

THE INFORMATION RETRIEVAL SYSTEM OF THE  
NORTHERN ARCHAEOLOGICAL SURVEY

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The Northern Archaeological Survey was set up jointly by the DoE and Durham University in May 1974 to investigate the effect of development on archaeology in the counties of Durham, Northumberland, Tyne and Wear and Cumbria. This investigation will be published in the form of a report in the summer of 1975. It is hoped that the report will act as a structure plan for northern archaeology, showing where work is needed in areas defined both geographically and chronologically. It is also hoped that the report will act as an aspect report for the County Councils, which can be used in the construction of their policies regarding archaeological remains.

There are two basic requirements for the preparation of the report. One is a comprehensive list of sites, and the other is as near a comprehensive list of developments as is possible. The former list is not as comprehensive as we would have liked, largely due to lack of work in certain areas, but is the fullest available at the moment. The latter list has proved fairly easy to obtain, and is almost always in map form when it arrives from a developer.

The archaeological information held by the N.A.S. comprises a card index of sites which is largely based on the O.S. Cards, a minimum information card index, 6" maps and computer listing of the minimum card index. I would like to consider each of these in turn.

Card Index and 6" Maps

The system is to a certain extent based on a cross-referenced card index to sites in County Durham which was inherited by the N.A.S. This was started about ten years ago, before the O.S. Archaeology Record Cards were obtained, when individual workers gave information to the Local Information Room, as our predecessor was called. All this information was plotted onto 6" maps of the county and arranged in separate card indices cross-referenced according to type of site and find. Once the O.S. cards had been obtained, the lists of sites already known were checked to see how much duplication there was, and to correlate the two numbering systems. In fact, there was very little overlap as the O.S. Cards seem to have depended largely on the V.C.H. and similar works, while the information coming in was largely the result of field work.

We have obtained a copy of a minimum information card index to the O.S. cards for Northumberland prepared by the Field Research Group of the Society of Antiquaries of Newcastle upon Tyne. A similar index for North Cumbria has been given to us by Cumbria County Council which was prepared by the County Archaeologist for Cumberland. At present there is no set of O.S. cards in the North for S. Cumbria, though a minimum information index from the O.S. cards held by the N.M.R. has been prepared. Ultimately, it is hoped to have O.S. cards for the whole of North England (excluding Cleveland at the moment).

The O.S. information is being expanded all the time by field workers and researchers providing us with new material, some of which is subject to conditions regarding access by the general public.

#### Aerial Photographs

A collection of aerial photographs taken by Dr. Dennis Harding and Mrs Jean Ward is being catalogued and included in the card indices for the counties covered by the N.A.S. Material from the past flying activities of Dr. Norman McCord and the present flying of Dr. Stafford Linsley, both of Newcastle University, will eventually be included in this catalogue. My colleague has prepared a list of aerial photographs relevant to the area, which are held by the N.M.R., which duplicates to a certain extent the maps Northumberland County Council gave us on which all the A.P.s they hold are marked, as well as the date they were taken and sources.

The N.A.S. holds information on about 10,000 sites, and about 2,000 find locations in its area. The detailed card index covers sites in County Durham while the minimum information card index covers all sites in the area, all of which are being put onto 6" maps. One of my own hopes is that the A.P. index will eventually include at least one photograph of every site in the indices.

#### Computer

Because of the Survey brief, we have also had to collect information regarding development, and to correlate this with the location of sites. This task is impossible for two people to do in 12 months, as well as prepare a report. We decided that the computer was necessary as one of the tools for preparing draft maps for our draughtsman. The information held on computer is the grid reference, accuracy of the reference, period, type of site, condition, threat and source (where the information is classified), all being taken from the minimum information card index.

Since neither my colleague nor I is versed in computer programming, we had to turn to the Computer Unit at Durham University. Mr. J.S. Roper, a Senior Lecturer there, wrote a

programme to our specifications using PL/1. The specifications were that we should be able to reference the listing for any of the individual variables, or any combination of them, and that we should be able to extract sites falling within specified rectangular or square areas defined according to grid reference.

Another argument put forward for using the computer was that lists of sites in areas due for development agencies had an interest, could easily be prepared. It would also provide individuals with the lists of sites in any given area.

