# ARCHAEOLOGISTS AND THEIR INFORMATION SOURCES

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## Introduction

The information needs, behaviour and practices of researchers have been a topic of continuous scholarly interest since the 1960s (Case 2007). The literature shows that there are considerable differences between scholarly and scientific disciplines (e.g. Talja & Maula 2003, Tenopir & Rowlands 2007, Tenopir et al. 2005, Meho & Tibbo 2003, Tibbo 2003). Humanities scholars and social scientists have been studied to a lesser extent than scientists, even though the number of studies on the use of information in the humanities and social sciences has increased steadily in the last twenty years (e.g. Ocholla 1996, Weintraub 1980, Stieg 1981, Stone 1982, Broadbent 1986, Bakewell et al. 1988, Lönnqvist 1988, J. Wiberley S. E. & Jones 1989, Wiberley Jr. 1991, Ahlbäck 1992, Tibbo 1993 ; 1994 ; 2003, M. Bates et al. 1995, Brockman et al. 2001, Lönnqvist 2003, Talja & Maula 2003, Dalton & Charnigo 2004). In spite of the slightly growing general interest, there is only a little research on certain disciplines like archaeology. Academic archaeologists have been included in the group of informants studied by e.g. Corkill (1981), Stone (1983), and Lönnqvist (1988) (all the in-

formants were classical archaeologists) and (2003, 71) (six archaeologists, none representing classical archaeology), but they tend to represent a clear minority in the studies. Another shortcoming in the earlier literature is that the studies focus on academic archaeological research even though in practice, the vast majority of archaeological investigations are conducted by government agencies and private consultancies in many countries (e.g. Korkeakoski-Väisänen 2003, Aitchison 1999). As a rare example, Sufian (2009) has conducted a study of archaeologists' and heritage-management professionals' information behaviour, but the principal focus of the study is on the services of a single Indian library. The only comprehensive study of the information work of archaeology professionals so far was published by the author of this article (Huvila, 2006).

The aim of this chapter is to provide a retrospective of the patterns of information source use of archaeology professionals in the wave of digitalisation in order to form a baseline for future studies and to inform the management of archaeological information processes and development of information services for the archaeological domain. In this chapter, the notion of information source is used broadly to denote information channels, consulted sources and information objects (i.e. sources) contributed and created by the informants. Perhaps, in contrast to other chapters, this discussion is more about the past than the future, but here as elsewhere in this volume, the purpose is to underline the significance of the links between the past practices and the current and future state of the art.

It is rather safe to posit that the importance of understanding of how archaeologists use information has increased during the last two decades. Digitalisation of information processes has had a major impact on archaeological work (Lock 2003). The extent of archaeological fieldwork has exploded in many parts of the world because of increased land use and urban development. The growth of commercial contract archaeology is another factor that has changed the

landscape of archaeological work (Aitchison 1999). In developing countries, the growth of population, expanding land use and poorly resourced and developed cultural heritage administration pose direct threats to archaeological sites (Karlström 2009). In many parts of the developing world, rapid economic growth has put increasing demands on the efficiency of archaeological work. Besides the highest priority, the quality of fieldwork and documentation, the effectiveness of information use can have also a major economic impact (Brattli 2009, Skeates 2000).

## Empirical study

This chapter and its observations on the information source use and non-use is based on an empirical investigation of the information work of Nordic archaeologists. The material consists of 25 thematic interviews of Finnish and Swedish archaeology professionals conducted in 2004. A typical interview took 150 minutes. The shortest lasted 105 minutes and the two longest 180 minutes. Work duties of the informants range from education to field archaeology, museum work and cultural heritage management. The empirical data were collected using an adapted version of a semi-structured approach called thematic interview (Hirsjärvi & Hurme 1995, 35-37). The qualitative nature of the study and fact that the informants represent Swedish and Finnish archaeologists limit the generalizability of the results beyond the specific context of the study. The richness of the data allowed, however, the making of analytical inferences that are likely to be relevant outside the specific context of the present study.

