Zeitschrift: Zeitschrift für schweizerische Archäologie und Kunstgeschichte = Revue suisse d'art et d'archéologie = Rivista svizzera d'arte e d'archeologia = Journal of Swiss archeology and art history

Band: 41 (1984)

Heft: 1

Artikel: Lake shore settlements and predictive land use : testing site catchment analysis in Lake Neuchâtel (Switzerland) during the Late Bronze Age

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DOI: https://doi.org/10.5169/seals-168378

Lake Shore Settlements and Predictive Land Use
Testing Site Catchment Analysis in Lake Neuchâtel (Switzerland) during the Late Bronze Age

By Maria Angelica Borrello

This paper deals with the occupation of a group of sites during the Late Bronze Age (Ha B1 - Ha B2) in an area of Lake Neuchâtel mainly coincident with the Canton of Neuchâtel (Egloff 1981). This area is a part of a larger one now defined as the *Jura Lakes region,* on the basis of a relatively homogeneous framework. Lakes (Neuchâtel, Bienne and Morat) are the emphasized element in the definition of the *region*[1].

The choice of Late Bronze Age sites is related to the possibility of access to new data, either those derived from the present underwater survey in the area in question or those based on dendrochronology and typology.

Some considerations on theory

Site catchment analysis.

The principle of *site catchment analysis* (Higgs [ed.] 1975, p.IX. Higgs and Vita-Finzi 1972; Jarman 1972; Vita-Finzi 1976, p. 23-31) is that any human group will tend to minimise effort to obtain food by inhabitating the most advantageous location for exploiting the environment.

In the aim of discovering site-environment relation-ships, *site catchment analysis* implies two complementary issues
- to what extent the *catchment* did serve the site
- where do materials found in the site come from.

Now, we assume that:

1) The *catchment* with frontiers of 5 km/1 hr. walk radii (Higgs [Ed.] 1975, p. IX; Higgs and Vita-Finzi 1972; Jarman 1972) is an arbitrary unit to be used only as a starting point when predicting the limits of any spatial unit in which potential economic activities were carried out.
2) Resource spaces (Clarke 1976, p. 9) within the *catchments* may be determined by combining different classificatory approaches - vegetation communities, soils types, land forms, present land use (the last one will be useful *only* when major differences in topography, soils and sub-soils exist) (Dennel 1978, p. 45).
3) The identification of environmental changes and their role in the distribution of potential resource spaces within a *catchment* remains problematic (Dennell 1978, p. 50).
4) The evaluation of potential resource spaces and the quantification of potential resources within a *catchment* remains problematic (Dennell 1978, p. 51-52; Flannery 1976, p. 106; Jochim 1976, p. 49).
5) *Site catchment analysis* considers the site as the *focus* of an area in which economic activities have been developped. Time has special importance in the *catchment* exploitation: the more one moves away from the *focus,* the more energy must be invested (Clarke 1977, p. 23; Higgs and Vita-Finzi 1972; Jarman 1972; Jochim 1976, p. 43).
6)There is a relationship between a site's location and its function - such relationships always suggest at least some economic parameters (Dennel 1978, p. 45; Flannery 1976, p. 91).
7) The environment is never uniform; it changes over space and time (seasons). Dimensions, shape and position of a *catchment* are functions of spatial and temporal distribution of resource spaces which may be exploited from a site (Dennell 1978, p. 50; Flannery 1976, p. 94; Jochim 1976, p.43).
8) To a certain degree, the possibilities of a *catchment* exploitation depends on the technology of the human group which it serves (Dennell 1978, p. 48).
9) The *site catchment* is an open [economic] system (Roper 1979).
10) The determination of few *catchments* in a region depends upon
    a) the inference of contemporary sites;
    b) the knowledge of all the sites (Dennel 1978, p. 52; Flannery 1976, p. 103 ss; Zarky 1976).
11) *Site catchment analysis* may be useful in infering the reason of site's location (agriculture, herding, defense, etc.), its size and the arrangement of sites in a region (Dennel 1978, p. 52; Flannery 1976, chapter 4; Mills 1976, p. 191 ss).

