ARCHAEOLOGICAL HERITAGE MANAGEMENT IN THE NETHERLANDS

Fifty Years State Service for Archaeological Investigations

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Contents

Preface

Starting in the 1980s and especially during the last decade, the contexts of Dutch archaeological practice have changed considerably. The growing awareness of the rapid erosion of the archaeological record, increased public concern and support for heritage management, involvement at all levels of government, and the lively debate about the necessary restructuring of Dutch archaeology that arose after signing the Convention of Valletta in 1992, have already led to important changes. New legislation, the introduction of contract archaeology in excavations, the growing recognition of the role of archaeological resource management – and of cultural resource management in general – as an important factor in spatial planning and, last but not least, the changed mission and organisation of the ROB (*Rijksdienst voor het Oudheidkundig Bodemonderzoek* – the Dutch State Service for Archaeological Investigations) will lead to a radical transformation in the immediate future.

At the moment, Dutch archaeology is in a state of transition, and so is the ROB which celebrates its 50th anniversary this year. The institute was founded in 1947 as an excavation service and to maintain a national register, a database of archaeological finds and monuments. It is now changing into a national centre for the management and research of the archaeological heritage. The contributions in this anniversary publication are intended to give an overview of the development and present concerns of archaeological heritage management in the Netherlands in an international context.

Although it covers a wide range of subjects, this publication does not aim to give a complete coverage of all relevant aspects. Some obvious topics are lacking. For example, a translation of the revised Dutch Monuments Act of 1988 has been included but there is no separate chapter on legislation because a new revision will be necessary – which is currently being considered. Aspects of this are discussed in the first and third chapter, but the Minister of State for Cultural Affairs, A. Nuis, has just sent a letter to parliament with an outline for the implementation of 'Malta', as the Convention of Valletta is commonly referred to, in Dutch law. By the time this book will appear in print, discussion of his letter in parliament will hopefully have provided the guidelines for a revision.

Nevertheless, we hope that our anniversary publication, which is the first of its kind in the Netherlands, can also be of use as a handbook for students and colleagues and will provide archaeologists and heritage managers abroad with a clearer picture of Dutch archaeological heritage management. For this reason, it has been published in collaboration with Van Gorcum Publishers and not as an issue of our *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek*. Most but not all contributions have been written especially for this volume by archaeologists within and outside the ROB and in many cases they are directly inspired by the institute's current policies, concerns and priorities. Obviously, many of these are currently being revised and reformulated as a result of the ROB's changing position.

Although the contents have not actually been subdivided, the editors have

arranged the book into several clusters. The first three chapters are general summaries. The introductory article is concerned with the history, development, current priorities and future aspects of archaeological heritage management in the Netherlands. It is followed by a similar contribution from the viewpoint of archaeology underwater and by an analysis of the impact of the Convention of Valletta.

These introductions are followed by two major contributions on predictive modelling and on dealing with the difficult subject of significance, two subjects which are currently the focal point of archaeological interest, and by three chapters on the role of conservation science, aerial photography and urban archaeology.

The next three articles report on specific projects: the *terpen* (the dwelling mounds along the coast), the protection programme on the megalithic monuments in the northern part of the country, and a joint heritage management programme with our German neighbour-institute, the *Rheinisches Amt für Bodendenkmalpflege* in Bonn. All of these have international aspects, and the last project, especially, has been specifically designed to create a basis for fruitful cross-frontier collaboration in the future. In an age with increasing impact of European policies and regulations at the national level, not only the exchange of information but practical cooperation in the management of archaeological resources will be vitally important.

These are followed by two chapters devoted to the subject of finds and how to deal with them, the management of collections that result from fieldwork – a traditional but still highly relevant concern.

Finally there is a contribution on documentation, with a discussion of ARCHIS, the archaeological database of the Netherlands that is the essential link in the cyclical process of managing the archaeological archives in our soil, and the book is concluded by a brief résumé of excavations by the ROB.

The title of the ROB's policy statement for 1997–2000 published earlier this year, *Geef de toekomst een verleden*, can be translated as 'A future for our past'. Providing this future is the central task of heritage management and the contents of this book are intended to show how this is being done. As directors of the ROB, we would like to thank the contributors, many of whom somehow found time to write despite their very busy daily schedules, and to the editors who had a double task. We are also grateful to mrs. A. Steendijk and mrs. M. Alkemade, whose assistance was indispensable in the final editing of the text and to mr. G.H. Scheepstra, responsible for the illustrations.

