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The twentieth anniversary of the Archaeological Research Laboratory at Stockholm University

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In this paper the ideas behind the installation of the Archaeological Reserach Laboratory in 1976 are recalled, and the development during the 20 years described.

As we celebrate the twentieth anniversary of the Archaeological Research Laboratory this year it could be of certain interest to recall the ideas which were behind its establishment in 1976 and to try to follow the further development of laboratory archaeology since then. I will here offer my very personal view of the time passed and I am eager to emphasize that this account only gives one perspective on the events.

As so often is the case, at least within the humanities where lack of money is a consistent reality, there was a long planning before the laboratory actually could start. The inspiration to realize such a laboratory I got from my experiences in the Museum of National Antiquities. Working in the fifties and early sixties in the Iron Age department at the museum I often heard the complaints from the senior curators of the faults and lack of skill in the department for conservation of archaeological items. Among the archaeologists there was a constant doubt in the capability of the conservation department and there were many stories around about items disappearing during the conservation procedure. Being the youngest of the curators I had the responsibility to bring the items to the conservation laboratory and by time I took more and more part in the work done in that department. My interest was aroused as I realized the great knowledge potential which was hidden in the items themselves. Being trained as a geologist (my second subject besides archaeology), it was natural for me to examine the items with a microscope. The only place to find such equipment was in the conservation department. Therefore I came to spend a lot of time in there and I learned that the conservators had just the same disregard for the curators as the curators had for them. The stories told in the conservation department were that the curators could imagine everything out of a simple corrosion crust and even if the X-ray showed nothing they would insist on the existence of some fictional feature. This mutual disregard puzzled me and I felt the necessity to disguise myself as I in some way belonged to both sides.

In the late fifties I got to know Whilley's and Phillip's book *Method and Theory in American Archaeology* (1958) and this displayed to me the possibility of using archaeological material to investigate wider cultural issues. I worked at that time with my postgraduate paper on garnet cloisonné work and I underlined the technical aspects of the art. The analyses were at that time performed using a microscope to aid only a visual examination. The extensive use of a microscope was however at that time rare in Swedish archaeology and I remember that my opponent (Hans Christiansson 1961) declared that he himself had looked through the microscope and could therefore verify that the properties I had described and photographed really existed.

The early sixties was a turbulent period in Swedish archaeology. Mats Malmer had published his important work on the Battle-Axe Culture (1962) and heavily criticized what he called impressionistic typology, calling for a typology with exact definitions and measurements. He brought out his book on "Methodological problems in the history of art during the Scandinavian Iron Age" (Malmer 1963) where he further stressed the importance of a typology based on clear and measurable properties. Here he was in opposition to the more art directed research led by Wilhelm Holmqvist and Bertil Almgren,

and this debate reached its climax in the battle for the professor's chair in Uppsala 1964.

The turmoil around the professorship in Uppsala affected all young scholars in Stockholm and Uppsala, as we all became in one way or another mixed up in the battle, not least because two of the combatants (Holmqvist and Malmer) were curators in the Museum and were the heads of two of its departments. Fierce discussion inflicted the daily work in the Museum as in fact the different views also had an influence on how archaeological items should be used in the museum work. I was engaged in the excavations at Helgö and felt very dissatisfied with the way the excavation was laid out and, not least, the care of the finds. It was, I felt, clear that a more extensive use of scientific methods in the fieldwork and find handling would not only give more reliable results, but also quicker results. Getting little support for these ideas I left the excavation and took a deputy post as head of the technical department which was made a permanent post in 1966. My aim was to realize some of the goals set for what in Sweden was now called *Laborativ arkeologi*, laboratory archaeology. Erik Nylén had been the prime leader of laboratory archaeology (cf. Nylén 1968) advocating that the work carried on in the conservation laboratory should be under direct supervision of the archaeologists. This idea, however promising it seemed at the writing desk, was extremely difficult to realize in practice due to the reluctance from both sides. As head of the technical department I came to understand that one of the main hindrances was the bad equipment being used. The first years in the technical department most of my time was occupied in organizing new laboratories. The economy of the department was appalling as there was no clear budget but only money coming from what was left over in other departments.