The interview data was analysed on the basis of digitised tape recordings and draft transcriptions. The use of digital transcription software allowed a simultaneous processing of the audio track and the text. The entire transcription and coding work was conducted by the author, which eliminates the bias caused by a possible lack of intercoder reliability. The simultaneous processing of transcription

and audio data reduced the need to complete a comprehensive transcription of every utterance and yet made it possible to work with a complete set of data (referential adequacy Lincoln & Guba 1985, 313-314). For the purposes of citation, each of the 25 individuals were assigned a random letter between A and Z written between brackets in the present article, for instance [A]. Furthermore, the approach allowed a continuous evaluation and revision of the transcriptions in order to increase their reliability. The data analysis was based on a combination of the constant comparative method (Strauss 1987, Corbin & Strauss 1990) and schema-based approaches Ryan & Bernard (2000, 782-784). The analysis was elaborated in the later stages using writing as an explicit form of inquiry (Richardson 2000).

## Information work in archaeology

Archaeology can be described to be an information-intensive scholarly discipline and profession that has a specific aim of explicating past human activity on the basis of its material remains (referred as 'archaeological material') (Manacorda 2004, 3-7). A grounded theory (Glaser & Strauss 1967) based schema analysis (Ryan & Bernard 2000, 783-784) of the interview data from the interviews indicated that archaeological work may be structured in seven major non-exclusive categories, listed in Table 1.

The basic objective of archaeological work may be described as preserving and managing known and prospective sites (a place where some traces of past human activity have been preserved) and areas of archaeological interest, investigating them and maintaining the information acquired for present and future use, e.g. for the purposes of research and public interest (Darvill 2002, Trigger 1989, Renfrew & Bahn 1996). Archaeology incorporates both academic research and professional craftsmanship, and in practice, it is often difficult to distinguish the two.

| Category | Work profile |
|---|---|
| Academic teaching | Education of future archaeologists at universities. |
| Field archaeology | Excavations and archaeological fieldwork. |
| Antiquarian | Collection management and artefact analysis duties at archaeological museums and research institutions. |
| Public dissemination | Popularization of archaeological knowledge in different forms: books, films, museum exhibitions and workshops. |
| Academic research | Academic research in archaeology. |
| Cultural heritage administration | Cultural heritage management duties in state organizations responsible for the preservation of archaeological heritage. |
| Infrastructural development | Development of methods and techniques for archaeological work, e.g. analysis methods, information systems or best practices. |

Table 1.   Categories of archaeological work

The empirical findings support the view of Gardin (1980, 5-7) of the layout of the archaeological information process. He describes archaeologists' intellectual process as an iterative cycle of observation, elaboration and publication. It is typical that the intellectual reasoning and all three phases of the cycle occur in all of the categories of archaeological work (Table 1), both in the 'more' professionally and 'more' academically oriented ones. The scope and extent of the process vary between individuals and categories of work, and they tend to be subordinated to the premises and objectives of the information activity that relates to the immediate goals of the assignments and duties at hand.

The empirical material shows that the principal source of archaeological information for all interviewed archaeology professionals is archaeological material and (first-hand) investigation reports. The daily use of archaeological material as a direct source of information varies across different categories of archaeological work, but all informants were very explicit about the origins of the information they use. Archaeological material consists of a variety of material objects that are capable of shedding light to past human activity. It comprises individual objects (e.g. shards of pottery, tools and relevant natural objects), buildings, and different kinds of structures such as fields, roads and their remains (Renfrew & Bahn 1996). The interviewees' descriptions of the archaeological investigation process follow the descriptions found in the archaeological literature (e.g. Roskams 2001, Joukowsky 1980). Archaeological sites are investigated by excavating or surveying, archaeologists document their findings and the investigation process and during a post-investigation phase, write up and draft the final archivable versions of their sketches and notes, and prepare any retrieved finds for storage.

