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Uus 18, Tallinn 10111, Eesti

Toimetuskolleegium:

Jaan Tamm
Heiki Valk
Toomas Tamla
Ülle Tamla

Uus 18, Tallinn 10111, Eesti
e-mail Ulle.Tamla@mail.ee

Kujundus ja makett:

Jaana Kool

TARTU ÜLIKOOLI
RAAMATUKOGU
SUNDEKSEMPLAR

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REMAINS OF A MARINE FORTIFICATION ON THE BOTTOM OF THE BAY OF TALLINN

Vello MÄSS and Andres EERO
Eesti Meremuuseum (Estonian Maritime Museum)
Pikk 70, 10133 Tallinn, Eesti (Estonia)

A huge mound of stones and timber with an approximate area of 3500 m^2 was found on the bottom of the Bay of Tallinn, 900 metres off shore, by a group of scuba divers - the amateur marine archaeologists of the Estonian Maritime Museum - in the summer of 1985 (Fig. 1). Judging by the state of preservation of this stone and wooden construction, laying between the depths 8 to 11,5 metres, the newly discovered object could be dated to the 18th century, but its purpose and origin remained uncertain. Ends of the thick logs were fastened to each other using tenons in some places, but the whole construction seemed to be badly damaged, in some places completely destroyed. In close vicinity of the ruins, a strong and massive log-frame like box filled with stones was also found (Fig. 2). The five metres high box with 10,6 by 11,3 metre long sides is located at the north-western edge of the construction, at the opposite side of the seashore.

On the map of the Bay of Tallinn, dated to the first quarter of the 18th century, a small angular object with the description *Citadel* in Russian language can be seen at the location of the underwater construction (Fig. 3). The same object can also be noticed on the relatively correct map of the Bay of Tallinn, made by the Russian hydrographer A. Nagayev in 1757 (Fig. 4).

According to historical sources (Gustavson 1994), the marine fortification *Citadel* had been erected in the deep sea in the 1720's. The fortification was intended to keep the fairway leading to the Tallinn harbour under the control of cannons that

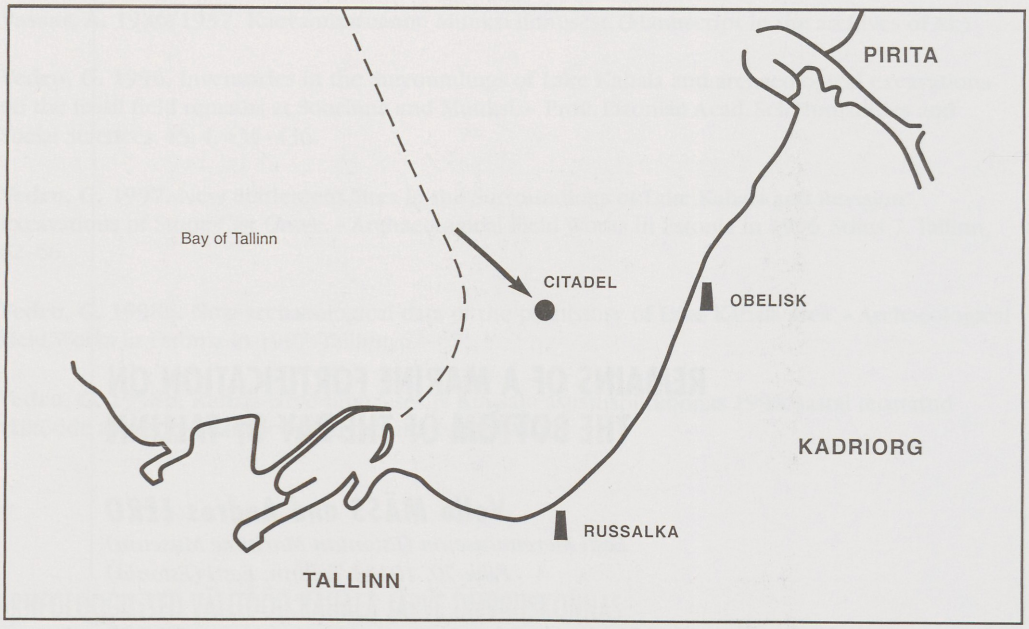

Fig.1. Location of the newly found object within the Bay of Tallinn.
Joon. 1. Hävinud merekindluse asukoht Tallinna lahes.