Willem J. H. Willems (scientific director) and Henriëtte C.M van der Linden (managing director)
Amersfoort, July 1997

Cross-border Cooperation on Archaeological Heritage Management and Research: the Niers-Kendel Project

J. Deeben, J.-N. Andrikopoulou-Strack, R. Gerlach, J. Obladen-Kauder, and W. J. H. Willems

Even archaeology has a role to play in the European integration process, albeit an ambiguous one. The archaeological heritage is well-suited to political purposes, for example when it is a question of emphasising common cultural and historical roots and putting into perspective the significance of present-day national frontiers.[1] Thus archaeology in general, and archaeological heritage management in particular, are being offered new opportunities in today's Europe; they are also, however, being exposed to old dangers. These themes are discussed at many conferences and in numerous publications.[2] In the present article, the aim is not primarily to make a direct contribution to this discussion. There is already a long tradition of cooperation in archaeology in the Rhineland and the Netherlands. However, as in most other places, this is virtually undeveloped in the specific area of heritage management. Archaeological heritage management is characterised by specific national public-law procedures and is traditionally directed towards individual archaeological sites. In the last decade in particular, however, new concepts have been developed which emphasise not the individual relic but the cultural landscape as unit of a heritage management and at the same time introduce the archaeological heritage as an important element in the discussion of regional planning and environmental protection.[3] International and interdisciplinary projects are well suited for the testing, application and further development of such concepts.

BACKGROUND AND OBJECTIVES OF THE PROJECT

The Niers-Kendel project (fig. 1), which only recently took on this form, has a rather long history. Since the late 1980s, the Lower Rhine area has acted as a focus for research by the *Rheinisches Amt für Bodendenkmalpflege* (RAB – Rhineland Service for Archaeological Heritage Management). In this context, a 36 km^2, as yet largely unresearched, test area near Goch was defined and named after the two rivers characterising the landscape: the Niers-Kendel project.[4] Here, a diachronic investigation, that is, covering all periods, was to be carried out into settlement systems, in close conjunction with landscape change. Initially the work was restricted to the evaluation of the historical maps and archaeological data already available. The fieldwork required to amplify that knowledge was to be undertaken at a later date.

1. A good example of this is the 'European Bronze Age campaign' of the Council of Europe in Strasbourg.
2. See, e.g., Koschik 1994, Kohl & Fawcett 1995 and Saas 1995, which vary considerably in content.
3. Bloemers, Van Pelt & Perk 1990; Koschik 1993; MacInnes & Wickham-Jones 1992 and many others.
4. The initiative came from the archaeologists W. Schwellnus and D. von Detten, who at the time were responsible for the Prospection Department in Bonn and the Lower Rhine branch office in Xanten.

Figure 1 Location of the project area.

In parallel, specialist contacts were developed in the context of other projects between Dutch archaeologists from the *Instituut voor Pre- en Protohistorische Archeologie* (IPP) at the University of Amsterdam and staff of the RAB. The Niers-Kendel investigation area also came under discussion in this group, and met with considerable interest. On the initiative of the authors, who were now working on the project, the idea arose of expanding the project on the Dutch side. This also made it possible to form a link with the long-term research programme of the *Rijksdienst voor het Oudheidkundig Bodemonderzoek* (ROB – State Service for Archaeological Investigation) in the eastern river area and the adjacent valley of the river Meuse.[5]

As early as 1991, the European Community had adopted the Interreg II assistance programme with the objective of reinforcing and expanding cross-border cooperation on a long-term basis. Within this framework, the RAB applied to the Rhine-Waal European region for assistance with specialist exchanges between Dutch and Rhineland archaeologists, and received approval in 1993. The financial support involved offered a concrete opportunity to hold the necessary planning talks for a binational Niers-Kendel project and to formulate the substance and objectives of the planned cooperation.

The physical geography means that it makes sense to expand the investigation area to the west. The modern border constitutes an artificial division in a uniform cultural landscape with related historical origins. The archaeological information on the German side is patchy. This is because, in the past, research in the Rhineland has concentrated on the investigation of Roman camps along the *limes* and the settlement history in the fertile loess plains. On the Dutch side, however, many years' activity by amateur-archaeologists and a number of extensive excavations have provided a good database. The partners in the project agreed that this greater depth of knowledge should be used within the context of cross-border work.

The archaeologists involved on the Dutch side are from the ROB and the IPP of the University of Amsterdam. On the German side, the Prospection Department, scientific specialists in geology and historical geography and the Lower Rhine branch office of the RAB are taking part. In addition, there are all the amateur-archaeologists operating in the area.

The institutions involved are pursuing three objectives in their cooperation:

5. Bloemers, Hulst & Willems 1980 and ROB *Jaarsverslagen* since 1979.

- standardisation and development of procedures and techniques for establishing the position, nature and state of preservation (quality) of archaeological sites. This includes designating locations where features structures, finds, organic remains and environmental relics are encountered in association;
- diachronic landscape reconstruction and analysis of settlement systems and patterns at different points in time in a micro- and macro-regional context and the definition of important archaeological landscapes.
- gaining appropriate knowledge of the typical appearance of archaeological sites (e.g., settlements or cemeteries) and landscapes; during planning processes, this may be helpful to the safeguarding and preservation of the archaeological heritage. It should not only be applicable in the Niers-Kendel area but should also serve to facilitate the speedier and better assessment of archaeological phenomena in regions with similar land-scapes.