So my first task was to arrange the administrative routines so that the department got its own budget based on the production of items conserved and reported analyses. Through special grants new equipment was bought and the wheels begun to move. However, I felt that many of the conservation methods had to be further developed not as much to enable better conservation as to be able to gain more information on the items conserved. This interest, however, came in conflict with what a conservation department was expected to do, namely achieve a rapid production of ready conserved items. I had the opportunity to discuss these problems with the then president of the Central Board of National Antiquities, Prof. Sven B. F. Jansson and his successor Roland Pålsson. Both understood the necessity of having such a laboratory, but felt that its structure did not fit into the main policy of the Central Board. Professor Jansson early proposed a connection with Stockholm University, and professor Greta Arwidsson, who at that time had the chair of archaeology, was very positive about this idea.

Professor Arwidsson convinced me to finish my work on garnet jewellery and apply for a docent position (readership) at Stockholm University. At the time when I moved to the University professor Arwidsson had retired and her successor professor Mats Malmer was head of the department. He too supported the idea of establishing a laboratory at the University but there were no means or rooms for teaching laboratory archaeology. In my first years as a docent I therefore had to teach general archaeology at the base level. This was a good training and penetrating the ground courses I became more convinced of the importance of training archaeologists from the very beginning to use technical devices such as microscopes to study source material. There was, however, little comprehension in the Faculty of Humanities at the University of the importance of developing laboratory archaeology. In the new university buildings, which were planned in the sixties and ready in 1971–72, most of the humanities were gathered in an office complex and the space for the Department of Archaeology only included small offices and a coffee room, whereas the lecture rooms were shared with other departments and had to be booked in advance. In the beginning the departments were not even allowed to keep their own libraries and the university library was situated in a provisional locality without any seminar rooms.

So for a while things did not look very promising and I even began planning to return to the Technical Department at the Central Board of National Antiquities. However, strolling in a depressed mood around the university campus I noticed that an old house in the northern part, close to the new chemical and physical laboratories, used as a store for water samples by the Geological Survey of Sweden, was being emptied. The plans were to tear down the building, but following an impulse I went to the then president of the University, professor Gunnar Hoppe, and asked if it would be possible to use the building, Greens villa, as an Archaeological Research Laboratory.

He said neither yes nor no but asked me to come back with more detailed plans. Some weeks later I came back together with Prof. Mats P. Malmer, head of the Department of Archaeology, and presented a detailed plan for the laboratory and an application for instruments and furniture to be sent to Knut and Alice Wallenberg's foundation. I had already some years earlier with the kind support of Prof. Greta Arwidsson and Prof. Sven B. F. Jansson had the possibility to present a plan of an archaeological laboratory for some of the members of the board of the foundation and had an oral promise that if the University could provide the localities, they might provide a donation covering the costs of the instruments (up to around one million SEK). Prof. Hoppe immediately grasped the opportunity and arranged a meeting with the central department for university buildings (*Byggnadsstyrelsen*) and could confirm within some weeks that there would be money for rebuilding the lower storey of the house into a laboratory. This all happened in January and February 1975 and during this time there also came a message from the Wallenberg foundation

that they would provide the grant. Immediately the architect firm Lennart Janson with Per Åsradsson started the drawing work, and the building work could start before the summer and was almost finished in August 1975. The building was an old timber villa from the late 19th century (fig.1), and the architects thought it was a challenge to change the ground floor to a laboratory.

The walls, carefully covered with plaster panels were painted in blue–green typical for the *Art Nouveau*, the mouldings on the doors were retained and even the old faience stove was kept as a store for inflammable chemicals. This, I thought, would make the interior look more familiar for the other members of the faculty of humanities and of course also for my museum colleagues.

The equipment for the laboratory was very much planned to provide simple analytical tools which an archaeologist could learn to handle him or herself. My idea was that the scientific methods used within archaeology are mostly not very sophisticated (dating techniques are an exception), and only when archaeologists learn to use them with their own hands would they be used in the field and treated with the criticism necessary. This was, and is, not an uncontroversial standpoint. There exist all around the world archaeological laboratories directed by scientists whose main field is natural science and whose knowledge of archaeology is less and often self-acquired without proper schooling. My idea was that scientific methods could be learned within a limited time, whereas archaeology as a whole needed much longer and more profound studies. Further, I believed that the knowledge of a method used in every detail is a necessity to be able to understand the results gained.