were placed on the *Citadel.*

In 1997, the Maritime Museum continued more detailed investigation of the remains found 12 years ago. The surveying vessel "Mare" and side scan sonar equipment were successfully used for obtaining an image of the whole fortification area in the correct proportions. It appeared that the ruins of the *Citadel* have a crescent-like form and a total of three log-frames surround the deepest side of the fortification. Some videofilming of the remains were also made.

In 1998, the log-frames were preliminarily documented and the depths above and around the boxes measured. The very strong and solid construction of the boxes suggests that the frames had been placed at the seaward side of the fortification in order to protect the *Citadel* against possible attacks by enemy warships, heavy sea and drifting ice, which could evidently be dangerous to the wooden construction of the fortification, people and cannons. Construction of this "protective line" was obviously not completed. On top of each log-frame one more similar box should have been placed.

In November 1998, the surveying vessel "Jacob Hägg" of the Swedish Marine Administration arrived in Tallinn. With the help of researchers from the Stockholm

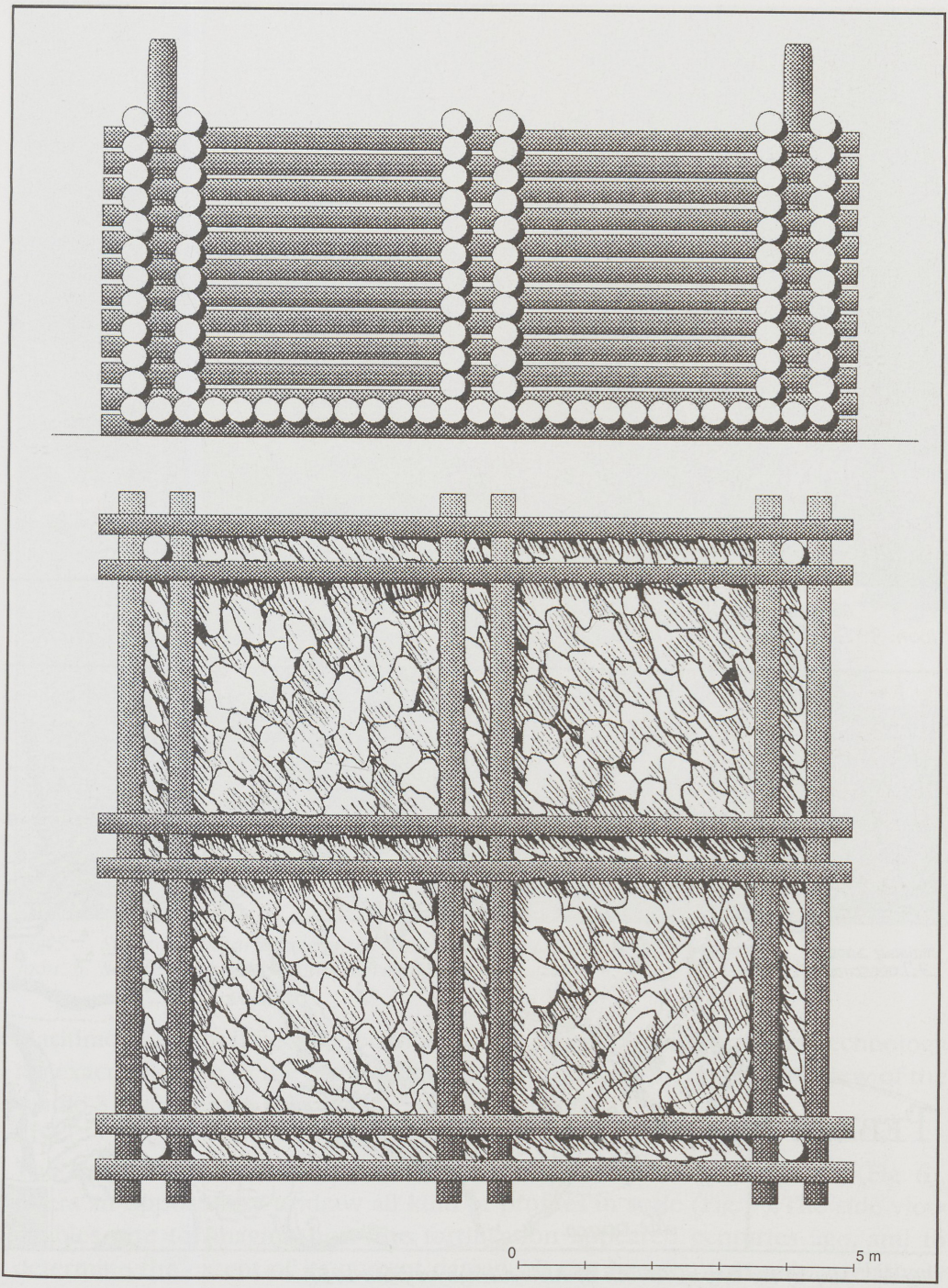

Fig.2. Log-frame with the limestone filling. *Joon. 2. Paekividega täidetud kärgkast.*

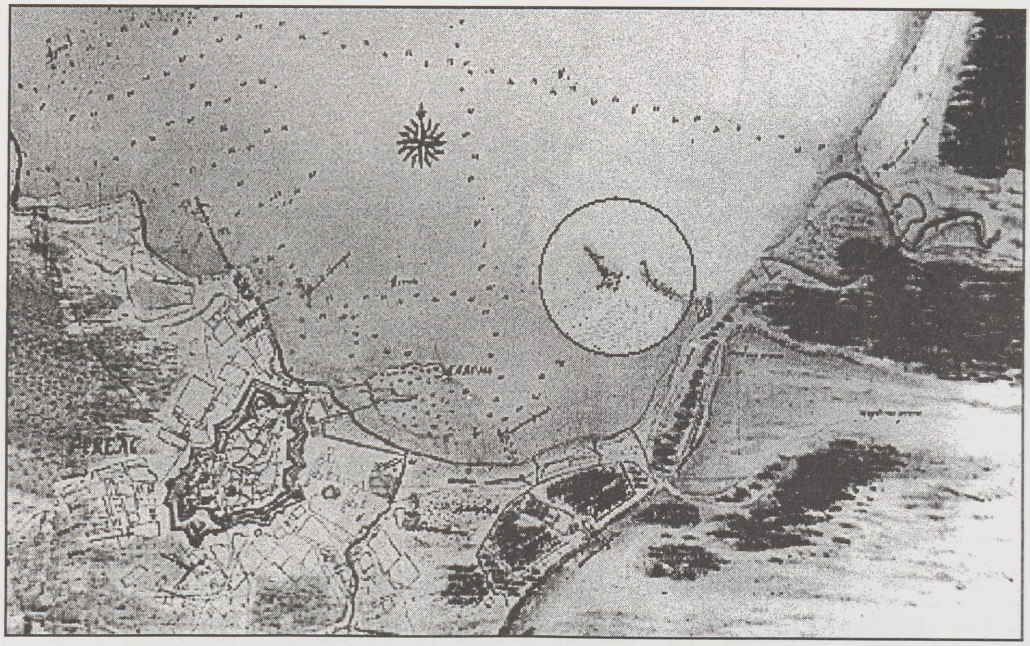

Fig.3. Russian map of the Bay of Tallinn from the 1720's.
Joon. 3. Tallinna laht. Vene kaart 1720. aastatest.