The archaeological material is used as building blocks in a process of constructing an understanding of the past human activity at hand. The process combines information from the archaeological remains

with secondary information available from a variety of sources (e.g. Literature, personal communication). The nature of archaeologically relevant information varies considerably and comprises both quantitative scientific information, and qualitative and comparative inferences. Due to the heterogeneity of the information and the distance between the present-day archaeology professional and past human beings, the processes of information seeking, use and production are highly complex and place a special emphasis on the contexts of the study and of the studied past.

## Information sources

## Archaeological material

Archaeological material (artefacts, features, structures, non- artefactual organic or environmental remains, Renfrew & Bahn 1996) is used in field archaeology and antiquarian work roles as an information source on an everyday basis. The use of archaeological materials is frequent also in academic research and public dissemination. The informants emphasised the necessity of adequate meta-information about the location and the date of a find, and a description of its appearance, material and measures [All]. The descriptive information is needed for identification, and it also serves as a basic context for studying and evaluating the find and its function. Without the meta-information, the information value of the finds would be significantly lower.

Informants felt that original archaeological material would be difficult to substitute with aggregates such as textual descriptions, drawings, photographs or three-dimensional models. Visiting the museums and archaeological collections in person was perceived to be important by all of the interviewees. The informants saw the collections clearly as a form of 'capital' (Brockman et al. 2001).

However, the aggregates were indicated to be better than nothing if the original materials proved to be inaccessible. Of the aggregates, the informants tended to prefer three-dimensional models, photographs and drawings (in that order of preference). Secondary publications were considered to be useful, but they were generally seen to lack comprehensiveness and necessary details (cf. Lönnqvist 1988, 45). In contrast with Lönnqvist's study (cf. Lönnqvist 1988, 46), the bureaucratic problems did not seem to be a decisive issue for the informants interviewed for the present study. The difference may be explained by the better accessibility of the Nordic collections (majority in the current study) compared to the collections located in the Southern Europe (majority in Lönnqvist 1988, 46).

## Literature

The scholarly and professional literature plays a central role for the informants. Articles were preferred by those interviewees who worked with specific questions and duties [e.g. B, C, I, L] that did not encompass the principal creation of primary information. Interviewees tended to resort to the institutional repositories and personal contacts in acquiring articles [e.g. A, C, F, H, I, L, M]. Most of the informants were members of the national archaeological associations, specialised associations, such as a society for medieval or maritime archaeology, or they subscribed to their journals.

As a whole, the significance of journals (both printed and electronic) in archaeology is clearly lower than in the sciences. In this respect the present study supports the earlier findings (Lönnqvist 2003, 160 cf. Corkill & Mann 1981). This compares to the general patterns observed in the humanities (Ahlbäck 1992, Tibbo 1994, Thompson 2002, S. E. Wiberley 2003, Larivière et al. 2006). The general observation on the prevalence of monographs (e.g. Thompson 2002) in the humanities did not, however, receive unequivocal support in this study. Some of the informants indicated that they probably used

more monographs than articles [V, S], but a significant group of them said that they actually used more articles [e.g. A, G, Q]. The findings of the present investigation seem to indicate that the actual preference between articles and monographs depends primarily on the precise nature of the purposes of the information work [A, O, P, S, U, X]. Journals provide focused and often technical descriptions and studies of relatively restricted themes [A, B, C, F, G, I, M, O, Q, V]. Articles were perceived to be more up to date [G, P, Q] Their significant role in supporting the general awareness function is also of consequence [A, O].

Most of the archaeological journals tend to be specialised both in terms of their subject and geographical coverage. In spite of the internationalisation of the research community and, especially, despite the broadening of the theoretical debate, archaeology is still a significantly national project in the Nordic countries. Some individual fields such as classical archaeology or archaeological science may claim the existence of a broader international community of researchers. Even then, however, the total number of participating researchers remains relatively low in comparison to the emphatically international disciplines such as the genetic science (cf. Star & Ruhleder 1996).