It should be possible to achieve these objectives within a period of five years in the extended Niers-Kendel area. In the Netherlands this covers a small part of the provinces of Noord-Brabant and Limburg to the south-east of Nijmegen (GL). On the German side it consists of part of the district of Kleve to the west of Goch (fig. 3). The total surface area of the investigation area amounts to approximately 135 km^2. This includes, on the German side, the localities of Asperden, Hassum, Kessel, and Nierswalde. The largest Dutch municipalities are Gennep (L) and Boxmeer (NB). In addition to the Meuse and the Niers, the Kendel constitutes a further important watercourse.

GEOLOGY OF THE AREA

The landscape in the Niers-Kendel area is highly diversified due to differing sediments and soils, the rivers Meuse and Niers, and the relatively marked relief. Its development is well known due to a number of pedological, geological, geomorphologic and palaeobotanical studies (fig. 2).[6] The Niers-Kendel region is part of the Lower Rhine sedimentation area, which has been formed since the Tertiary as a consequence of tectonic movement. However, the landscape did not take on its present appearance until the most recent geological epoch, the Quarternary. Four major natural entities characterise the area: the end-moraine and sandr, the Rhine and Meuse Low Terraces with the *donken* and *kendel* landscape, extensive sand dunes, and the present Meuse-floodplain. The end-moraine which in the otherwise flat Lower Rhine area projects near Nijmegen and Kleve in the form of a ridge up to 80 m NAP (Dutch Datum Level) and which is visible from some distance, still marginally affects the investigation area. It was built up from Rhine sands and gravel by the ice cap advancing from the north-west during the Saalian Ice Age (*Formatie van Drenthe*, approximately 250 000 years ago). The major part of the still partly wooded 'highlands' does not, however, consist of the end-moraine itself but of the sandr immediately in front of it. These sandr deposits are meltwater sediments which were deposited in front of the end-moraine. They too still project clearly over the lowlands at an elevation of approximately 30 to 40 m NAP. At the end of the Weichselian the broad sandr surfaces in particular were again overlaid by the deflation and deposit of sand loess and coversand. Many of the former heathlands lay on this extensive sandy cover. Pure loess deposits may be found only in the core area of sandr, to the north of Kleve.

6. Bohncke 1991; Brunnacker 1978; Buitenhuis & Wolfert 1988; Klostermann 1992; Schelling 1951; Siebertz 1987; STIBOKA 1976; Thoma 1975; Van de Toorn 1967; Van den Broek & Maarleveld 1963.

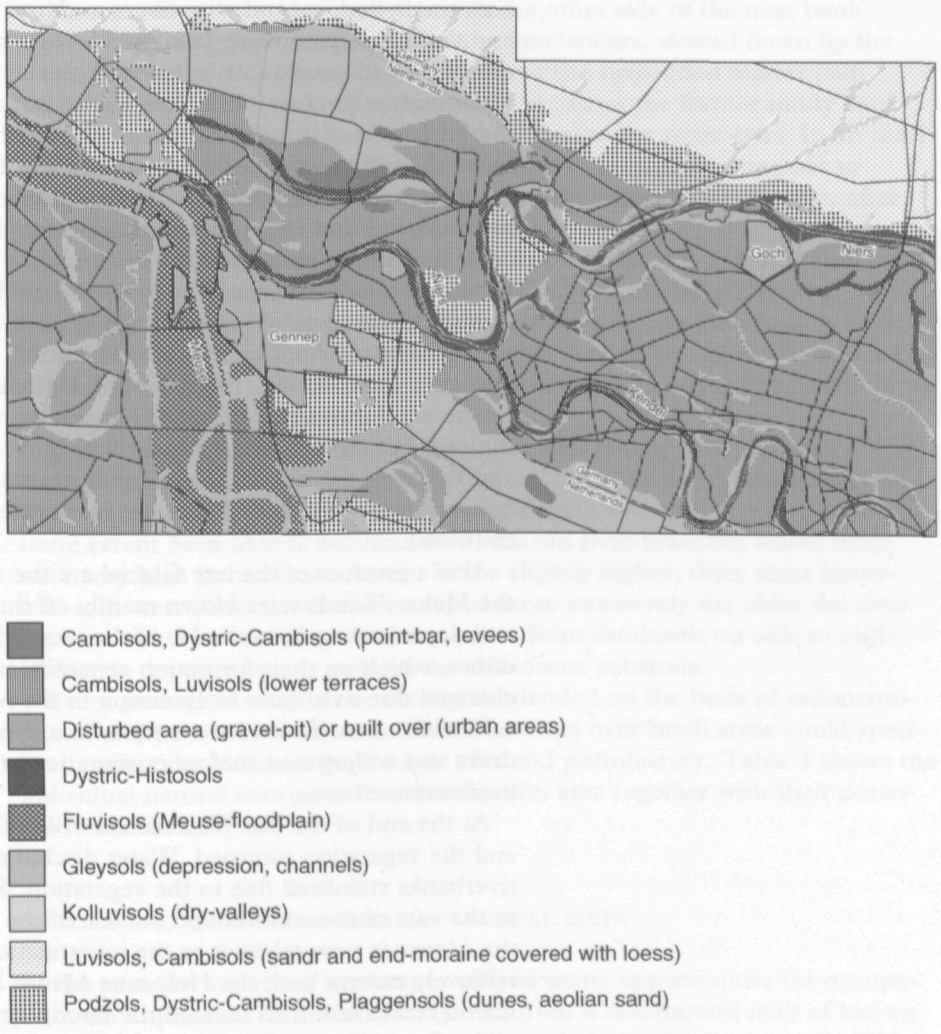


Figure 2 Simplified geological map of the Niers-Kendel area.

