

## NEW ERA IN ESTONIAN UNDERWATER ARCHAEOLOGY

Vello MÄSS

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At the present time the only institution engaged in underwater archaeological research in Estonia is the Maritime Museum. According to the speciality of the Museum the main direction of the underwater research is maritime archaeology. Since 1978 forty-two sunken ships have been located. Two of them, the Maasilinn ship (Mäss, 1994, pp. 189–193) and the Pärnu cog (Mäss, 1992, pp. 293–298), have been excavated, lifted up, and successfully conserved (Peets, 1995, p. 89).

The Museum's exposition has been replenished with new items. Some aspects of Estonian maritime history have also been clarified by a group of divers, who can go at sea with the research vessel *Mare*, a small ship adapted especially for the purposes of underwater archaeology.

In spite of the above-mentioned activities the research work at sea has not been very systematic because of lack of modern electronic detection equipment, necessary for looking for sunken ships on the bottom. This problem was solved, however, with the help of our Swedish colleagues. In 1992 the Estonian Maritime Museum and the Royal Institute of Technology started cooperation in the field of marine research. By now the Swedish research vessel *Altair* and the Estonian ship *Mare* have been working together in Estonian waters for four seasons.

Cooperation has turned out to be beneficial especially for the Estonian partners. Although no excavations have been undertaken, Estonians have been taught to handle modern underwater technology like a side scan sonar, a special video camera, etc. Eight wrecks have been detected by means of a side scan sonar and the located objects have been documented. Contacts have strengthened from year to year and the Royal Institute of Technology has provided the Estonian Maritime Museum with some necessary equipment like dry diving suits, a rubber boat for the divers, and a satellite navigator Garmin-50 GPS for the ship.

In summer 1995 both institutions took part in a very serious operation in Estonian waters. During two months the *Altair* and the *Mare* worked in the coastal waters of the Pakri Islands and Osmussaar, looking for dangerous objects under water and demolishing them. A total of 470 different kinds of bombs and cannon shells were located and blown up. The project was supported by the Swedish Government as financial and technical aid to Estonia. In the course of this operation modern underwater technology – a side scan sonar LC-100 and a remotely operated vehicle (ROV) the *Sea Lion* – were mounted on the *Mare*.

The side scan sonar makes it possible to locate and identify various man-made and natural objects on the bottom like sunken ships, aircraft, cables, rocks, torpedoes, mines, etc. The research vessel tows the submerged "fish" at moderate speed and the pulses transmitted by the "fish" explore the sea bottom continuously (Fig. 1). The thoroughly examined strip of the seabed behind the ship could be 25, 50, 100, 150, 200, 300, or 400 m wide. The high-resolution image of the seafloor can be watched on a flat-panel colour display and saved on the hard disk of the apparatus or on 4 mm DDS tape for future playback.

The extremely good image of the bottom has 256 colours and shades. The *Sea Lion* is an unmanned, completely mobile, very high performance camera system capable of moving in any direction and able to submerge up to 100 m. ROV is

equipped with six thrusters, a digital compass, four halogen lamps, 100 W each, and a colour video-camera.

Using ROV the objects located by the side scan sonar can be inspected under water without divers. Researchers can get information from beneath the surface by the cable, sitting on the deck and watching a colour video-monitor. All information can be saved by the video-recorder.

In 1994 a wreck of an unknown ship (Fig. 2) lying at a depth of 70 m was discovered off Naissaar Island. The wreck was preliminarily investigated in

Perspektiiv. Eelbrik, 89.