Points 10 and 11 concern the territorial analysis, i.e. *site catchment analysis* in a region. It allows for the description of *settlement patterns* and the construction of models of *settlement systems* (Dennell 1978, p. 56; Flannery 1976, p. 162).

Regional analysis.

Crumley (1979, p. 143) defines a *region* as ". . . an arbitrary areal classification whose limits are defined by the researcher, for the purpose of studying phoenomena within these boundaries". She insists on the existence of ". . . homogeneous as well as heterogeneous features [which] characterize any region and is within the power of the researcher to stress one or the other, relative to the study at hand".

One can identify an area as a region for certain time periods, when the regional boundaries, on the basis of a number of factors, are congruent. "When we define a region, we do so because we can comprehend, identify and select it as a unit in its interrelationships with other units; thus the term region has a certain perceptual size; that is, it is defined on a scale at which the researcher believes he or she can distinguish the pattern" (Crumley 1979, p. 164).

Now, we assume that:

1) The Swiss Jura lakes region may be defined *temporally* as well *spatially* on the basis of a variety of cultural and natural factors.

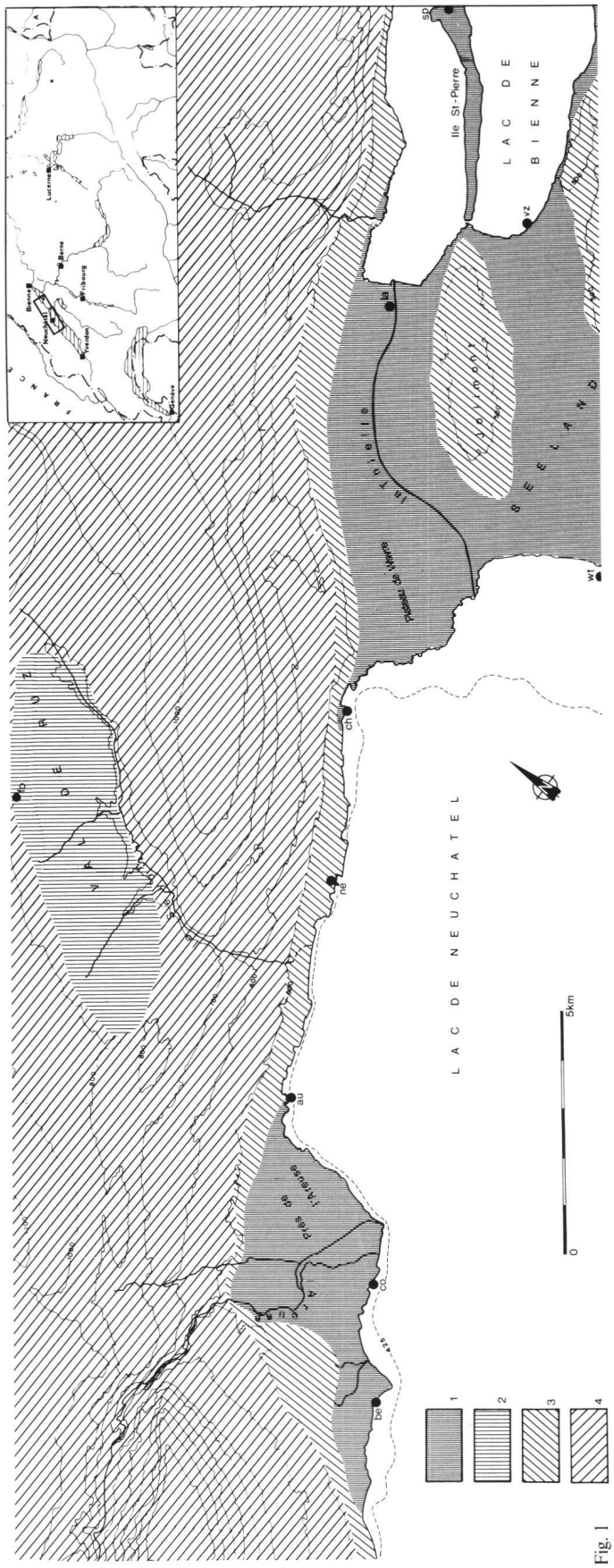

Fig. 1

Cultural factors mainly deal with Late Bronze Age [and other prehistoric] occupations in lake dwellings or "palafittes". Natural factors mainly deal with lakes and their role in the ecosystem.