The typical soils of the end-moraine and sandr are dense luvisols and cambisols, and, on the purely sandy coversand deposits, the nutrient-poor podzols, which may be overlaid with anthropogenic plaggensoil or *enkeerd* soils. In the west, a Low Terrace plateau (approximately 15 to 17 m NAP) adjoins the sandr and end-moraine. The sandr and gravel of the Low Terrace were deposited during the last Ice Age (Weichselian Ice Age, approximately 70 000 to 10 000 years ago), mainly by the Rhine, which flowed around the end-moraine and sandr. At that time, the Rhine and the Meuse flowed in branches spread over kilometres forming a braided river system, constantly changing course through a tundra area poor in vegetation. Due to enormous quantities of frost debris from the hinterland, the rivers could accumulate an enormous amount of sand and gravel, building up the Low Terraces. The fine-grained loams of the high river level ('old river clay') formed the limit of the Low Terrace deposits. The so-called '*Donken- und Kendel*' landscape (*Donk* – low terrace plateau, *Kendel* – channel) subsequently emerged on the Low Terrace. The typically winding channels were formed at the end of the Weichselian when the Meuse and the Rhine were transformed from Late Glacial rivers, kilometres wide, with countless constantly changing branches, to the post-Gla-

cial, single-bed, meandering rivers we know today. At that time, the Meuse and the Rhine cut deeply into the Low Terrace surface at the level of the present meadowland (see below). At the start of this process, however, the groundwater level was still close to the surface of the Low Terrace. During the initial use of braided former river branches, separate, smaller run-offs formed on the surface of the Low Terrace, from which, however, even in the early Holocene, the water was virtually drained off by the now well embedded rivers Meuse and Rhine. Since then, most channels on the Low Terrace surface have filled up with sediments. The Niers and the Kendel still, however, remain as small streams. Due to considerable meandering in the late Glacial, sandy slip-off slope sediments formed on the inside of the bends, as is the case with any meandering river (see below). Again in the late Ice Age, but also after the clearance phases in the Holocene, these could be transformed by the wind into small dunes. Thus there are frequently sandy areas and dunes on the inside of the bends, which are today characterised by a podzol and dystric cambisol. In the channels themselves, pure groundwater soils (gleysols) were formed. There are also some low peat areas (dystric histosols).

Also a product of the late Glacial are the extensive dune areas to the east of the Meuse. Sands were blown mainly off the dry Low Terraces at that time and deposited again in the lee of the west winds. The morphology of these dunes, which on their formation generally exhibited considerable relief, changed due to human intervention in the Middle Ages, and presumably at an earlier date too. Thus, for example, as a consequence of clearances, new sand drifts and widespread surface erosion occurred. Podzols and plaggensols predominate here.

At the end of the last Weichselian (10 000 BC), the climate warmed up again and the vegetation returned. Water discharge became more uniform and the riverbanks stabilised due to the vegetation. Since then, the Rhine has flowed to the east of the endmoraine outside of the investigation area, so that only the Meuse is now relevant to the investigation area. Being restricted to a relatively narrow bed, the Holocene Meuse had to cut into the body of the Low Terrace and thus created the floodplain about 4 m deeper. It was formed and reformed as a consequence of the meanderings of the Meuse. On the surface, the Holocene river deposits end with a fine-grained sediment ('young river clay'). In the course of the Holocene there were a number of periods of more intensive rearrangement due to the shifting river meanders. Thus the floodplains are also built up of small, floodplain terraces, which are the retained products of such rearrangement phases of the rivers over the last 10 000 years. Only in the nineteenth century did the alignment and stabilisation of the Meuse put an end to the natural rearrangement dynamics. Confined to an artificial bed, the river can now only cut downwards. Highly characteristic sedimentological and morphological features occur in a river floodplain as a result of meandering. They largely determine the suitability of the floodplain for occupation. Starting from a small initial curve, a meander gradually spreads out, increases its radius and in doing so slowly moves downstream. Characteristic sediments are deposited. Coarser gravel can only be carried in the actual river bed, where the depth of the water and speed of the current are great enough. Towards the bank areas, due to the lesser depth of the water and speed of the current, the grain size of the material carried is reduced until it is the size of grains of sand.

Thus so-called natural levees build up on both sides of the river because the floodwaters deposit the major part of their load, the coarser, sandier

sediments, directly on the bank area. On the other side of the near bank area, in the floodplain, the gently flowing floodwaters, slowed down by the vegetation of the floodplain, can only deposit the suspended matter (silt, loam, and clay). The shifting of the river bed causes the former sandy bank deposits on the inside of a meander to be added to the point-bars. In an ideal situation, a point-bar is divided up by ribs and depressions, witnesses to earlier meandering phases. As the final act of the meandering process, after the break-through of the loop an oxbow lake remains.