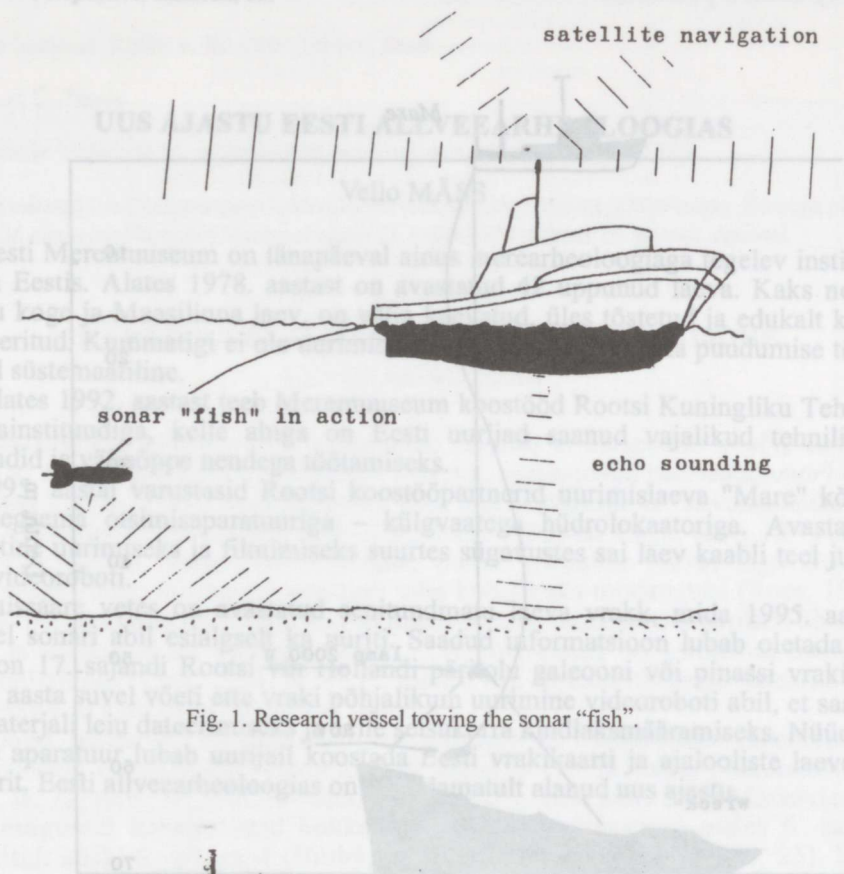


Fig. 1. Research vessel towing the sonar "fish".

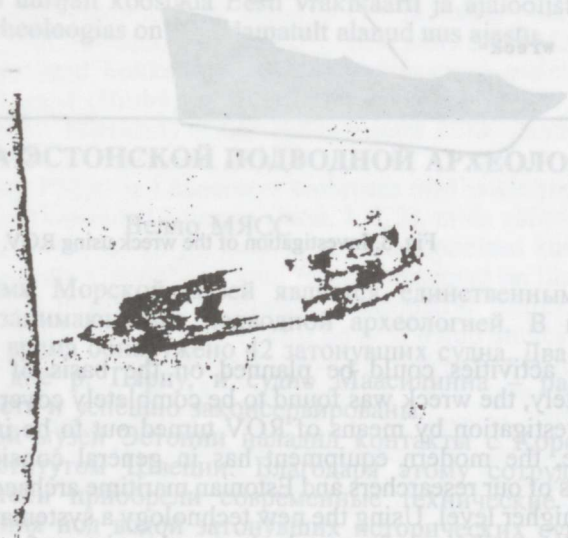


Fig. 2. Side scan sonar image of the wreck.

September 1995 using side scan sonar equipment. Judging by the information obtained the wreck might be a 17th century Swedish or Dutch galleon or pinnace. The wreck is approximately 40 m long and it lies on the bottom with its forepart embedded in mud. The ship's stern seems imposing with its 12 m height.

In the summer of 1996 a survey of the wreck was undertaken. The research vessel was anchored just above the wreck and ROV launched under water in order to inspect all parts of the sunken ship and get good pictures of them (Fig. 3). All information was intended to be recorded on the video-tape in order to enable more exact dating of the wreck and determine the state of its preservation.