Experience and theory are very often too slightly different things. In theory, the computer would be the quickest and most efficient way of preparing information for dissemination to developers, field and research workers. In practice, no archaeologist has asked for information which the machine could have prepared more easily than any other way: usually the requests are for all known sites in small areas, perhaps one or two parishes, but in far more detail than is on the computer record.

All but one of the few enquiries from developers have been answered by print-out containing lists of sites for the area in which the developer is interested. The exception was a request for information more or less immediately. This was answered by xeroxing the minimum information index and posting: no more than 30 minutes at the outside. It would not have been possible to get the information to that developer as quickly by using the computer, as there is a long walk to the computer unit followed by a wait until a terminal is free. The answer, of course, is to have a terminal in the office; but then there is the question of cost.

The whole system as it now stands may be represented as in Figure 1.

I have already said something about the way the N.A.S. deals with the threat posed by development agencies. The map record and minimum information card index really seem the quickest way of providing information. The role of the computer, while we use it, is of little importance when dealing with threat from development as its use in this context can only be justified when information is needed within 24 hours, and the number of requests for such information is quite large. The only place in which I can see this happening, is the Development Control section of local government Planning Offices. The relevant information could be obtained as quickly by using a carousel type of filing system from which information can be retrieved within 10 seconds, and can be operated by three people simultaneously (Harnett, 1974). In fact, the computer retrieval time for sites within areas of between 3 and 96 hectares is,