Since natural levees and point-bars are sandier than floodplain sediments, they form small elevations and ridges in the level of the floodplain. In the floodplain which is by its nature constantly threatened by flooding, these few inches above the average high water level and the sandier, lighter and hence more rapidly drying soil could be the essential decisive factor as to suitability for occupation.

Soil development in the Meuse floodplain can also be differentiated according to age and position: in the channel positions are found groundwater soils: gleysols and in the swampy areas dystric histosols. Peats have to some extent been able to accumulate in the old river branches where there were very high groundwater levels. In the slightly higher, drier areas terrestrial soils were formed, which developed more intensively the older the river deposits are. The succession thus stretches from cambisols on old- to mid-Holocene deposits to A–C soils on neo-Holocene substrata.

Every geological unit can be further subdivided on the basis of sedimentological and pedological features. Soil differences over small areas could specifically affect decisions on land use in pre- and protohistory. Table 1 shows the individual natural entities in the investigation area together with their potential 'value' in the past.

NATURE AND QUALITY OF ARCHAEOLOGICAL DATA

In the past, the variety of landscapes offered many opportunities for occupation. An impression of this may be gained from a distribution map of known archaeological sites (fig. 3). The state of knowledge varies between the Rhineland and the Netherlands. In the Netherlands, no less than 352 findspots are known, mainly due to the intensive observations carried out by amateur-archaeologists, which are continuing today. An analysis of the findspots in the Dutch section of the Niers-Kendel area according to age confirms the general impression of the Meuse region: a relatively large number of findspots from the Neolithic and the Roman period. In contrast, findspots from the Bronze Age and the Early Middle Ages are rare.[7]

Over 90% of these known findspots are so-called surface sites, or the finds have come to the surface due to ploughing, construction, or roadbuilding works. Only 18 findspots have been excavated. The excavations mostly are of small size, with the exception of the investigation of a fifth-century settlement by the Meuse at Gennep.[8] The excavations focus on the more recent archaeological periods: Iron Age to Late Middle Ages. This too is characteristic of the Meuse region.

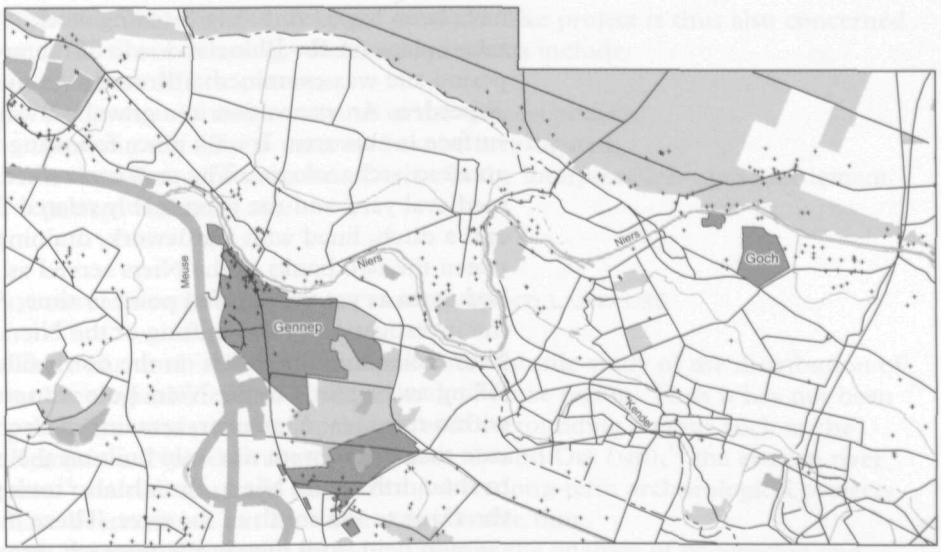
The excavated sites for the most part revealed traces of multiple periods. This indicates primarily how attractive the area was. It is generally true that the closer the site to the Meuse, the greater the probability that the area was in use from an early date and was subsequently subject to repeated use. It follows that the excavations produce features from different periods. This