Many of the specialist themes and sub-disciplines of archaeology have their own journals (e.g. META and SKAS for medieval archaeology and International Journal of Nautical Archaeology for nautical and maritime archaeology). Besides their importance within the specific sub-disciplines, some of the individual journals were indicated to have significance also for the informants, who were occasionally in need of specialist information outside the precise focus of their own expertise (e.g. antiquarians and field archaeologists). The status of these publications varied considerably, however. As with journals, some of the nationally or thematically distinctive series were considered to be more relevant than the others (e.g. Fennoscandia

Archaeologica). Their number and general significance seemed to be rather low.

A simultaneous reason and explanation for the diversity of the publications is the high proportion of archaeological periodicals and literature that are published in national languages. This pattern is related to the social organisation of archaeology, which is rather nation-centric. Besides being an expression of 'tribalism', the patterns of publication contribute to the continuance of small-scale co-operation by reducing the international circulation of the information. The Swedish informants regretted their lack of skills in Finnish, while both the Finnish and the Swedish interviewees mentioned the problems caused by their insufficient knowledge of the neighbouring Slavic languages [e.g. H, O, T, W]. Such language skills would be highly relevant due to the proximity and similarity of the archaeological materials and material cultures in North-eastern Europe.

Monographs are typically favoured by those who seek extensive information on a relatively non-specific topic [e.g. O, Q] or work in teaching or in public dissemination, and by those who need to connect a specific piece of information to a larger context. A good monograph is a comprehensive overview e.g. of a site or a theme. High-quality illustrations and detailed information add to their value as references [H]. The novelty of both the monographs and articles play a central role in their usability as information sources, even though this aspect is not as important as in the sciences (Tenopir et al. 2003). Compared to the articles, the use of the most important standard monographs is likely to be more intensive. The interviews also indicated that the informants were more likely to return to a monograph than to an article. Especially observations and eyewitness reports on past investigations and visits that have been published in a monograph retain their value over time, even though some of the interpretations and propositions may utlimately be rejected.

In comparison to scientists and, to a degree, social scientists (e.g. Erdelez & Means 2005, Tenopir et al. 2005, Herman 2004), the informants were rather infrequent users of electronic literature. The most of the informants acknowledged the increasing significance of electronic resources and were aware of the growing number of the relevant journals and data sources available online [e.g. G, M] (M. J. Bates 1996) but used them only sporadically. The situation has likely changed since the interviews, although not as significantly as might be expected, because the majority of the journals and monograph series listed by the informants are still available in print-only versions.

Besides the apparent persistence of the habits of the informants, another clear explanation for the comparatively low usage of electronic materials is their relative scarcity in several specialist fields of archaeology. The informants who had cross-disciplinary contacts and research interests that coincided with the natural sciences emphasised the importance and value of electronic data services. They also contrasted the abundance of electronic data sources in the sciences to their scarcity in archaeology [D, N, V]. The present evolutionary phase of the electronic journal use might be related to the "evolving" phase in the categorisation proposed by Tenopir et al. (2003), even though the present study does not provide data for comparable longitudinal comparisons.

## Reports

Archaeological investigation reports (a formal report written to document to an investigation process and findings) were interestingly mentioned as being important far more often than they were used and actually reported as being useful. A typical comment was: "I use them less than I could" [e.g. O, Q]. The typical problems with the reports included that they usually are too specific to small excavations or too general about large ones, and that the reported results

are not very well tied into a larger frame of reference. On several occasions the reports were stated to be difficult to access, because the consultation required travelling to the capital city or another distant place.

Regardless of the problems, a report was seen as a primary source of archaeological information on a particular excavation and site. Secondary publications were often seen as abridgements, which did not give enough information on the subject matter to be useful in further scholarly considerations. The principal importance of the reports as first-hand accounts was also emphasised by the academic educators. They also underlined that it is necessary that their students use original reports in order to become acquainted with this particular type of information source [M, Z], (see also Raninen 2005).