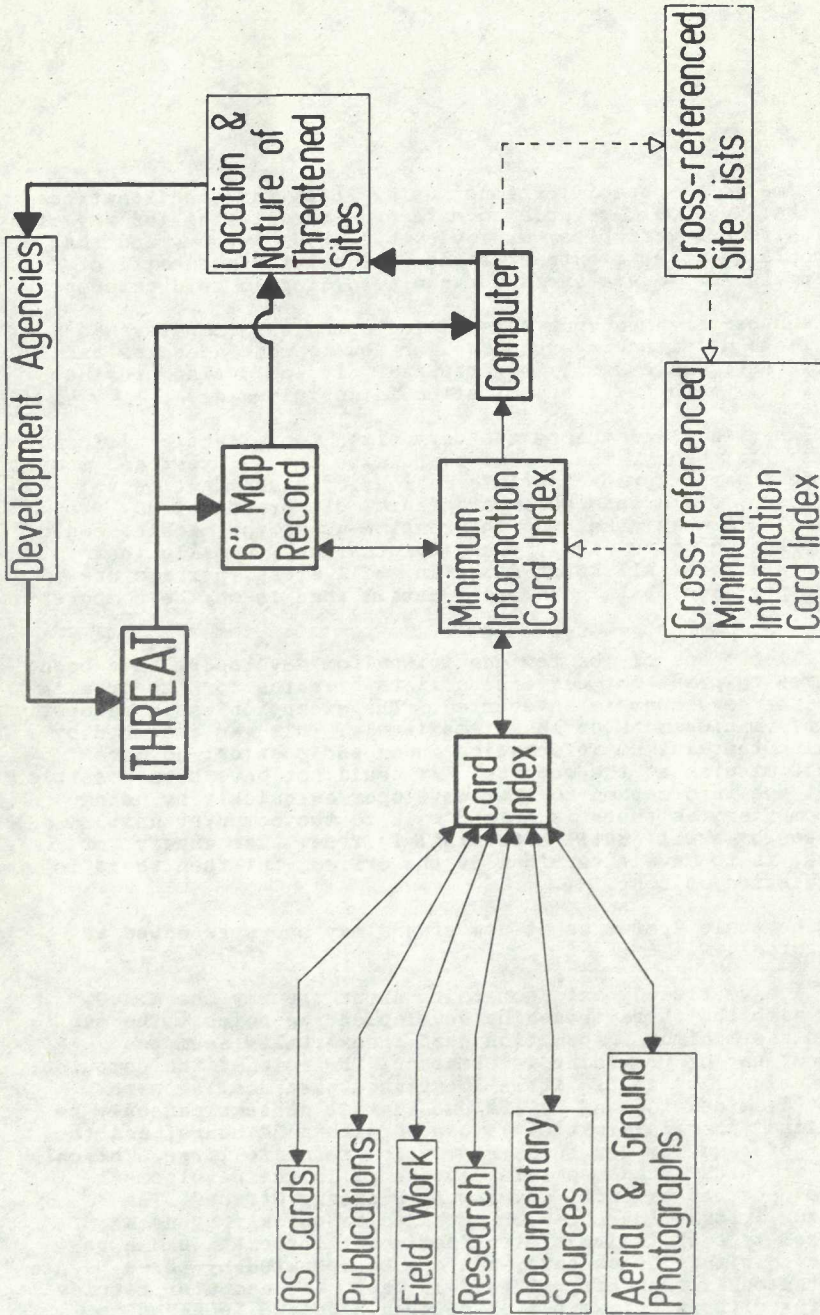
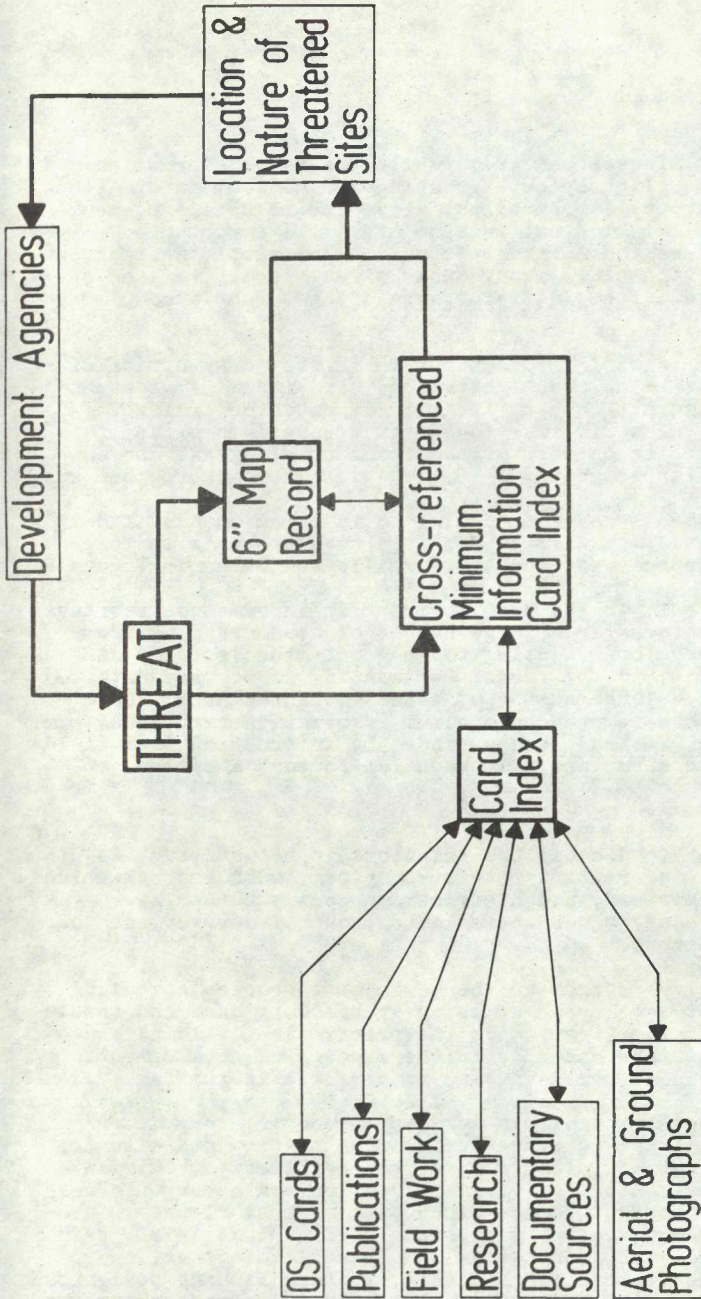


Figure 1.



ULTIMATE FORM OF SYSTEM AS OPERATED BY N.A.S

Figure 2.

on average, 2 minutes per area, while the same information can be obtained slightly quicker using the minimum information card index - about 1½ minutes per area. Its role for archaeological work in this context is also of little importance, since it provides too little information for people wanting to know as much as possible about known sites. It may well be of some assistance in the initial stages of research in compiling site lists.