Having this as the idea behind the start of the laboratory the purchase of instruments was based on the thought that all instruments should, after instructions, be used by the students. So the first things bought were microscopes, including a scanning electron microscope. As the laboratory was placed in the centre of a new university campus, the different technical firms would have an excellent possibility to advertise their products and this fact I used to get very favourable prices. So the million SEK did not only pay for the different microscopes but also covered instruments such as a spectrophotometer, a device for doing trace element analysis with polarographic technique, and further equipment for handling metal and ceramic samples. And then of course all the ordinary laboratory equipment: apparatus for producing distilled water, ovens, fume-cupboards, etc. Altogether the equipment provided made it possible to do most of the analysis except dating asked for by archaeologists. Thereafter we have renewed our equipment more than twice (with grants from the Wallenberg foundation as well as the Research Council) and also widened the analysis capacity to diffraction analysis as well as X-ray fluorescence. In the latest years equipment for analysing large organic molecules such as proteins and lipids using gas chromatography, mass spectrometry, FTIR, etc. has been purchased and we have also gone into the DNA-research. However, the principle that all equipment should after instruction be available to others than the researcher

Figure1 The so called Greens villa which hosts the Archaeological Research Laboratory. Photo Per Bergström

who originally asked for it, we still follow. So in connection with every new instrument there follows a long period where the instrument is tested and detailed instructions worked out.

I was in the beginning quite alone in the laboratory, as there was no money for assistants or technicians to service the equipment. The latter shortcoming really gave me the opportunity to learn the details of the equipment bought, as of course in the beginning there were lot of troubles to drive the devices. However fairly quickly the conservator Margaretha Klockhoff came to work with conservation and preparation of finds from the Museum of National Antiquities. So we also bought equipment for conservation of archaeological items, and we later also got other equipment to be able to document the items, such as a laser scanner for surface investigations (specially built for the laboratory by engineer Henry Freij). Margaretha Klockhoff helped to improve the EDTA–phoshate treatment of metal items, a method which I had introduced already in the Technical department and which gives possibilities to remove corrosion in stratified layers. Pretty soon Dr Inga Hägg also joined us. At the time when I was the head of the technical department Dr Hägg had made her doctorate thesis analysing textiles adhering to tortoise brooches found in graves from Birka. Here Dr Hägg had shown that minute microscope analyses of how the textiles were placed in the brooches could give information on how the textiles were used. Earlier textile analyses had mostly been done on textiles loosened from adhering metal items and flattened out. Hägg showed, however, that the study of the wrinkles and turns of the textiles using an archaeological section method could give useful clues about how the textiles were used in the original dress. Through the Research Council she got a grant to pursue her studies now using fragments from male graves. These fragments had earlier been published by Dr Agnes Geijer (1938), however without using Dr Hägg's technique. A revision of Dr Geijer's study done more than 40 years earlier seemed to be an uncontroversial task, but to our great surprise the authorities in the Museum of National Antiquities were negative to this research and in the beginning did not let Dr Hägg open the small boxes covered with glass in which the textile fragments were placed. Without opening the boxes there was no possibility for Dr Hägg to pursue her investigations. So after some months of intense debate with different authorities and help from colleagues she at last got the permission to bring the boxes to the laboratory and examine the fragments, after which the boxes were again carefully sealed. Later Dr Hägg completed her studies using textiles found at Hedeby and moved to the museum of Hedeby.

The problem we encountered here, the trouble of getting access to items for laboratory analysis, is a situation which in time I learned often is met in laboratory archaeology. Therefore it is of importance that the laboratory has its own excavations to produce material for further examinations. To have its own material also made it possible to take measurements in the field to prepare the material for further analyses. The development of special conservation methods in the field became an important task. For many years we had excavations on Björkö with the aim of finding the settlements that were the predecessors of the town of Birka, excavations which Dr Lena Holmquist Olausson presented as her doctoral thesis (1993). Later we moved to Husby–Långhundra, excavating a large mound (Gullhögen) and examining the settlement around the cemetery. In the last years we have in connection to the research project SIV, *Svealand in the Vendel and Viking Periods*, begun excavations in Vendel examining a chieftain's site from the early Medieval period.