7. J. Mooren is currently producing a supplementary inventory.
8. Heidinga & Offenburg 1992.

habitat	sediment	soil (FAO)[1]	SOIL-CHARACTERISTICS	MODIFICATIONS SINCE THE NEOLITHIC PERIOD
ENDMORAINE AND SANDR				
loess covered end-moraine or sandr	loamy loess over sand and gravel	Luvisol	(heavy)[2], (damp), nutrients ++[3]	in Neolithic time less loamy, erosion
drift sand	loamy drift sand	Cambic Arenosol Dystric Cambisol	dry (light), nutrients –	(erosion), (secondary sanddrift)
LOW TERRACE				
old channels at the Low Terrace (Niers and others)	sandy loam, loamy sand	Gleysol	damp-wet, nutrients +/–	in former times pools of water possible, accumulation
	loam swamp	Humic Gleysol, Dystric Histosol	wet, heavy, nutrients +	in former times standing water, accumulation
Low Terrace-Plates (donken)	sandy loam, loamy sand	Luvisol, Cambisol	(dry), (heavy), nutrients +/–	in Neolithic time less loamy
drift sand	(loamy-silty) drift sand	Dystric Cambisol, Leptic Podzol	dry, light, nutrients –	(erosion), (secondary sanddrift)
DEPRESSION AREA IN LOW TERRACE				
low-lying areas near groundwater level	sandy loam, loamy sand	Gleysol	damp-wet, (heavy), nutrients +/–	drained since 19th century
DUNES				
old dunes (late glacial)	(silty) drift sand	Dystric Cambisol, Podzol	dry, light, nutrients –	erosion, secondary sanddrift
	(silty) drift sand with humus layers	Plaggensol	dry, light, nutrients +	anthropogenic soil from Middle Ages
young dunes (Holocene)	drift sand	Regosol	dry, light, nutrients – –	mainly drifted since Iron Age
MEUSE-FLOODPLAIN				
back-swamp areas, fossilised channels	loam swamp	Humic Gleysol, Dystric Histosol	damp-wet, heavy, nutrients +	Holocene accumulation (till now), former rivers, standing water
floodplain	loam, sandy loam	Fluvi-Eutric Cambisol	(damp), (heavy), nutrients ++	Holocene accumulation (till now)
levees and point-bars	sand, (loamy-silty) sand	Fluvi-Eutric Cambisol	(dry), (light), nutrients +	Holocene accumulation (till now)

Table 1 Soil-units and their modifications since the Neolithic period in the Niers-Kendel-Region. [1] Soil classification according to the Food and Agricultural Organisation of the United Nations (FAO); [2] (heavy) weak characteristics or processes; [3] content of nutrients in soil: ++ very high; + high; +/– mediocre; – low; – – very low.

Figure 3 Distribution of sites.



also clarifies the archaeological problem of surface sites: if an area is disturbed by ploughing or other intervention, the finds come to the surface mixed together. It is frequently the case that a large proportion of the finds can then no longer be assigned to a particular culture or period. This explains why archaeologists working in areas that have been intensively settled over a long period of time, such as the Meuse region, have a preference for excavated sites.

In drawing up a full archaeological inventory of the region, in addition to the above-mentioned lack of information from surface sites and the past concentration of excavations on more recent archaeological epochs, a further distortion occurs: the excavations in the Dutch section of the Niers-Kendel project are not evenly distributed over the area. Good contacts with amateur-archaeologists are essential since they discovered the majority of findspots and they are generally also the owners of the finds. Amateur-archaeologists in the Netherlands have been provided with comprehensive information on the project and are eager to be involved with it.

The situation is different in the German section of the Niers-Kendel region. Here, very little is known about archaeological findspots, which are fairly equally divided among all periods. This contradicts all the knowledge gained so far in the southern work area of the *Rheinisches Amt für Bodendenkmalpflege*, where the distribution of finds over the archaeological perods is similar to that in the Meuse region.[9] This contrast results from numerous archaeological sites which are identifiable above ground, the preservation of which is due to their location within the extensive wooded areas. A large number of modern bunkers and defence installations, a Medieval monastery, two mottes, and many prehistoric *tumuli* are known to exist. Information about surface finds is available thanks mainly to honorary members of the RAB and local collectors.[10]

Unambiguous allocation to archaeological sites of known finds on the German side at the start of the project is possible only in a few cases, since these are generally isolated finds. Only four findspots can be interpreted as Bronze Age, Iron Age or Roman settlements on the basis of materials and quantity. In addition, five single graves from the Roman Period and two Medieval wells

9. Schwellnus 1985.

10. In order to improve the level of knowledge, all available information has since 1994 been systematically collected and evaluated under contract by E. Riedmeier-Fischer.

have been exposed during building work. So far, only three excavations have taken place on the Rhineland side of the project area. In two cases a one period site was examined: a Bronze Age *tumulus* and the Roman *burgus* of Asperden. An excavation in a gravel pit was the first to investigate a large surface in this area. It took place following the discovery of finds by a local amateur archaeologist. The area earmarked for gravel quarrying contained a medieval yard and the presumably related field systems in the form of fences and a ditch, lined with wattlework, draining down into the Niers. A ford between the two banks of the Niers served as a crossing over the silted-up river bed at an as yet unspecified point in time. A focal point of the excavation was the investigation of the shifting of the Niers river bed since its inception.[11] Numerous limonite mines on the north side of a *donk* (Low Terrace plateau) falling away gently to the Niers bear witness to the winning of raw materials within this area. Moreover, remains of Bronze Age and Iron Age burials indicate that *tumuli* were not only built on the elevations of the endmoraine lying to the north of the Niers. Burials also took place directly on the low plain of the *Donk* to the south of the river. These indicate that, contrary to the opinion held until now in the research, proximity to water is by no means an unfavourable location for archaeological sites. Only palaeogeographic analysis of an area permits any statement to be made on the use and evaluation of the area, based on the connection with the finds contained in it.