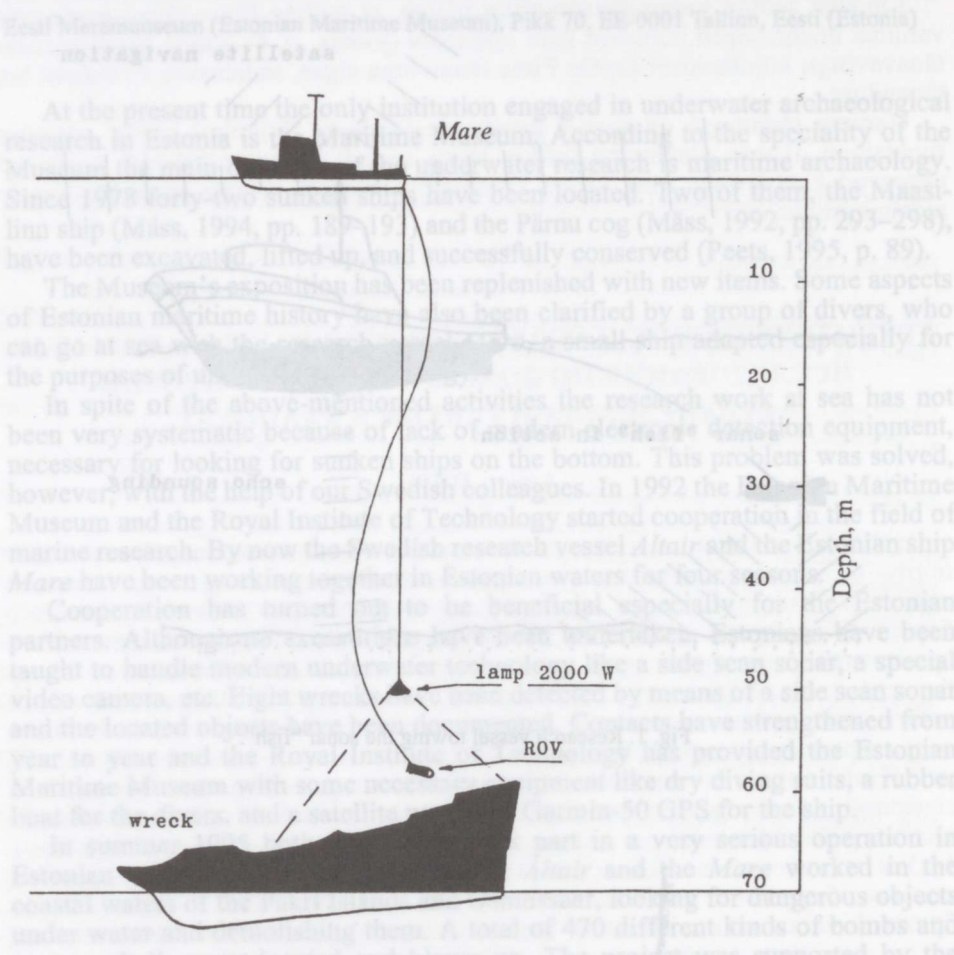


Fig. 3. Investigation of the wreck using ROV.

Further activities could be planned on the basis of the results obtained. Unfortunately, the wreck was found to be completely covered with fishing trawls and its investigation by means of ROV turned out to be impossible. In spite of this failure, the modern equipment has in general considerably extended the possibilities of our researchers and Estonian maritime archaeology has undoubtedly reached a higher level. Using the new technology a systematic survey of Estonian waters and compilation of a wreck chart and register of sunken ancient ships is under way. A new era in Estonian underwater archaeology has already started.

## REFERENCES

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## UUS AJASTU EESTI ALLVEEARHEOLOOGIAS

Vello MÄSS

Eesti Meremuuseum on tänapäeval ainus merearheoloogiaga tegelev institutsioon Eestis. Alates 1978. aastast on avastatud 42 uppunud laeva. Kaks neist, Pärnu koge ja Maasilinna laev, on välja kaevatud, üles tõstetud ja edukalt konserveeritud. Kumatigi ei ole uurimistöö moodsa allveetehnika puudumise tõttu olnud süstemaatiline.

Alates 1992. aastast teeb Meremuuseum koostööd Rootsi Kuningliku Tehnoloogiainstituudiga, kelle abiga on Eesti uurijad saanud vajalikud tehnilised vahendid ja väljaõppe nendega töötamiseks.

1995. aastal varustasid Rootsi koostööpartnerid uurimislaeva "Mare" kõige kaasaegsema otsimisaparatuuriga – külgvaatega hüdrolokaatoriga. Avastatud objektide uurimiseks ja filmimiseks suurtes sügavustes sai laev kaabli teel juhitava videoroboti.

Naissaare vetes on avastatud senitundmatu laeva vrakk, mida 1995. aasta sügisel sonari abil esialgselt ka uuriti. Saadud informatsioon lubab oletada, et tegu on 17. sajandi Rootsi või Hollandi päritolu galeooni või pinassi vrakiga. 1996. aasta suvel võeti ette vraki põhjalikum uurimine videoroboti abil, et saada lisamaterjali leiu dateerimiseks ja selle seisukorra kindlaksmääramiseks. Nüüdisaegne aparatuur lubab uurijail koostada Eesti vrakikaarti ja ajalooliste laevade registrit. Eesti allveearheoloogias on vaieldamatult alanud uus ajastu.