## Academic theses

The perceived role of theses and dissertations as information sources shows some variation. Most of the informants agreed that the value of a thesis depends on its contents. The scholarly nature of a thesis does not affect its quality as a source of information. Field archaeologists tended to be interested in everything that might touch upon the subject of their research. They were generally not emphatically concerned about the formal qualifications or level of the theses. An undergraduate essay was assessed to be potentially useful, not unlike a doctoral dissertation. Academics and, interestingly, younger archaeologists tended to be more sensitive to good formal qualifications (i.e. grade) and the high, preferably doctoral, level of the theses [D, G, Q, V, Z]. Considering the usefulness of the theses, some of the interviewees remarked that the formal scholarly criteria did occasionally make a thesis difficult to read [C, N, P, W]. Unpublished theses are often also rather difficult to obtain, which was noted to reduce their usability as an information source [e.g. I, K].

# Reference works

Specialised reference works are relatively scarce in the Nordic archaeology and in many of its special fields [Z]. The annual Nordic Archaeological Abstracts (NAA) monographs were the prevailing general reference mentioned by the interviewees. Kulturhistorisk lexikon för nordisk medeltid (Eng. The Lexicon of the Cultural History of the Middle Ages in the Nordic Countries) was mentioned by several (primarily) Swedish respondents as a basically non-archaeological, but still important general reference work on early-medieval and medieval culture in Sweden [O, R, S, G, V, J, K, N]. In spite of the scarcity of archaeological reference works, the informants could rely on the relevant reference works from related disciplines, such as shipbuilding in maritime archaeology. In many cases some meticulously compiled standard works such as comprehensive dissertations or monographs may serve as a reference work [H, V]. In contrast to classical archaeology (Lönnqvist 1988, 75), most of the special fields of archaeology lack a similar comprehensive apparatus of reference works.

# Databases

The interviewees were relatively active users of small-scale databases that are specifically built for their personal needs or for their home institution. Most of the informants described that they work with the proprietary databases of their own institution or small databases made by themselves for their very specific research and reporting needs [e.g. A, B, C, D, I, J, N, P, Q, W]. The national heritage authorities have centralised collection and site registers although they tend to be far from comprehensive. Old legacy systems exist and are being used together with the new systems. Besides the several central repositories, additional cataloguing may be done in yet another system in order to serve some special needs, such as the maintenance

of a loans inventory [e.g. F, I]. The existence of multiple databases is largely explained by a chronic lack of funding for integration, conversions and cataloguing of the unregistered data. Most institutions have begun to register their new data in electronic repositories, typically from the late 1990's onwards. The database is typically parallel to a physical archive [O, P, Q, R, V, W, A, C, D, F, I, J, N].

Unfortunately, the quality of the repositories also shows considerable variation. As one of the informants pointed out, not all of the data entry work has been professional and consistent [D]. In spite of the immanent shortcomings, the databases were considered to be vital tools especially in cultural heritage administration. In general, the archaeologists working in cultural heritage administration were most active in their usage of databases and electronic information resources. Individual respondents indicated that they mostly use databases that are published and maintained by their home institutions [e.g. A]. Most of the relevant external databases cover secondary subjects such as the natural sciences, not archaeology. Library OPACs and web pages with contact information were also mentioned as useful databases [e.g. P, Q, R, T, V, W, X, Z]. The overall lack of useful and complete archaeological databases was widely acknowledged. The same notion applies to all forms of electronic media. Only one informant, who works with a specialised natural science topic in the field of archaeological research, was a heavy user of electronic resources. In spite of the scarcity of such resources, many of the interviewees were enthusiastic about them (cf. Lönnqvist 1988, 75). Part of the enthusiasm may be credited to the attempts to satisfy the interviewer, because the invitation to the interview could be read as an indication of a special interest in computerised information systems. The tendency of satisfying the interviewer is, however, unlikely to ground all of the optimism. The interviews gave a clear indication of the generally positive experiences of and expectations for electronic data and information resources. Therefore, it may be

suggested that these positive attitudes should be taken as an explicit impetus to work further with computerised information management and the development of electronic information resources for archaeological use.