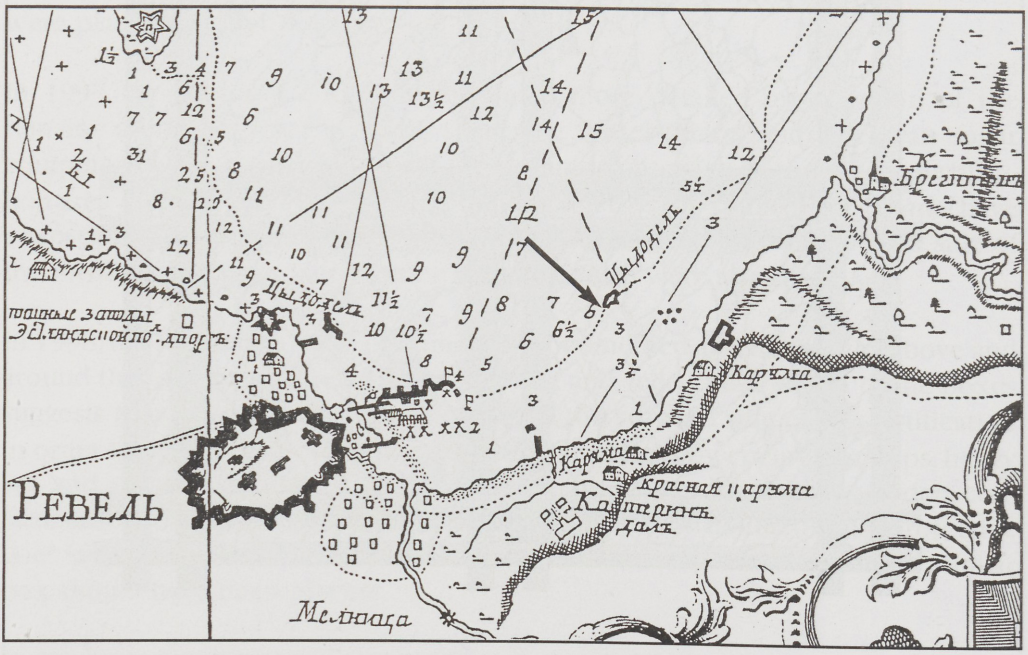

Fig.4. Map of the Bay of Tallinn by Aleksei Nagayev from 1757.
Joon. 4. Aleksei Nagajevi koostatud Tallinna lahe kaart 1757. aastast.