An ongoing problem during the laboratory's first decade was the very small financial resources. The money for the excavations we had to apply for every year and there was no money for teaching laboratory archaeology. All the students had to work in the laboratory's ongoing research programmes supported by different funds. We had one project concentrating on ancient metal technology (which among other things resulted in a dissertation on ancient copper alloys by Helena Forshell, a dissertation on the manufacture and production of vessels of copper alloys from the Viking Period by Gustaf Trotzig, a dissertation on ancient metal weights by Erik Sperber, and an ongoing doctorate study by Johan Anund on bronze casting in Early Medieval time), supported by *Jernkontoret* among others; one on ancient diet (resulting in a dissertation by Kerstin Lidén on diet changes, and two other doctorate theses to come in the near future), supported by the Research Council for Humanities; then the excavations projects named above and supported by different funds. Several recently commenced doctorate studies (on the warrior's dress, on kinship structures, on horse breeding, on colonization, and on distribution of organic remains in cultural layers) are tied to the above named project SIV, supported by the Bank of Sweden Tercentenary Foundation.

Already in the first term of 1976 we had our first graduate course, financed through a special grant arranged by the then educational leader in the faculty of Humanities, Bengt Tomson, who took a keen interest in the laboratory. The course dealt with laboratory methods in Medieval archaeology. Many of the now leading archaeologists dealing with Medieval archaeology in central Sweden took part in this course which in some way was the starting point for Medieval archaeology in central Sweden

The first doctorate made in the laboratory was by Dr Zaiga Blumbergs, presenting a couple of graves from Roman Iron Age found on Gotland, where the females wore a cap with *paillettes* of bronze. She made a careful analyses of the *paillettes* in the SEM, and also analysed their bronze metal and how the *paillettes* were sown on to the cap, apparently in a certain pattern. Although the cap

now was quite decayed, by deciphering the pattern in certain places and comparing this with how the corrosion had developed, she was able to make a reconstruction of the circular pattern in which the *paillettes* were placed. Similar finds of females with a corresponding cap in Lithuania allowed us to hypothesize an immigration over the Baltic to Gotland

After Blumberg's disputation in 1981 it took another five years, however, to the next disputation at Stockholm University, when Uaininn O'Meadhra summarized in a thesis a part of her analysis of the use and occurrence of trial motif pieces. The reason for this delay was not lack of students with laboratory interests, but the way the studies had to be laid out. Laboratory archaeology was at that time not a separate subject and thus the students had to take all the courses and reading current in general archaeology. As laboratory analysis takes time both to learn and make, studying laboratory archaeology became a much heavier task compared to general archaeology. Anyhow some students struggled on. Among them were Wladyslaw Duczko, who however presented his thesis on Viking Age filigree work analysed with SEM at the Department of Archaeology at Uppsala University (1985). Another was Sonja Wigren, who for long time had worked with fire-cracked stone heaps from the Bronze Age. She used thermoluminescence dating of the latest level of the heaps to reconstruct when the heaps last were used. Her hypothesis was that a place with a great accumulation of these heaps indicated a settlement with a central-place function. It appeared that in Södermanland (in southern Sweden) these central places seemed to have been abandoned during a fairly synchronous period during the later Bronze Age.

In 1980 the Research Council for Humanities arranged for me to get a six years research position, which also included some means for arranging seminars and having one research assistant. The great leap forward was however in 1986, when the University made a professorship, first as an adjoining position but later as a regular chair in laboratory archaeology. This installation which came through a special admission from the government after a joint application from all the professors in the field of archaeology in Sweden, meant an enormous improvement for the whole subject. Together with the chair came money for technical assistants and money for having regular seminars. All the time since the laboratory started we have had what we called colloquia, i.e. meetings, every fortnight where scientific problems were discussed. However, due to the lack of money we very seldom could invite speakers, although I realize, when I study our guest lists, that specially colleagues from abroad, came around passing Stockholm and gave many interesting lectures. Now the seminars could be arranged every week and there begun to come regularly a group of more advanced students who contributed to many interesting discussions.