## НОВАЯ ЭПОХА ЭСТОНСКОЙ ПОДВОДНОЙ АРХЕОЛОГИИ

Велло МЯСС

В настоящее время Морской музей является единственным учреждением в Эстонии, занимающимся подводной археологией. В период с 1978 г. по настоящее время обнаружено 42 затонувших судна. Два из них – когг, найденный на дне р. Пярну, и судно Маасилинна – раскопаны, подняты на поверхность и успешно законсервированы.

В 1992 г. Морской музей Эстонии наладил контакты с Королевским технологическим институтом Швеции. Благодаря этому сотрудничеству эстонские исследователи приобрели современные технические средства обнаружения и изучения под водой затонувших исторических судов. Так, сейчас исследовательское судно музея "Mare" снабжено гидролокатором бокового обзора (рис. 1) и управляемым по кабелю видеороботом.

Вблизи о-ва Найссаар на глубине 70 м лежит затонувшее судно, остов которого в 1995 г. был предварительно обследован гидролокатором (рис. 2). Предполагается, что этот остов принадлежит шведскому либо голландскому галеону или же пинассу 17 в. Летом 1996 г. предприняты попытки определить точный возраст этого судна и степень его сохранности с помощью видеоробота (рис. 3).

Кроме того, современная аппаратура позволяет исследователям приступить к составлению карты и реестра исторических судов, затонувших в водах Эстонии. Несомненно, эстонская подводная археология вступает в новую эпоху своего развития.

## UUS ALASTU ESTI ALVEARHIOLOOGIA

Vello MASS

Esti Meremuuseum on lähivõel ainu meretuuletoloogias tegelav institutsioon Eestis. Alates 1978. aastast on avastatud 42 upunud laeva. Kaks neist – Pärnu kope ja Massilõuna laev, on välja kaevatud. Nles tõstatud ja edukalt konserveeritud. Kuumatigi ei ole uurimistöö moodas alvearhiooloogia poodumise tõttu olnud eüstematiline.

Alates 1992. aastast teeb Meremuuseum koostööd Rootsi Kuningliku Tehnoloogiainstituudiga, kelle abiga on Eesti muuseum saanud vajalikud tehnilised vahendid ja võimalused nendega töötamiseks.

1992. aastal varustasid Rootsi koostööpartnerid uurimislava "Mare" kõige kaasaegsemat optimeerustarvitustega – külgsuurtõu hüdrokatsustoriga. Avastatud objektide uurimiseks ja filmimiseks kasutatakse sügavates saev kaevati teel juhitava videoroboti.

Naissuurt võets on avastatud seadimudman laeva vask. mida 1992. aastal sügusel soolalt ähli esialgselt ka uuriti. Saadud informatsioon lubab oletada, et tegu on 17. sajandi Rootsi või Hollandi päritolu galconou või pinassi vaskiga. 1996. aastal võeti ette vaski põhjalikult uurimine videoroboti abil, et saada üldisemalt teada selle laeva kohta. Nõudis- ja materjalidele on tähtsustatud ja selle seadimud Rootsi vaskiga ja alalooist laevade seadimud spatsiaal muuseumi koostööd Eesti vaskiga ja alalooist laevade teadust. Eesti alvearhiooloogia on teaduslikult ainu uur ajastu.

## NOVAE EPOHA ESTONSKOJ PODVODNOJ ARHEOLOGIJ

Vello MASS

В настоящее время Морской музей является единственным учреждением в Эстонии, занимающимся подводной археологией. В период с 1978 г. по настоящее время обнаружено 42 затонувших судна. Два из них – Pärnu копия и Массилонна – выкопаны. Два других – подняты и консервированы. В остальном же археологическая работа не велась из-за отсутствия финансирования.

В 1992 г. Морской музей Эстонии наладил контакты с Королевским технологическим институтом Швеции. Благодаря этому сотрудничеством удалось получить необходимые для проведения современных технических исследований оборудование и материалы. В результате удалось получить доступ к новейшей гидрокамере и аппаратуре для подводного видеонаблюдения. В настоящее время ведутся работы по созданию видеокамеры, управляемой с помощью гидролокатора.