2) Within this region, we will consider the lake's role in the economic system - we may examine the lake within an ecological perspective, as a specific environment with specific resource basis for human use.
3) The region is an open [economic] system; intra-regional and inter-regional relationships may be considered on this basis.

Settlement pattern and settlement system.

FLANNERY (1976, p. 162) has made explicit the distinction between *settlement pattern* and *settlement system.* "A settlement pattern, as its name implies, is the pattern of sites on the regional landscape; it is empirically derived by sampling or total survey, and it is usually studied by counting sites, measuring their size and the distances between them and so on. A settlement system, on the other hand, is the set of 'rules' that generated the pattern in the first place. It cannot be empirically derived, but at least some of the rules can be deduced by simulation or the use of probabilistic models. Indeed, we have put the term 'rules' in quotation marks because (. . .) it is meant not in a jural or deterministic sense, but a probabilistic one."

Lake-shore location (*palafitte*) is a well known settlement pattern in Switzerland from the Neolithic onwards. Causes of such location have been analysed and current interpretations deal with potential agriculture and herding (HIGHAM 1968; MÜLLER-BECK 1968; SAKELLARIDIS 1979; STICKEL 1974; WYSS 1976).

We consider here that the analysis of areas sourrounding the sites *(catchments)* is at the base of any probabilistic statement concerning the location of sites as well as the spacing between sites in relationship to potential land use.

Some considerations on data and method

Sites and with-in site data.

Only the sites of Late Bronze Age (Ha B1 - Ha B2) of the Neuchâtel area are now considered - Bevaix, Cortaillod, Auvernier[2], Neuchâtel - Le Crêt, Hauterive-Champréveyres, Le Landeron, as well as Witzwil, St-Pierre Island and Vinelz, in canton Berne, which could have shared the Seeland plains with the Neuchâtel sites (fig. 1, 3, 5)[3]. However, these lakeshore settlements could not be considered as the only type of settlement in our area; a probable Late Bronze Age site has been partly surveyed in Fontaines (Val du Ruz).

Some facts must be kept in mind:

1) Ha B1 and Ha B2 occupations of these sites have been defined on typological basis (see RYCHNER 1979).
2) Even if it is possible to assume at least partial contemporaneity of some sites on the basis of dendrochronological data (see below p. 7 and EGGER 1980, 1982; EGGER and ORCEL 1980), we can

Fig. 1 *Major physiographic zones in the Neuchâtel area.*
1. Plains, mainly alluvial. 2. Valleys, morainic, partially alluvial. 3. Piedmont and morainic slow-hill reliefs. 4. Mountains. (sites: be: Bevaix; co: Cortaillod; au: Auvernier; ne: Neuchâtel-Le Crêt; ch: Hauterive-Champréveyres; la: Le Landeron; vz: Vinelz (Canton Bern); wt: Witzwil (Canton Bern); sp: St-Pierre Island (Canton Bern).

expect that new dendrochronological research might demonstrate that the *climax* of the different villages was not synchronal at all.

3) Only a few studies on faunal and botanical samples from Auvernier-Nord (DESSE personal communication; LUNDSTROM-BAUDAIS 1979; ARNOLD and SCHWEINGRUBER 1975) and Champréveyres (BORRELLO and CHAIX, on press) have been carried out. We consider these are *biased samples* and they are not able to be analysed in *normative terms,* i.e. as representing strictly within-site and off-site economical activities. (DENNELL 1976, 1979, p. 14–22; HUBBARD 1976),
4) In most cases the real - or even potential - surfaces of the sites are still unknown.
5) On the basis of within-site data, considerations concerning demographic, social and economical structures cannot be made here.

The levels of the Jurassian lakes during the Late Bronze Age

Lake level analysis may provide us with a set of ecological data useful when predicting economic systems.