Our speakers could be not only archaeologists with interests in laboratory archaeology but many times we invited natural scientists, whose speciality had importance for our subject. With special pleasure I remember the many seminars we had together with the quaternary geologists, especially the research group led by professor Urve Miller working with Holocene environmental history – the doctorate thesis by Agneta Åkerlund is a result of this collaboration. In 1992 we also could greet the first docents (readers) in laboratory archaeology at Stockholm University, Dr Gustaf Trotzig and Dr Margareta Nockert. Both docents had their regular positions in the Central Board of National Antiquities, but they became important members of our seminars.

From the very first there was a demand that we published our results (cf. appendix III). At the start we gave out very simple reports but by time we also started a journal, *Laborativ arkeologi, Journal of Nordic Archaeological Science*. The first issue came out in 1986 and was produced in a simple desk top manner. Later we got support from the Research Council and could publish the articles in English using more proper printing facilities.

In 1990 we were asked to host the *Fifth Nordic Conference on the Application of Scientific Methods in Archaeology*. The conference was a great success with more than 200 attendants and within a year we also could present most of the papers from the conference in our journal.

Around 1990 the dissertations came almost yearly (cf. appendix I). The recruitment came out of students making their graduate paper and master thesis in laboratory archaeology (cf. appendix II). Why the number of graduate students in a year could be increased, from one or two in the early eighties to now around ten, depended on not only the installation of a professorship, but also the changed economical system at the University, which allocated money for every graduate student that was examined in laboratory archaeology. The funds were used to pay assistance in tutorship in time regularized as a half-time position as a lecturer for Dr Lena Holmquist Olausson. The many dissertations also gave us access to scholarships designed for laboratory archaeology. Earlier the archaeologists doing laboratory archaeology had to make their applications for scholarship in competition with the students in general archaeology. The general judgements made by my colleagues in our archaeology department, was that the laboratory archaeologists were lacking a theoretical base or theoretical interest and therefore they more or less automatically were placed in the end of the queue for scholarships.

The doubts here expressed might partly be explained as a general fear for the new methods used by students in laboratory archaeology. But this reaction might also have to do with a general misinterpretation that using scientific methods means a positivistic non-theoretical approach. Here the archaeologists share with many other scholars the misinterpretation of positivism as a speciality for science-based research. This misinterpretation of positiv-

ism is embarrassing as it was actually in science that the first strong criticism on positivism started, e.g. the debate on Einstein's theory of relativity which was heavily discussed between theoretical physicists and philosophers, especially the so called Uppsala school with Hägerström et al. (cf. Gieser 1993:24ff) already in the early thirties.

In my opinion there is no more positivism in laboratory archaeology than other archaeology but the laboratory analyses offer an opportunity to give an enhanced quality to the material studied. As Collingwood (the first archaeologist to me known criticizing positivism) so diligently observed: to get knowledge out of archaeological sources you have to put questions to the material (Collingwood 1939:29ff).

In laboratory archaeology there are many opportunities to refine the questions and hypotheses set. This also implies that behind laboratory archaeology there must be as much theory as behind any other archaeology. For the future development of archaeology I believe that there is a need for a more mutual understanding of the different fields within the subject. The new results coming out of laboratory archaeology will inevitably also contribute to this understanding.

References

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Gieser, S. 1993. Philosophy and modern Physics in Sweden. *Center on the Periphery* (ed. S. Lindqvist) Science History Publications, Watson Publishing International, Canton, Ma, U.S.A.

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Appendix I

List of doctorates made in the laboratory

1982

Blumbergs, Zaiga Bronzebuckelchen als Trachtzier. Zu den Kontakten Gotlands mit dem Kontinent in der Älteren Römischen Eisenzeit. Theses and Papers in North-European Archaeology 12.

1987

O'Meadhra, Uaininn Early Christian, Viking and Romanesque Art. Motif-pieces from Ireland 2. A discussion on aspects of find context and function. Theses and Papers in North-European Archaeology 17.