The major role of the computer is in the construction of a minimum information cross-referenced card index. At present the minimum information card index is arranged according to 6" map sheets; we would like to see it arranged according to period/type of site as well as condition of site, and can see that the computer is going to be the quickest means to this end.

Once the cross-referenced minimum information card index has been prepared, it will be possible to dispense with the computer altogether, and the system will then be as in Figure 2.

This, I feel, is the best form for an information retrieval system which caters for a large number of needs ranging from those of the developer wanting to know only the location and extent of a site, to the researcher wanting to prepare detailed information on a large number of sites within an area. The 6" map record, cross-referenced minimum information card index, based on the O.S. cards, and expanded by information from field and research workers, are all essential to such a system.

### Planning

I now want to discuss the relationship between such an archaeological information retrieval system, such as that which I have just described, and district and county authority planning processes, since these latter control development to a very large extent.

There are two stages in the development process at both county and district level, at which archaeology can, and should, be brought in. The first is in the preparation of local and structure plans, the other is in the process of development control, which some would view as rather late in the day.

I would see it as of crucial importance in every district and county, that the relevant authorities be provided with all known archaeological information at the earliest possible date in the form they want it, i.e. the location and extent of each site. The relevance of chance finds, unless they clearly indicate a structure, should be questioned at this level. With this information they can decide on expanding conservation areas which they intend to designate, or have already designated, or may, when seen in conjunction with other information suggest new conservation areas. It may also indicate that some areas could have development allowed in them, but subject to controls

less stringent than those applying in conservation areas. The county and district authorities would be able to include a coherent policy regarding archaeological remains in the Structure Plans at present being prepared, rather than arriving at ad hoc agreements in scattered areas within the county. This is probably the most important aspect of the relationship between archaeology and development today, and cannot be overlooked. The part that local collections of archaeological information have to play in this is of the utmost importance; the more comprehensive the information, the more comprehensive will be the protection within the county structure plan. The county and districts may thus be able to divert some forms of development away from archaeologically sensitive areas.