The Aare river has influenced levels of the lakes Neuchâtel, Bienne and Morat during the post-glacial period - directly when flowing West from Aarberg and joining the Broye below lake Morat; and indirectly when flowing East. The deposits of its eastward flow below Aarberg have determined the raising of the alluvial plain and modified the Thielle's profil - the Thielle being the only emmisary of these three lakes. The Aare, and not deep climatic changes, is now considered as the main factor in defining lake levels and site locations (MAGNY 1979a).

Different research work suggests that lake levels were appreciably lower during the Late Bronze Age (AMMAN 1975; JOOS 1976; LÜDI 1935; MAGNY 1979a, 1979b; MÜLLER 1976). This suggestion is confirmed by the position of some villages in the Neuchâtel area (Auvernier-Nord, 427 m.a.sl.), Auvernier-Les Graviers (427.10 m.a.s.l.), Hauterive-Champréveyres (426.80 m.a.s.l.), Cortaillod-Est (426.40 m.a.s.l.)[4] as well as other sites of Jurassian Lakes (e.g. Vinelz BE, Mörigen BE, Portalban FR).

One may then assume that Late Bronze Age sites have been occupied during major lake regressions. The *catchments* surfaces, however, were not sensibly modified, gaining some additional hundreds of square meters of soils of variable quality depending on substrata and other parental material.

What were the conditions of the Seeland during the Late Bronze Age? A low level of the lakes means that the Gross Moos were drained and a big surface of lacustrine black soils, almost similar to the present one was available for agriculture exploitation. Fig. 2-4 shows poorly drained surfaces which in periods of high lake levels they were not available for agriculture because of a high degree of humidity but perhaps potentially exploitable as spring grazing areas.