Wigren, Sonja Sörmländsk bronsåldersbygd. En studie av tidiga centrumbildningar daterade med termoluminescens. Theses and Papers in North-European Archaeology 16.

1989

Österholm, Inger Bosättningsmönstret på Gotland under stenåldern. En analys av fysisk miljö, ekonomi och social struktur. Theses and Papers in Archaeology, New Series 3.

1991

Trotzig, Gustaf Vikingatida gravkärl av koppar och kopparlegeringar från Birka och Gotland. Tillverkning, användning och sociala förutsättningar. Theses and Papers in Archaeology B:1.

1992

Forshell, Helena The Inception of Copper Mining in Falun. Relation between element composition in copper artifacts, mining and manufacturing technology and historic development with particular emphasis on copper from the Falu mine. Theses and Papers in Archaeology B:2.

1993

Holmquist Olausson, Lena Aspects on Birka. Investigations and surveys 1976–1989. Theses and Papers in Archaeology B:3.

1995

Lidén, Kerstin Prehistoric Diet Transitions. An Archaeological Perspective. Theses and Papers in Scientific Archaeology 1.

Olausson, Michael Det inneslutna rummet – om kultiska hägnader, fornborgar och befästa gårdar i Uppland från 1300 f.Kr. till Kristi födelse. Studier från UV Stockholm. Riksantikvarieämbetet, Arkeologiska Undersökningar, Skrifter nr 9.

1996

Åkerlund, Agneta Human Responses to Shore Displacement. Living by the Sea in Eastern Middle Sweden during the Stone Age. Studier från UV Stockholm. Riksantikvarieämbetet, Arkeologiska Undersökningar, Skrifter nr 16.

Sperber, Erik Balances, Weights and Weighing in Ancient and Early Medieval Sweden. Theses and Papers in Scientific Archaeology 2.

Appendix II

List of graduate papers made in the laboratory

1976

Sundberg, Karin Birkas brynen, funktion och kvalitet.

1977

Jacobsson, Tomas Knivsmide, studie av en forntida teknik.

1978

Andersson, Eva Noggrannhet i röntgenflourescensanalys av arkeologiskt material av guld-, silver- och kopparlegeringar samt glas.

Berendt, Anette Inkrusteringsarbeten från 500- och 600-talen, funna i Sverige.

Holmquist, Lena Boplatsen vid Vinarve, Rone sn. Gotland – en kvantitativ analys av ett boplatsmaterial.

1979

Dahl, Per Kemisk analys av jord från Kapelludden, Öland. Bestämning av fosfat, pH och kol.

Nordgren, Sonja Vapen från Östergötlands Äldre järnålder, ett svärd och en lans.

Reisner, Inga-Lill Vendeltida djurhuvuden och gjutteknik.

1980

Freij, Henry Förändring av markmaterial genom mänsklig påverkan, speciellt dess magnetiska egenskaper.

Gustavsson, Kenneth Skärvstensrösen på Kökar – förhistoriska trankokningsplatser?

Sperber, Erik Deltar autotrofa bakterier i korrosion av nyfunna arkeologiska järnföremål?

1981

Hansson, Ann-Marie Forntida ärter och bönor, I. Inledande studie, innehållande bl.a. odlingsproblematik.

1982

Forshell, Helena Analys av sex gotiska fibulor från Kertsch – ur en folkvandringstida samling på historiska museet.

1983

Wikström, Siv Textilfragment från Bronsåldern – Sammanställning och analys.

1984

Dahlström, Åsa Koppar och dess legeringar i den nordiska bronsåldern.

Hansson, Ann-Marie Forntida ärter och bönor. Del II.

1985

Evanni, Louise & Tamm, Lisen Attityder till konservering – arkeologisk konservering jämförd med övrig konservering.

1986

Henricson, Lars G. Glaset i Birka – en material-, och tillverkningsteknologisk studie.

Koivunen, Sirpa & Derestorp, Maija Vågen från Bandlundeviken. – med en laborativ analys.

1988

Stenberg-Tyrefors, Britta 11 vävnader från Hedeby.