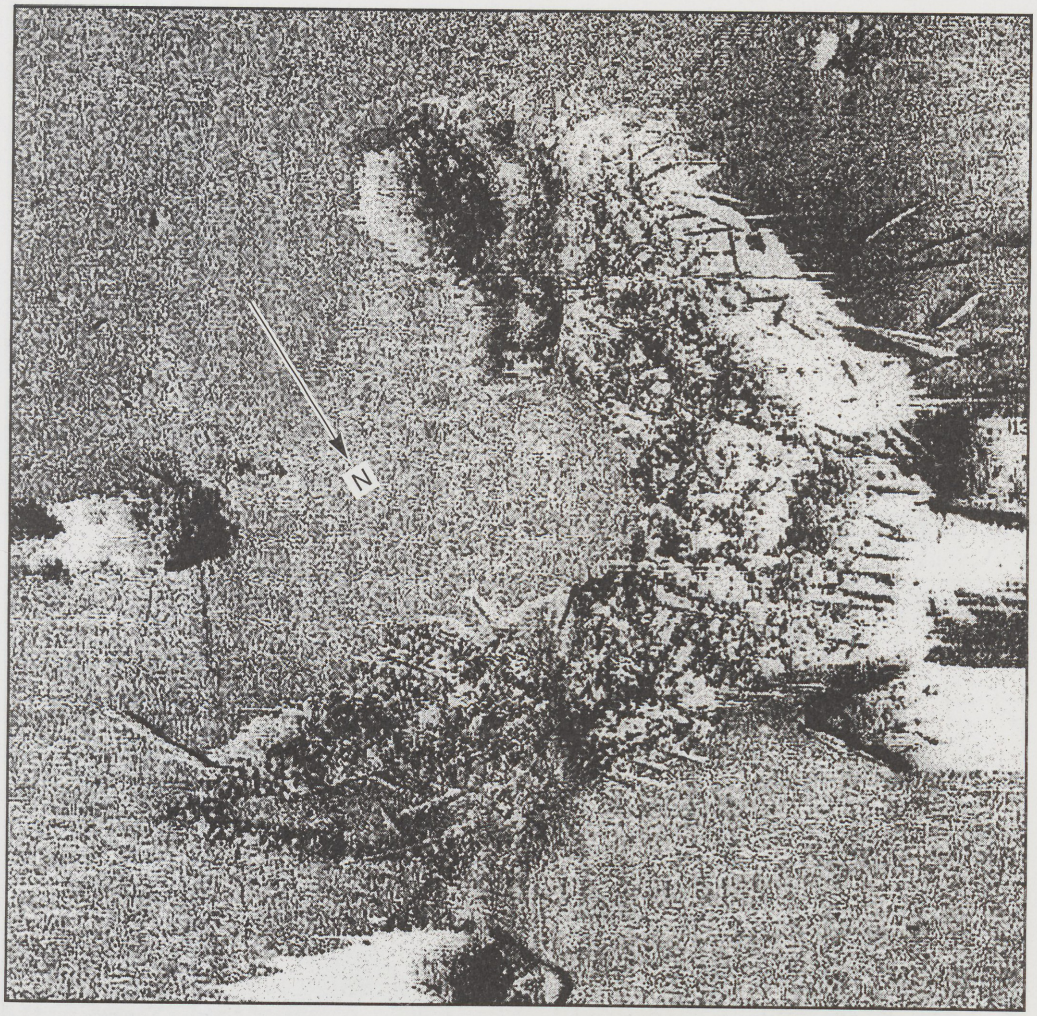

Fig.5. Side scan sonar image of the underwater remains of the fortification.
Joon. 5. Sonariga saadud kujutis merekindluse jäänustest.

Maritime Museum it became possible to use the ship and its modern technology for exact planning of the fortification and for obtaining an impressive view of the whole 3, 500 m² area (Fig. 5).

The North-South orientated plan of the remains with the depth-marks (Fig. 6), offers an opportunity to draw all kind of profiles in scale (Fig. 7). The side view enables one to imagine how the fortification appeared centuries ago, and to determine the extent of its current damage. It can be seen that only a relatively small part of the *Citadel* still exists. A great deal of stones and timber are missing.