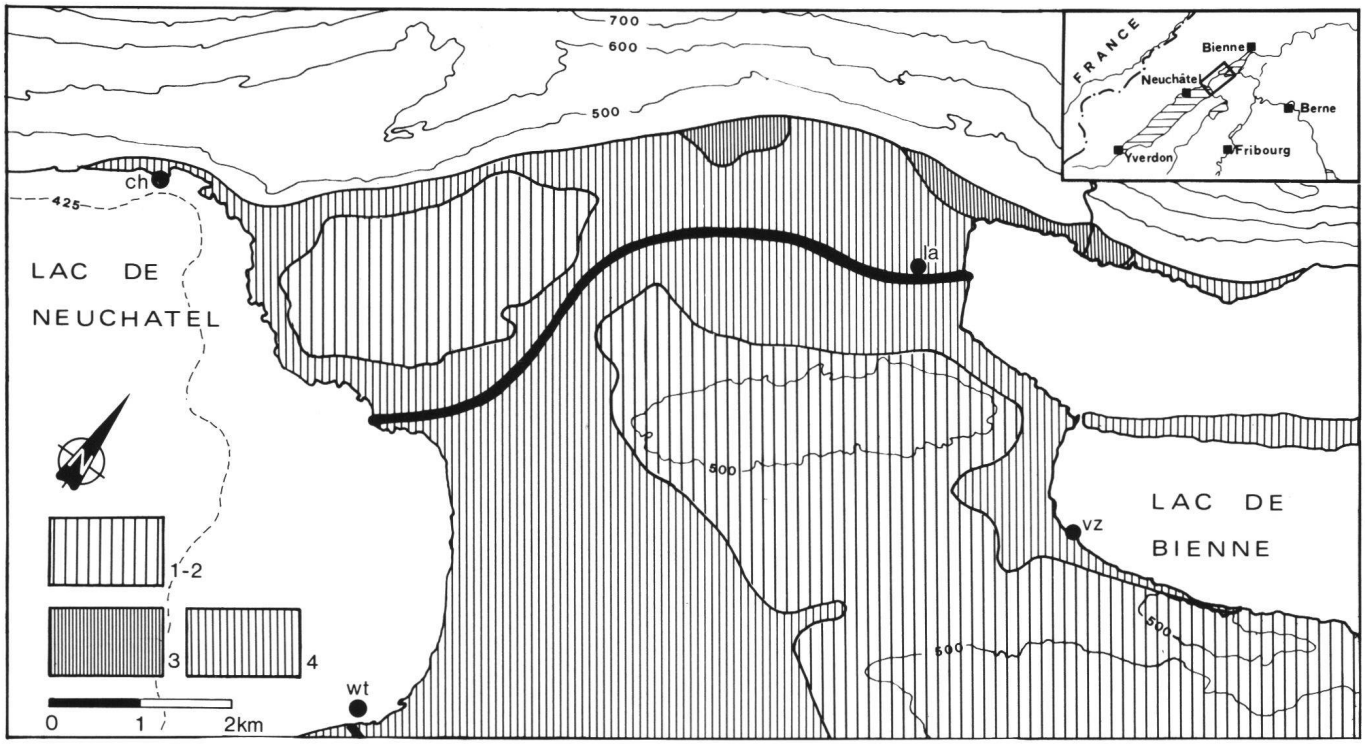

Fig. 2 The characteristics of the soils and the topography define the conditions of permeability in the Seeland area:
1. Morainic terrains (Quaternary), low permeability, which are not directly influenced by lake level variations. 2. Clayed and sandstone terrains (Miocenean and Oligocenean) low permeability, which are not directly influenced by lakes levels variations. 3. Alluvium of glaciar and fluvial origin, which are not influenced by lake level variations because of their high permeability. 4. Alluvium of glaciar and fluvial origin and peat, with middle to low permeability. These are areas easily overflowed when the level of the lakes is high.
(Based on LÜDI 1933 and the *Hydrogeological map of Canton Neuchâtel,* Geology Institute, University of Neuchâtel).