1989

Lidén, Kerstin En dietstudie från den mellanneolitiska boplatsen Ire, Hangvar sn. Gotland avseende $\delta^{13}C$, aminosyre- och spårämnesanalyser.

1990

Isaksson, Sven Spännande teknik – en analys av spännkonstruktionens tekniska utveckling på fibulor från Järnåldern.

1991

Eriksson, Gunilla Förhistorisk kost. En studie med fettsyraanalyser av ett material från bronsåldersboplatsen i Hallunda.

Fennö, Helena En studie av järn från Borg i Lofoten.

Sundberg, Gunnar Förhistorisk skärgård. Ett mikroperspektiv i Haninge.

1992

Anund, Johan Ett medeltida bronsgjuteri i Uppsala. Olawe Grytogiwtara och andra hantverkare i medeltidsstaden.

Ekstrand, Karl-Johan Gårdskomplexet Granby–Hyppinge i Orkesta socken, Uppland – en fosfatstudie.

Rudin, Gun-Britt En studie av Runsa fornborg. Funktionsuppdelning med utgångspunkt från fosfatanalys.

1993

Deutgen, Louise Snaldr och oppstadgogn – en utställning om textilhantverket i det tidigmedeltida Sigtuna.

Eriksson, Marianne Strandlinjer och fosfatanalys exemplifierat med en undersökning av en stenåldersboplats i Tunaberg vid Bråviken.

Nyström, Sophie En studie av olika konserveringsmetoder som tillämpas på arkeologiska järnföremål.

Petterson, Björn Stratigrafisk analys och bebyggelsestratigrafi i det tidigmedeltida Sigtuna – metod och preliminära resultat.

Ågren, Torbjörn Pälshår från Birka – en undersökning av hårrester i svepelektronmikroskop.

1994

Ekström, Peo Studie av en liten moränkulle vid Vendelsjön. Fornlämning 218, Stora Enen. Ett möjligt hamnläge vid Vendelsjön.

Engström, Anna-Karin Var det matoffer utanför graven? En fettsyraanalys på keramikskärvor från gånggriften Gladsax No 18 i Skåne.

Gustafsson, Pierre Mat till de döda: Analys av en matskorpa från yngre bronsålder ur en urnebrandgrop vid Klinga i Östergötland.

Götherström, Anders Post mortem DNA – ett neolitiskt problem ur ett molekylärevolutionistiskt perspektiv.

Hall, Ola Lickershamn, Stenkyrka socken – hamn redan på 700-talet, påvisad genom fosfatkartering.

Seiler, Anton Vendel före båtgravarnas tid: En analys av den äldsta bebyggelsen på en utvald del av Vendelåsen.

Wallin, Åsa Fosfatundersökning i Husby–Långhundra, Uppland. Vackerbergas gravar och terrasser.

1995

Donkow, Izabella Determining vessel function – an analysis

of absorbed organic residues in Late Iron Age potsherds and a Viking Period burial vessel from Vendel.

Fennö Muyingo, Helena Sammanställning av järnmaterialet från Borg i Lofoten.

Fischer, Cornelia Kremerade gravsättningar i megalitgravar.

Gustafsson, Sofi Vad har kärlen använts till? Analyser av 4 krukskärvor av keramik från bosättningen vid Birkas stadsvall.

Kitzler, Laila Ytstrukturanalys av Hillersjö-ättens runstenar samt av runstenar vid Hilleshög kyrka.

Pelve, Eva Makrofossilanalys av en vikingatida grav i Vendel: Undersökning av innehållet i ett lerkärl.

Sanglert, Carl Johan Kyrkbacken i Vendel och några av dess hemligheter. Arkeologisk förundersökning med geofysiska och geokemiska analysmetoder.

Strage, Kristin Makrofossilanalys av växtlämningar på material från Vendel och Sigtuna.

Tengnér, Boel Verktyg vid Birkas stadsvall.

1996

Bergström, Liselotte Arkeobotaniska växtstenar: En metodstudie och morfologisk analys av kiselfytoliter ur jordprover från Vendel.

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Appendix III

List of publications, other than doctorate theses, from the laboratory

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1981

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1982

Holmquist, Lena, Saers, Jozef & Sperber, Erik Vikingatidsstudier.

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