PROCEDURES AND METHODS

At the start of the project the intention was to cover all findspots in the investigation area in the field. Because of the anticipated large number of archaeological sites and the timeframe of five years which was laid down, this will not be achievable. In order, nonetheless, to obtain a broadly complete picture of the available archaeological information, supplementary inventory work is currently being carried out. New sites are being registered and information on known findspots supplemented. Samples are selected from the information for more detailed examination.

Selection of sites is based, among other factors, on the circumstances of the find: excavated findspots generally take priority over those known only as a result of surface finds. It will be clear from the above that in the Meuse region a higher value is specifically placed on excavated sites. A second factor in selection is the occurrence together of similar or different site types from the same period, e.g., burial ground and settlement, and, in the case of earlier periods such as the Stone Age, reoccupied areas where the settlements are spatially separate.

The third factor is the diversity of the landscape: in the Niers-Kendel area this is reflected above all in the difference between findspots along the Meuse and those in the hinterland, in the high-lying (on the endmoraine) and low-lying areas. Finally, there are also divergent site types. By this is meant sites which, in terms of content and/or situation, do not correspond to the known distribution pattern.

The findspots selected in this way are subjected to more detailed examination. This is intended to gather new information on the area. An opportunity will arise in the near future for archaeological work to accompany larger-scale intervention in the landscape, e.g., work on the regulation of the Meuse and the setting-up of new housing and industrial zones. It will also be possible to gain a better insight into features occurring in the area surrounding clearly

11. This was carried out in collaboration with J. Klostermann of the *Geologisches Landesamt* (Regional Geological Office) at Krefeld together with full-time and honorary members of the RAB.

definable settlements and burial grounds. The project is thus also concerned with off-site archaeology. Relevant questions include:

- are there off-site patterns;
- if so, what do they consist of in the various periods;
- how can the off-site patterns best be investigated;
- is the off-site information of value in the interpretation of the settlement pattern and land use?

QUESTIONS RELATING TO SETTLEMENT AND LAND USE

There has until now been no detailed diachronic study of the distribution of archaeological sites and land use in the Meuse region. Thus it has not been possible to undertake comparisons with surrounding regions such as the Kempen in Noord-Brabant,[12] the area around Oss (NB),[13] the eastern river area[14] and the southern Rhineland, where long-term archaeological projects have been carried out for some considerable time.

It is essential to make up lost ground in the analysis of occupation and landscape use from the late Palaeolithic up to the modern era within a micro- and macro-regional context in the Niers-Kendel area in order to be able to compare patterns and developments with those in the surrounding regions. In the case of the Middle Ages and the modern era this also includes the evaluation of textual sources, historical-geographical analysis of surviving physical remains and the summary recording, which is important for these periods, of historical built objects in the localities.

Investigations into occupation and land use have until now been carried out in the southern Netherlands primarily by the IPP and the *Instituut voor Prehistorie* (IPL) at the University of Leiden[15] and a number of researchers from the ROB.[16] Theoretical models of the transition from the Palaeolithic to the Mesolithic in the southern Netherlands,[17] or of the neolithisation process,[18] which are well-developed or will be completed in the foreseeable future should also be used in the Niers-Kendel area.

Since in the investigation of the Niers-Kendel area a particular emphasis is placed on landscape genesis and use and the historical processes, geologists and physical and historical geographers will also be involved in the study.

BENEFITS OF THE PROJECT TO ARCHAEOLOGICAL HERITAGE MANAGEMENT

An essential part of the project is the development of common standards for archaeological data from the Netherlands and the Rhineland. This involves the standardisation and digital processing of archaeological information and cartographic bases such as modern topographical and historical maps and soil and geological maps. In so doing, uniform terms for the designation of soil types, archaeological sites, finds and dating are worked out. The common cartographic bases are produced in cooperation between the ARCHIS project[19] at the ROB and the EDV department [20] at the RAB. By establishing appropriate export formats it is ensured that the two institutes are able to input archaeological and cartographic data to their respective Geographical Information Systems.

This procedure is absolutely necessary in order, firstly, to analyse the Niers-Kendel project area as an entity and, above all, to be able to undertake joint German-Netherlands projects in the future. This is most recently the

12. Roymans & Theuws 1991; 1993.
13. Fokkens 1996; Van der Sanden 1987.
14. Willems 1986.
15. The project *Nederzetting en landschap in het Maas-Demer-Scheldegebied (2900 v. Chr. tot 1300 na Chr.)* by H. Fokkens, N. Roymans, and F. Theuws, subsidised by *Nederlandse Organisatie voor Wetenschappelijk Onderzoek* (the Netherlands Organisation for Scientific Research). See also notes 10 and 11.
16. R. Proos, *Landschap en samenleving in de vroege Middeleeuwen langs de Maas in Limburg.* H.-J. Sprokholt, *Bewoningsgeschiedenis van het Limburgse Maasgebied in de Romeinse tijd met nadruk op de opkomst, bloei en ondergang van het villasysteem (van ca. 15 voor Chr. tot ca. 400 na Chr.)*. This research was (in part) supported by the *Stichting Historische Wetenschappen* (History, Archaeology and Art History Foundation), which is subsidised by NWO.
17. J. Deeben, *De overgang van het Paleolithicum naar Mesolithicum in Zuid-Nederland* (NWO project).
18. J. Schreurs, *Nederzettingsfuncties in het Noordwestelijke verspreidingsgebied van de Michelsberg -cultuur: een low en high power gebruikssporenstudie van vuurstenen artefacten.* L. Verhart en M. Wansleeben, *De overgang Meso-Neolithicum in het Maasdal.* (Verhart en Wansleeben 1990). (NWO projects.)
19. On ARCHIS (Archaeological Information System), see Zoetbrood *et al.*, this volume.
20. The *Abteilung Elektronische Daten Verarbeitung* (Electronic Data Processing).