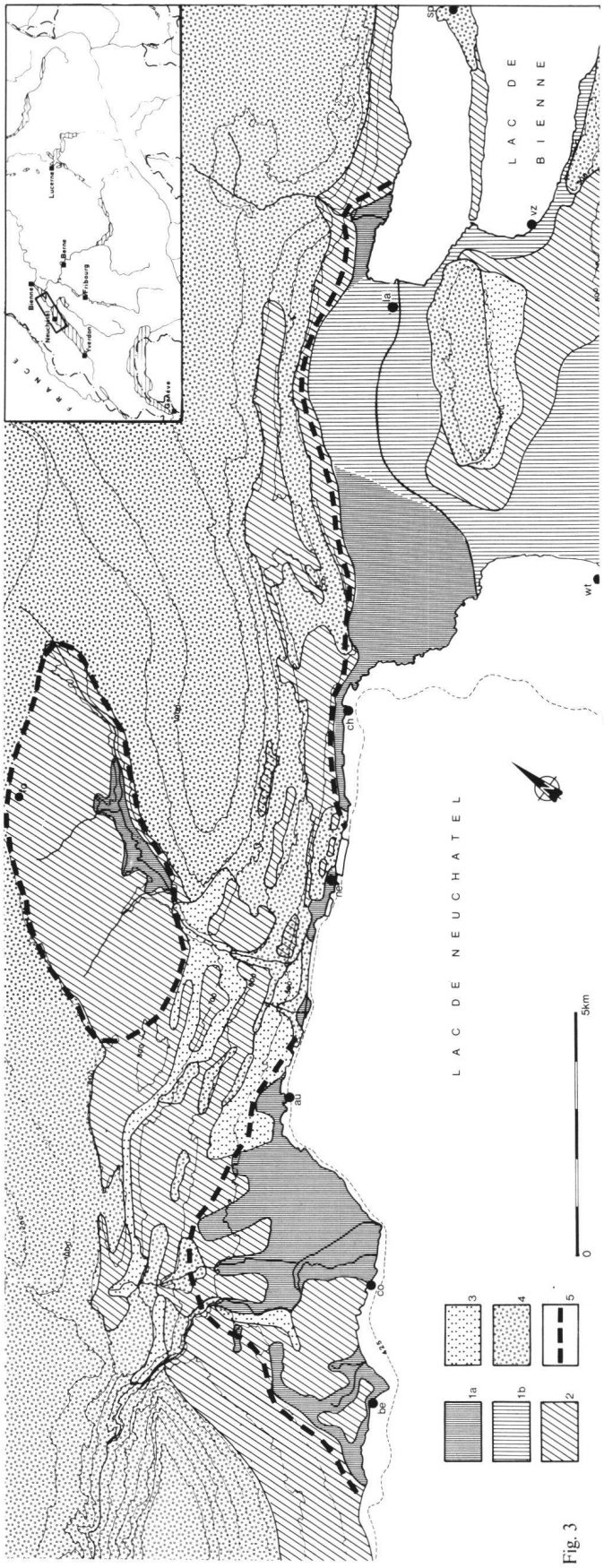

Fig. 3

We assume that lake levels have played a major role in short ecological variations. Vegetal communities are very sensible to lake as well as water table variations. The low level of the lakes during the Late Bronze Age would have allowed the development of vegetal communities similar to today (AMMANN pers. com.; RICHARD pers. com.) which played an important role in the development of brown soils, as will be seen below.

Settlement system and lake-shore location

A consequence of the assumption that "Site location has been induced by economic relations with the natural environment" (STICKEL 1974, p. 296) is that a *catchment* will necessarily reflect the economic choices of the people who which inhabited such sites.

HIGHAM (1968) has already proposed that shore locations are a function of several variables: 1) arable soils, which implies agriculture facilities; 2) relative abundance of herbaceous, rush and water plants, which implies fodder facilities; 3) better climatic conditions, which imply a longer growing season; 4) fishing and fowling opportunities.

Variables 1, 2, 3 will now be analysed for the Late Bronze Age sites of the Neuchâtel area on the basis of off-site data (edaphology, topography, phytosociology and general climatic data as well as present land use). Variable 4, concerning fishing and fowling opportunities will not be analysed in detail here. Even if lake resources allowed the development of food supply strategies as seems to be demonstrated by awles found in all Late Bronze Age sites in Neuchâtel area, archaeozoological data concerning such activities are not yet available.

Agriculture and fodder facilities

The area now considered has at least four physiographic zones: 1) plains, mainly alluvial; 2) valleys, partly alluvial; 3) piedmont and morainic slow hill reliefs; 4) mountains (Jurassic and Cretacic) (fig. 1).

Main soil characteristics are shown in Fig. 3. Needless to say, brown soils should have been the major attraction for the Last Bronze Age farmers. The brown soils [sols bruns lessivés] are related to a previous development of brown forest soils. Their extension mainly coincides with alluvium and fluvioglacial deposits as well as flat areas with morainic substrat (e.g. East of St-Blaise) and former peat areas of the Seeland (cf. below, vegetal communities; fig. 2–5).

The location of lake-shore sites may be analysed and even *explained* in terms of alluvium and brown soil surfaces. All the sites are settled on alluvium; alluvium is always the main surface within the frontiers of 1 km and 2 km radii from the sites (fig. 4)[5].

All the sites are also well-located in relationship to large areas of morainic terrains.

Fig. 3 *Potential land use during the Late Bronze Age.*
1. Mainly alluvial, brown soils. *Arable* land after clearing. 2. Mainly alluvial and lacustrine soils, partly tourbous. *Arable* land after clearing during lakes regressions, i.e. if good drainage exists. 3. Mainly morainic, good *grazing* after clearing. 4. *Forest,* eventually poor/rough grazing. 5. *Forest,* improductive as arable or grazing land. 6. Limits of the brown soils areas.