## Plans and maps

Topographic and thematic charts and excavation and site maps as well as profile plans were used by all informants. Their importance appeared to be lower in artefact-centric work [B, G, I, Z] than in fieldwork, cultural heritage administration or landscape-related studies. The interviewees expressed, however, that an understanding of spatial relations and dimensions is necessary in all archaeological work, and it is based on maps and plans. The cartographic material provides vital information on the stratigraphic and subsequently chronological relations, spatial distributions and relations of the points of interest. A map also helps to situate and contextualise the entire intellectual process that is related to a specific site. The essentiality of plans and maps is accentuated in the field archaeology. Excavating archaeologists use multiple small-scale plans and maps to document the excavation work. Surveyors use a variety of detailed and larger-scale topographic, historical and thematic maps for identifying potential sites [F, N].

## Photographs and the moving image

Photographs are another central instrument of archaeological communication (cf. unlike in Lönnqvist 2003, 161-162). Every single archaeologist almost invariably uses photographs. Apart from a visit to an archaeological site or a first-hand contact with a find, photographs are the most important instrument for mediating information on primary materials.

A couple of informants had considered using moving images in field documentation [N, F]. Only a few individuals had had any direct experiences, and for most the idea of using a video as an information source in archaeology was a new one. Most of the discussed trials actually done in land archaeology were purely experimental and primarily directed towards producing video footage for public dissemination purposes [P, N]. No one had made any major attempts to use video in photogrammetrical documentation (Cosmas et al. 2003) of sites or in the documentation of the excavation process (Hodder 2000). In contrast to land archaeologists, maritime archaeologists use video extensively. The primary reason to resort to the moving image is the limited time that can be spent on an underwater site. The use of a video camera allows continuous documentation throughout the dive and thus maximises the input [All maritime archaeologists]. The theoretical possibility of covering an investigation completely by filming and later rewinding the process, attracted several land archaeologist informants [e.g. E, P]. The problems of archiving and browsing, however, would limit the usability of such comprehensive video documentation.

## Social practices of information sharing

In spite of the importance of physical and literary source materials, the most significant source of information for the interviewees was the social contacts with colleagues and experts of several related disciplines. Because of the convergence of practical work and academic research, the archaeologists only seldom work entirely alone (unlike e.g. historians in Tibbo 1994). The stereotype of 'lone humanities researchers' is not accurate in the context of archaeology.

Even if an academic and research-oriented archaeological activity itself were to involve considerable periods of independent work, this does not imply that the researchers would not use or benefit from informal communication (ref. Lönnqvist (2003, 66)). Excavations are

a group effort both practically and intellectually, although the ultimate intellectual authority is held by the director of the investigation. Academic research in archaeology is partly an individual enterprise, although the cross-disciplinarity of the data tends to require occasional consultation of colleagues and other specialists. Similarly, work in public dissemination, academic education, infrastructural development and cultural heritage administration is a collective effort. Individuals are free to make their own decisions, but colleagues are consulted with such frequency that they maintain strict collective control of the intellectual work. Colleagues provide direct information, pointers to things they are aware of, affirmation and confirmation [All]. The role of the community of colleagues as an important source of information is emphasised, because the formal publication channels are relatively scarce, resources for adequate and thorough publication of research results are generally lacking, and the number of active practitioners in archaeology is relatively small in both Finland and Sweden.