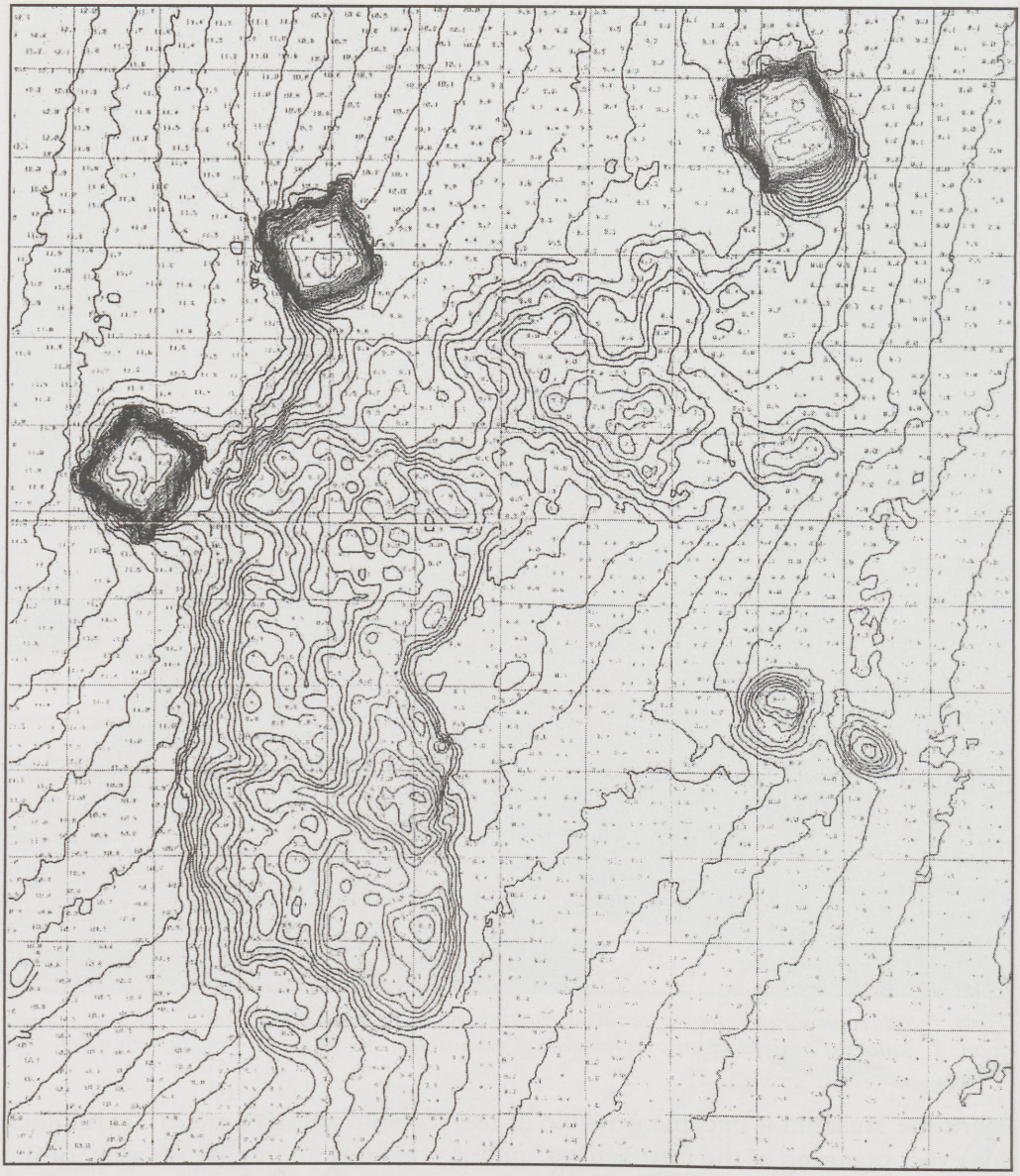

Fig.6. Plan of the fortification and log-frames with the depth-marks.
Joon. 6. Sügavusmärkidega merekindluse ja kärgkastide plaan.

Has the *Citadel* been destroyed by the sea or drift-ice? Evidently not because no building material can be seen laying scattered on the sea bottom in the vicinity of the remains. The most probable explanation is that when the harbour of Tallinn was restructured and extended in the 19th century, the old-fashioned and unnec-

