used in weaving the fragment, was widely spread in the Middle Ages. Most of the medieval textiles of Estonian towns were made with this technique. The different spin of the weft and warp yarns indicates that the cloth was made on weaving loom and following the guild regulations (different spins of weft and warp increased the density of the fabric, which was especially important in cloth making). This allows us to date the fragment earlier than the beginning of manufactory production, when the weft and warp yarns were of the same spin (mostly Z). The analysis of the cloth fragment dates it most likely to the 15th-16th centuries. Since the church was heavily damaged in the great fire of 1433 (Peets 1933, 5), the door in question as well as the covering cloth must be later than that. The extreme simplicity of the southern portal suggests that it was built after the Reformation (Lumiste 1971, 2). On the basis of the aforesaid, the cloth fragment could be dated with great confidence to the 16th century.

References

Peets, H. 1933. Tallinna Pühavaimu kirik. Tallinn.

Peets, J. & Maldre, L. 1995. Eesti kohaliku lambatõu kujunemisest arheoloogilise ja osteoloogilise materjali põhjal ehk neljasarvelised lambad ja Jakobsoni must kuub. – Kleio. Ajaloo ajakiri, 1 (11), 3–4.

Lumiste, M. 1971. Pühavaimu kirik. Tallinn.

Tekstiilileid kirikuukselt – välitööd ja laboratoorne uuring

Jüri PEETS

1999 leiti Pühavaimu kiriku ukse (foto 1) restaureerimistöödel ühe kinnisnaela alt u. 5 x 6 cm suurune sinakasroheline villase riide fragment (fotod 2 ja 3). Kangatüki servad olid rauasooladega tugevasti impregneerunud, kohati oli koos oksiididega ka liivaterakesi (joon.). Kangas oli küllaltki paks kvaliteetne kalev, kus lõimes oli 14-16 ja koes 8-10 lõnga ühe cm kohta. Selle pind oli hoolikalt karvastatud, nii et koemustrit oli vaid kohati näha fragmendi servades. Kangas oli kootud kolmeniielises toimses tehnikas (koeskeemi vt. joon.). Fragmendil oli säilinud roheline värv. Arvatavasti oli kangast värvitud kõigepealt kollase värvainega, milleks võis tõenäoliselt olla reseedast (*Reseda luteola*) saadud luteoliin ja seejärel, rohelise tooni saamiseks, sinise indigoga. Kudumiseks oli kasutatud hoolikalt töödeldud kvalteetsest villast kedratud lõnga (lõim Z, kude S). Tõenäoliselt on ukse väliskatteks kasutatud kangas valmistatud mõnes Lääne-Euroopa (Madalmaad, Inglismaa) kalevivalmistamise keskuses. Analüüsitulemuste põhjal võib kanga dateerida 15.-16. saj., kõige tõenäolisemalt 16. sajandisse. Viimase dateeringu kasuks räägivad ka ehitus-arhitektuuriliste uuringute tulemused.