case with the current wide-ranging cross-border plans such as the *Betuweroute* and the Aachen-Heerlen industrial zone.[21] It is as yet impossible to say what closer European unification will bring by way of further measures in the world of archaeology, but even now it is clear that cooperation will have to be intensified in the future.

Against this background it is important that, in terms of content, both sides speak the same archaeological language. This means having a uniform definition of the type of surface finds indicating e.g., a burial ground, a settlement, the extraction of raw materials, or a sanctuary. Working out which finds are characteristic of the different site types is a priority task. These observations must in any case be examined by arranging targeted surveys of selected sites. Another task relates to archaeological heritage management: the cultural remains hidden in the soil, the so-called soil archive, are increasingly threatened by many different disturbances in the landscape. One essential objective of the ROB and RAB is to safeguard archaeologically significant sites and landscapes from destruction or – if this is not possible – to document them for posterity by means of excavation. Preservation, of course, always takes priority.

One problem which arises in this context is that knowledge of the situation, scale, significance, and state of preservation of archaeological heritage is often inadequate. Site distribution maps always show only a fraction of the archaeological resources hidden in this area and reflect the current level of knowledge and research. There are in fact extensive areas where finds cannot be found at the surface because they are covered by thick layers of sediment such as aeolian sands, river deposits, or peat. In these so-called 'problematical archaeological landscapes' we barely know what archaeological resources lie concealed below the sediments. This is also true of the river deposits and dunes in the Niers-Kendel area. In many areas it is known that Roman and older sites are covered by more recent river sediments and in the dunes Bronze and Iron Age horizons are covered by aeolian sand. The use of non-destructive methods which spare the heritage, e.g., coring, should facilitate a better insight into the soils thus concealed and the archaeological resources of such problematical landscapes.[22] As regards our inadequate knowledge of the soil archive, attempts are being made to contribute through the project to eliminating the 'blank spaces' on the archaeological map – a failure of effective archaeological heritage management. Targeted prospection is required here. One problem of the non-destructive examination of archaeological sites with the exception of settlements is how to establish their location. In particular, burial grounds are especially difficult to locate. The ROB is therefore to focus on examining the choice of location, in terms of landscape and culture, for the establishment of burial grounds. At the same time, it will examine whether it is possible to identify them by coring and geochemical analysis of soil samples.

Another method of determining archaeologically valuable areas is the development and testing of so-called predictive models.[23] The theoretical starting point is the assumption that knowledge of the situation of known sites and physical characteristics, e.g., soil type, groundwater level, elevation, and geomorphology, can be used to predict unknown sites in analogous situations. The idea of the predictive model is that fixed behavioural patterns lay behind decisions on the selection of settlement locations and exploitation areas in the past and are identifiable today: settlements, for example, are often located on a sandy, well drained substratum close to open waters.

The analysis of the situation of different site types, both singly and in rela-

21. For further multi-area planning concepts: Jansen & Meyer 1993; Meyer *et al.* 1995.
22. Groenewoudt 1994.
23. Brandt *et al.* 1992; Deeben, Hallewas, Kolen & Wiemer, this volume.

tion to each other, in terms of the landscape should, according to the predictive model, produce knowledge which will also fit in to a supra-regional context. The aim here is to prepare and examine an indicative map of archaeological resources which shows the relationship between soil characteristics and site density.[24] Both may be crucial in the selection of areas or sites that should be prospected. Examples are: a low site indication, caused, e.g., by a thick layer of sediments; the particular nature of the site, e.g., votive deposits; the poor approachability of a site, e.g., site of unknown function.

By means of a detailed analysis of the situation of the sites in the Niers-Kendel area, we hope to improve the expectation model in order, on conclusion of the project, to produce more reliable archaeological predictive maps of the significant landscapes in an area. Such maps are also an important aid to the authorities, so that they can take account of archaeological heritage management interests in the context of spatial planning. This could be an important guiding principle in archaeological investigation and protection policy. Improved predictive models derived from the analyses in the Niers-Kendel area may similarly be of importance to the archaeological assets in the southern Meuse region and the Rhineland. In the near future, large-scale intervention will take place in this area in the context of the Meuse border project, with the extension of the A73/A61 and A68/A52 motorway links and the establishment of cross-border freight transport centres in the Emmerich/Nijmegen and Nettetal/Venlo areas.

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24. Deeben, Hallewas, Kolen & Wiemer, this volume.

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