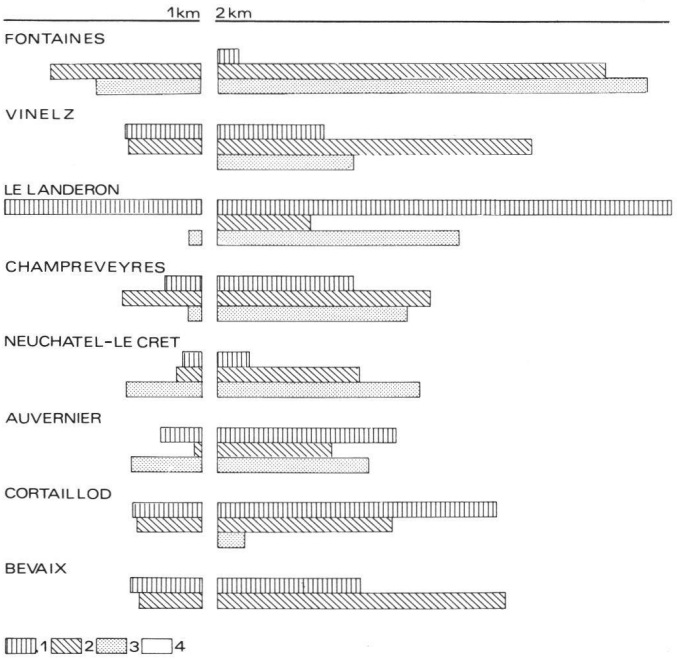

Fig. 4 *Potential land use in 1 km and 2 km radii around the sites.*
1. Arable land (cf. fig 3-1a and 3-1b). 2. Grazing (cf. fig. 3-2). 3. Forest (cf. fig. 3-3 and 3-4). 4. Surface equal 100 hectares.

Potential agriculture surfaces mainly coincide with alluvium which has high nutrient and moistures reserves. It is generally defined as «heavy soil» being difficult to work in very wet and very dry condition. Alluvial clay soils are, however, easy to work immediately after clearing (LIMBREY 1975, p. 244). (Fig. 3-1a and 3-1b).

When agriculture/husbandry economies *(mixed economies)* are developped, soils with extreme characteristics will be used for grazing.

Different kinds of *potential grazing surfaces* may be identified:

Dry grasslands develop mainly on morainic subsoils, after clearing. Primary dry grasslands do not exist in the area in question (fig. 3-2).

Open meadows develop mainly on alluvium areas, after clearing (i.e. low areas in 3-1a and 3-1b).

Primary grasslands and meadows could however exist in the Grosses Moos area (Fig. 3-1b); its exact position and extension is not possible to asses now (Richard pers. com.).

Furthermore, the herbaceous undergrowth of the mixed oak forests provides fodder for wintering. *Water plants* and *rushes* of the immediate lake border may supply additional fodder in early spring. *Fields laid fallow* are also good grazing surfaces.

The agricultural and grazing potential of the different kinds of soils as well as their position and extension may be predicted on the basis of vegetal community distribution. The deciduous forests play an important role in the development of brown soils. All our area, below 550/600 m.a.sl., corresponds to the *hill belt* which is characterized by mixed deciduous forests (oak forest with hornbeam, pubescent oak forest, mixed oak forests on acid soils, beech forests of low altitudes. RICHARD 1968). These communities have most been destroyed in historical times to make place for agricultural activities (intertilled crops, cereals, vineyards, orchards and hay meadows, fig. 5).

Fig. 3 shows the predicted extension of both agriculture and grazing surfaces on the basis of soil types and present-day potential vegetal communities. It coincides mainly with today's exploited surfaces and this could be a reason to consider today's land use as a reliable indicator to past potential agriculture and grazing surfaces.

Fig. 3 also suggests that large areas (4) could remain as forest. This assumption is based on very slight soils, pronounced slopes and high density of forest, even if some sectors of today's forest (3) are potentially poor grasslands.

We may consider here the probable Late Bronze Age occupation in Fontaines (Val de Ruz). Potential land use within Fontaines territory of 1 and 2 km radii (cf. fig. 4) does not reveal an agriculture-oriented economy. Even if the site is located near large surfaces of fertile brown soils, the climatic conditions could have been an important obstacle in the development of farming agriculture. Val de Ruz is today one of the most fertile areas in the Swiss Jura and agriculture is now possible because of the introduction of special cereal varieties (i.e. corn) adapted to high altitudes and low temperatures.

Lake and climatic conditions

Concerning climatic conditions, the following observations are made here: Lakes have an important regulatory effect on temperature up to 550-600 m.a.s.l. In the Jura Lakes region, temperature is today 2-3 °C higher than in other Swiss areas, at the same altitude. Climat, associated with soil characteristics and at least some forest resources (grazing in the herbaceous undergrowths, wood as raw material, etc.) could be considered as the best conditions in the Swiss plateau for the development of agriculture/husbandry economies in the Late Bronze Age as well as other prehistoric times, i.e. subsistence systems mainly based on the exploitation of sectors which are ecologically suitable for agriculture and husbandry (cf. fig. 6).