The complexity and important role of social information sharing was made apparent in the interviews. The strategies of sharing utilised in professional archaeological work groups, and teams engaged in field archaeology projects and other similar undertakings, do seem to bear a noticeable resemblance to the strategies and resons for sharing described by Cronin (1995). The reciprocal sharing of information resembles a system of giving and receiving gifts (Mauss 1925; Cronin 1995; Talja 2002; Hall 2003). Social exchange is based more on an expectation of emerging benefits than on direct needs and the setting of goals.

Only a few academic research, teaching and field-archaeology-oriented archaeologists said that they frequently relied on information specialists such as librarians. These results conform with several other investigations and observations on (academic) information behaviour (e.g. Kuhlthau 1993, 76; Hjørland 2002; Simmonds & An-

daleeb 200)). The situation was slightly different with the informants who worked with public dissemination, collection management and cultural-heritage-administration-related duties, but the overall picture may well be described as "disappointing" (Hjørland 2002) from a library and information service protagonist's point of view. Several informants indicated that they frequently consulted information technology specialists and specialists in a particular type of information, such as natural science, geographical or statistical data [e.g. C, E, M, S, W, X]. Those informants who did indicate that they consulted information specialists during their explicit information-seeking, shared the characteristics of being typically elderly and less computer literate, and of working in a relatively large public organisation [E, M, P, S, W]. Academics consulted specialists most infrequently. The reluctance to consult an information specialist seems to correlate with a rather narrow perceived horizon of relevant information, existence of well-established and stable publication and information dissemination channels, the small size of the closely relevant archaeological community, and the traditions and habits of esteeming personal information-seeking and access. Several informants acknowledged that they might benefit from consulting an expert in information-seeking matters, but were altogether rather dubious whether they would do so in the future. The results are comparable with the observations of, for instance, Steinerová (2001) and Singh (2005, 224-225) that libraries and information professionals need to struggle with the problems of new information environments, the service encounter, and identities and visibility in the rapidly evolving processes of information access, which have shifted the focus to the users' desktops and made the information-access providers increasingly transparent in the process of information-seeking and use.

# Discussion

The findings of the present study show that the core sources used by the archaeologists interviewed in the mid 2000s consist of archaeological primary materials (e.g. finds and sites), scholarly literature and personal communication. Registers, catalogues and databases were indicated to be of a direct importance, but most of the informants reported that the records tend to be lacking in comprehensiveness and often also in relevant information. The general patterns of information source use are in line with the findings of the earlier and contemporary studies on the humanities scholars. The cross-disciplinary and scientific tendencies of the archaeological practice became apparent on the level of individual information sources and information-seeking archaeologists. The general tendency to make distinction between primary and secondary materials, a variety of information sources utilised, and the long lifespan of the relevant literature seem to be, however, a common characteristic shared by the archaeologists and the majority of humanities scholars (e.g. Tibbo 1994 ; 2003). In this respect, archaeology is clearly one of the humanities in Finland and in Sweden, as also the placing of the departments within the university faculties suggests. This is in contrast with the North American conception of archaeology as a social science and a branch of anthropology (Darvill 2002, Renfrew & Bahn 1996).

The use of information sources by the archaeologists interviewed was highly specific to the purposes of the work at hand. It varies according to the situation and context of the information work. Besides being dependent on personal habits of information source use, the choice of sources shows distinct work-profile-specific variation on the level of the characteristics and the specificity of the resources. The information source use tends to be more specific when the work duties incorporated academic research, collection management, field

archaeology, development of methods and tools and cultural heritage administration. In contrast, archaeologists working with public dissemination of archaeological information and academic teaching were likely to use general sources of information. Similarly, the sources are consulted to extract different types of information depending on the work duties, even if the source itself is the same one.

Academic research seems to be the only exception to the general rule. For researchers, their use of information sources tends to be specific to current research topics, but at the same time, the information itself may serve multiple functions in its various contexts and situations. The nature of the information is determined by the specific research questions, their meaning, purposes and values, not the horizon of the work itself.