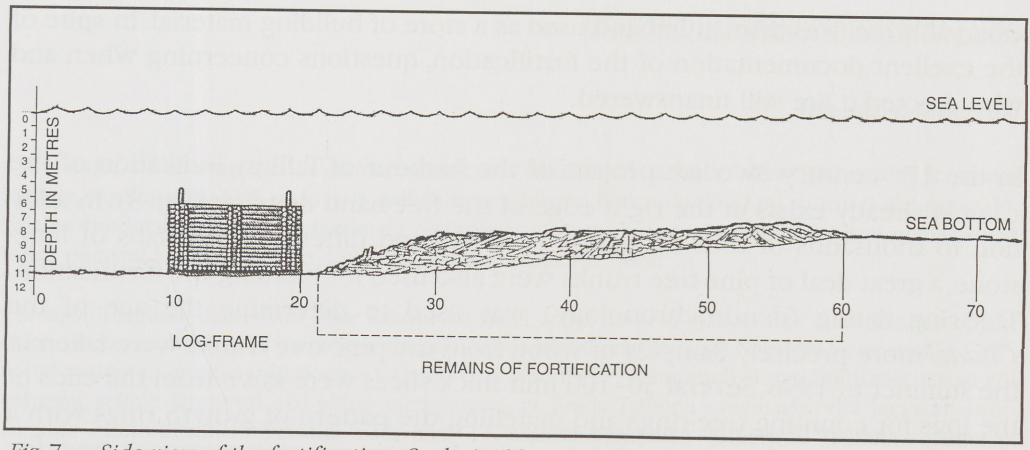

Fig.7. Side view of the fortification. Scale 1:100.
Joon. 7. Külgvaade merekindlusest. Mõõt 1: 100.

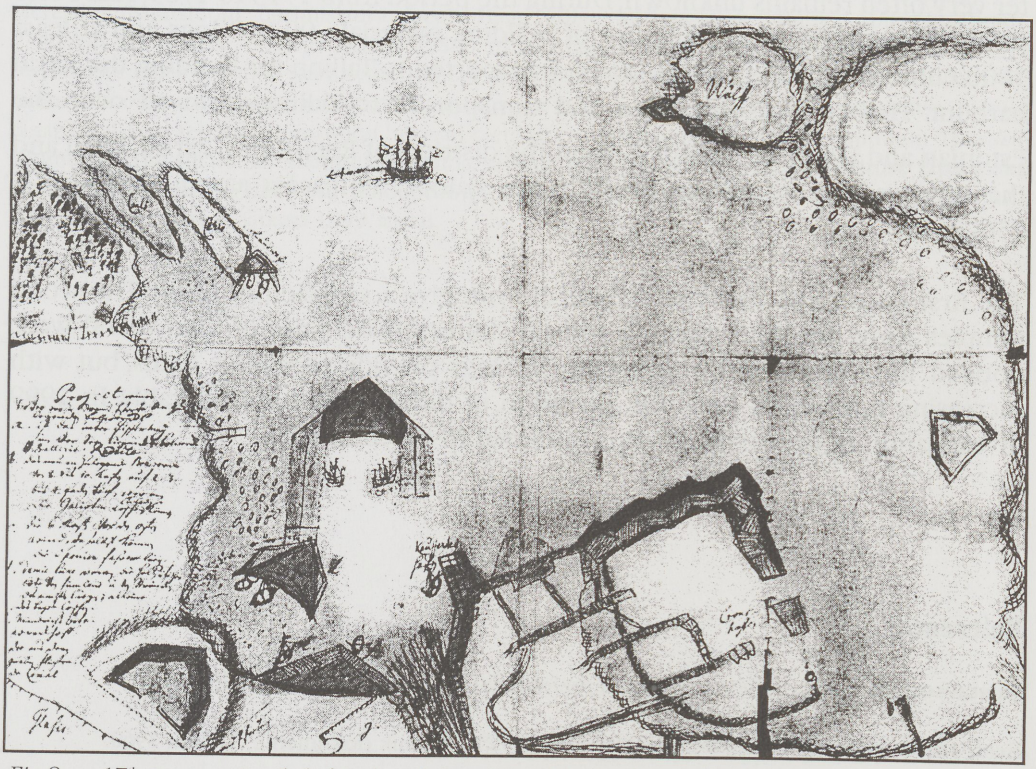

Fig.8. 17th century Swedish free-hand drawing of the harbour of Tallinn and fortification with the Citadel on the right edge of the drawing.
Joon. 8. Vaba käega tehtud rootsiaegne joonis Tallinna sadamast. Tsitadell joonise parempoolses servas.

essary *Citadel* was dismantled and used as a store of building material. In spite of the exellent documentation of the fortification, questions concerning when and who erected it are still unanswered.