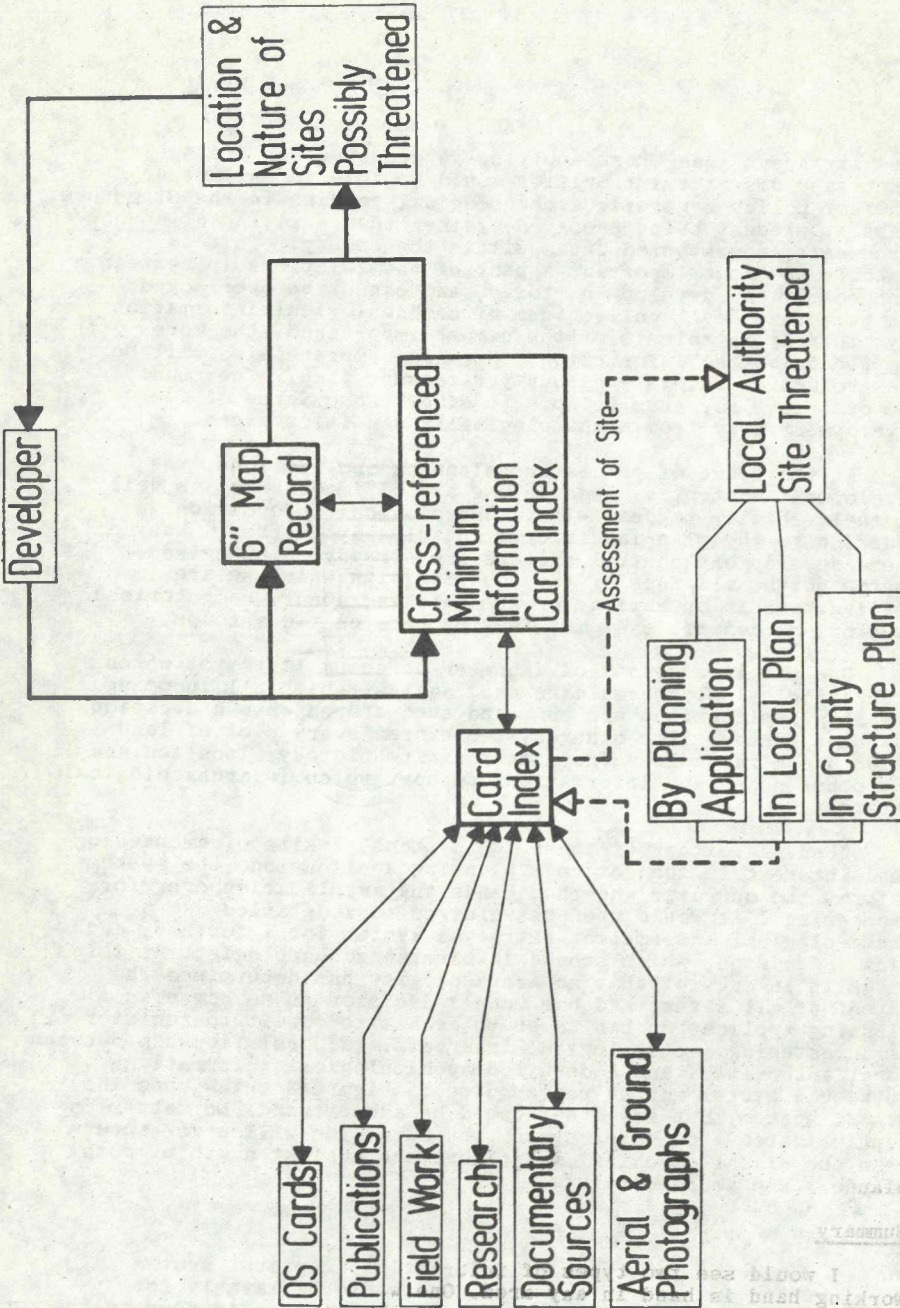
At the stage of processing planning applications, the development control systems in use are of importance, as well as their ability to deal with archaeological information in addition to the planning information already on them. Many of these development control systems are already computerised. In the north, all four of the counties with which we are dealing have in operation, or are thinking about, computerised development control systems. They operate on two methods.

One simply consists of a number of check lists, of which archaeological sites could be one, against which all incoming planning applications are run, and then stored when a decision has been reached. The other system stores every plot of land which has a rateable value, its planning history, location and any other necessary information, amongst which is archaeological interest.

When, in either of these two systems, a site of archaeological interest is subject to a planning application, the system informs the operator who then hands that application over for processing. It would then be referred to a detailed archaeological information retrieval system for a further, and final, decision, which should involve an archaeologist. At this stage it is crucial that an archaeologist has determined the extent of all sites, and has made a decision as to how near a planning application has to be to each site for it to register as threatening archaeological interests. This relationship between local authorities and a detailed archaeological information retrieval system may be represented in Figure 3 which uses the N.A.S. system, but any other could be substituted. No matter how sophisticated a computer system you have, you will never supercede the visual checking of applications against a map by both planners and archaeologists.

#### Summary

I would see two types of information retrieval system working hand in hand in any area. One would be largely for archaeological use, and would probably be similar in form to the



ULTIMATE FORM OF N.A.S. SYSTEM IN CO-OPERATION WITH LOCAL AUTHORITIES

Figure 3.



final form of the N.A.S. system, i.e. a card and map-based system. The other would be based on local authorities, in particular, the Planning Departments, and would almost certainly be computer-based, particularly for largely urban districts and counties. It would also be bound to vary in detail from area to area, though in all cases being tied to Development Control sections within the Planning Departments. It would inform the Planning Authority when archaeological and planning interests are in conflict, and refer these matters to the archaeological system for further comment by an archaeologist prior to making any decision. The possession of this information would enable Planning Authorities to construct coherent and comprehensive policies regarding archaeological remains and sites in County Structure Plans and District local plans. This does not take away from the archaeological system its place as advisor to developers where sites lie within the developer's area of interest. It is part of an early warning system to the developer and archaeologist, and could be evolved in much the same way that has been done by the N.A.S. in its work both with developers and local government.

Harnett, J. (1974) "Unwise investment can be disaster"  
The Times, 27.11.74, p.14