Basically all source materials, including archaeological material, serve a dual purpose of being both information containers and pointers to new information. Sources may contain direct links such as bibliographical references, but also indirect references to potentially interesting follow-ups, such as the material, the find spot and the form of an object. General non-scholarly information sources such as newspapers, television and magazines were considered to be of a relatively little use. Informants who work as cultural heritage administrators gave some weight to news broadcasts and newspapers for keeping abreast of the public debate and various public matters, such as current land use plans [e.g. C, W]. Otherwise their relevance was considered low, with the exception of providing occasional pointers to other sources.

A general remark made by several informants is that published, accessible and altogether existing archaeological information is only sporadically available. The problem is especially immanent in field archaeology. Reports on earlier investigations may be entirely non-existent or consist of some scattered notes, uncatalogued finds and fragmentary data (e.g. Rímon (2005).The occasionally lacking doc-

umentation, the small number of researchers, and consequently of the publications, in many special fields of archaeology, limits the total amount and quality of the information resources. These kinds of shortcomings show a striking resemblance to the observations of Ocholla (1996) in a third-world context. Like the academics in a third-world university, the archaeologists are forced to resort to alternative information acquisition methods. Archaeologists need to congregate around the available resources and channels (cf. the library in Ocholla's 1996 study) and to forge them to fill the place of the non-existent resources in their communal discourse. This type of a formation of the information use behaviour is natural, but it signals of an inefficiency in the general information process in the profession. If the financial and practical possibilities are available to conduct investigations, there should be enough resources and pressure to finish the documentation process adequately and to manage the information properly.

The archaeologists' information work resembles an unnecessary degree archaeological work itself. Archaeologists need to 'excavate' their information from inadequately organised resources, combine several sources and information channels and rely heavily on social information acquisition even for rather simple tasks. The functional and economic reasons do not, however, provide a comprehensive explanation of the patterns of information use. The kind of tribalism and information use described, which resembles the archaeological work itself, is not a direct consequence of analogy between archaeological fieldwork and information work. Not even the scarcity of resources necessarily begets such behaviour outside a social milieu where shared information sources are a precondition per se.

When interpreting the findings, it is necessary to consider their retrospective nature. Several aspects, both technical and administrative ones, have changed since the empirical material was gathered a decade ago. More archaeological literature and especially data is

available in digital formats, though seldom in centralised digital repositories. Also, the use of computers and digital tools has become more common in both fieldwork and later stages of the work process. From a structural point of view, the commercialisation of rescue archaeology has had consequences for the availability and production of information, even though the situation is still very much in a state of development, and it is difficult to say how the responsibilities will be defined in the future.

Even if archaeological work has changed during a decade, it is hard to see that any of the observable changes would have been radical enough to have revolutionised the general picture of information source use in archaeology. The development of centralised archaeological data archives, for instance, in the UK and the Netherlands, and similar projects in other countries, and the work for a European archaeological research infrastructure in the EC-funded ARIADNE infrastructure project can be factors that have the capability to function as significant game changers. From a structural point of view, the organisation of rescue archaeology and the addressing of questions of archiving archaeological materials are two others issues that may cause major changes in how archaeologists use information sources in the future.

## Conclusions

In conclusion, the findings show that the information use patterns and source selection of the informants was at the same time dependent on the demands of the multifaceted nature of archaeological work and the limitations imposed by how information is managed and disseminated in archaeology. Tribalistic and rationalising information source use patterns are a consequence of the existence of multiple small specialist fields, but also of the persistence of the formalities and traditions of producing archaeological and publishing results primarily in national languages. The retrospect shows that more

open forms and processes of disseminating information and systematic development of relevant finding would contribute to increasing the impact of archaeological information and facilitate the work of both archaeologists and other stakeholders of archaeological information. At the same time, the findings imply that the development of such systematic processes is not merely an administrative or a technological task. The choice of information sources and the emergence of information practices in archaeology are social practices with a broad range premises that are only indirectly related to how archaeological information should and could be disseminated, made available and used.

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