In the 17th century Swedish project of the harbour of Tallinn, indication of the *Citadel* already exists at the right edge of the free-hand drawing (Fig. 8). In addition to thousands of tons of granite boulders and different-sized slabs of limestone, a great deal of pine-tree trunks were also used for building the fortification. Tree-ring dating (dendrochronology) was used to determine the age of the *Citadel* more precisely. Samples of wood from the pine-tree trunks were taken in the summer of 1998. Several 50–100 mm thick slices were sawn from the ends of the logs for counting tree-rings and matching the pattern of growth rings with a special diagram in the museum's laboratory. In optimum circumstances, tree-ring dating can give very precise results - even to a single year. The outermost ring is desirably present, and the place where the tree grew must be known. But the latter very often remains unknown. During the period from 1713 to 1715, Tzar Peter the Great ordered a great amount of building material - 90 000 logs and at least 1000 cubic fathoms of stones - to be transported to Tallinn for building the naval harbour. Timber was cut down and transported to Tallinn from all over the Estonian and Livonian territory - from the districts of Riga, Cēsis, Pärnu, Tartu and the surroundings of Tallinn. (Eesti rahva ajaloost Põhjasõja aastail 1700–1721, 256–262).

The first attempt to date the *Citadel* did not give a satisfactory result. The wood samples were not thick enough and no characteristic rings of "bad years" were noticed. Ring sequences of less than 50 rings provide unreliable dates, but with increasing number of rings the precision of dating grows considerably. In 1999 investigation of the fortification is intended to be continued.

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MEREKINDLUSE JÄÄNUSED TALLINNA LAHES

Vello MÄSS ja Andres EERO

1985. aasta suvel avastasid Eesti Meremuuseumi sukeldujad Tallinna lahes, 900 meetri kaugusel kaldast, sügavuses 8–11,5 m, kivi- ja palkehituse jäänused ligikaudu 3500 m² suurusel alal (joon. 1). Esialgu tundmatu päritolu ja teadmata otstarbega tehtud ehituse sügavamat, kaldast eemalasuvat külge piiravad kolm massiivset, kividega täidetud kärgkasti (joon. 2).

18. sajandi algusse dateeritud Vene kaardil on sellel kohal nurgeline, *Tsitadelli* nime kandev objekt (joon. 3). Sama objekti võib näha ka vene admirali ja hüdrograafi Aleksei Nagajevi koostatud ja 1757. aastal avaldatud merekaardil (joon. 4). Heino Gustavsoni (1994) andmeil ehitati Põhjasõja aastail või vahetult sellele järgneval ajal sinna merepatarei, et hoida Tallinna sadamasse viiv laevatee suurtükkide kontrolli all. Kummatigi võib juba 17. sajandi keskpaika dateeritud Tallinna sadama ja merekindluste Rootsi projektil samal kohal näha merekindlust (joon. 8).

Eesti Meremuuseum jätkas ehitusjäänuste uurimist 1997. ja 1998. aastal. Tehti mõõdistustöid, varemete sondeerimist hüdrolokaatori e. sonari abil ja allvee-filmimist. 1998. aastal õnnestus Rootsi Mereadministratsiooni uurimislaeva Jacob Hägg kõige kaasaegsema tehnika abil plaanistada *Tsitadelli* ala ja selle ümbrus kokku 22500 m² ulatuses koos sügavuste registreerimise ja ehitusjäänuste täpse kujutise saamisega (joon. 5 ja 6). Ehitusjäänuste külgvaade (joon. 7) annab võimaluse hoomata kunagise merepatarei suurust ja vormi ning hinnata selle purustuse ulatust tänapäeval. Seni tehtud uurimistööd lubavad oletada, et vananenud ja kasutuks muutunud *Tsitadell* lammutati ehitusmaterjali saamiseks Tallinna sadama laiendamisel 19. sajandil. Ehituse täpsemaks dateerimiseks võeti *Tsitadellilt* puiduproove, kuid dendroanalüüs pole andnud veel tulemust. Uurimistöid tahetakse jätkata 1999. aastal.