Spacing between sites - catchments for synchronic and diachronic occupations of Late Bronze Age sites in the Neuchâtel area

The analysis of variables 1, 2, 3 of HIGHAM could suggest a *model* of high density settlement in the lakes area during the Late Bronze Age (Ha B1 - Ha B2), i.e. small, rich and closely packed *catchments* (fig. 6).

A preliminary dendrochronological analysis has shown the synchronism in the three-felling dates between Cortaillod-Est and Hauterive-Champréveyres (first phase) as well as between Le Landeron, Cortaillod-Est, Auvernier-Graviers and Hauterive-Champréveyres (second phase) and Auvernier-Nord and Cortaillod-Les Esserts (EGGER 1980, fig. 3; 1982). We cannot exclude that the occupation of these sites could also be synchronic to Bevaix or Neuchâtel-Le Crêt: Ha B1 and Ha B2 artifacts have already been found in both sites but dendrochronological analysis is still absent (Bevaix) or impossible to carry out[6].

General dendrochronological data and typology allow to propose the synchronic occupation of all Late Bronze Age sites. *Catchments* show variability in size and shape (fig. 6). HIGGS and VITA-FINZI's

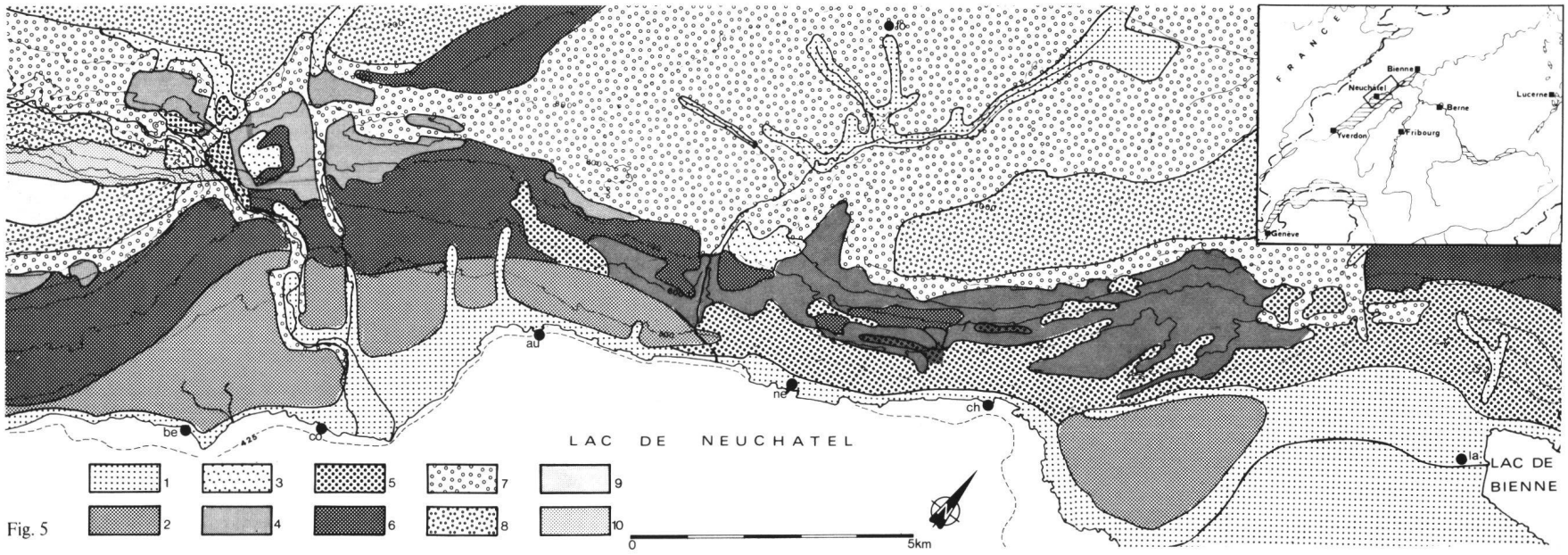
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Fig. 5

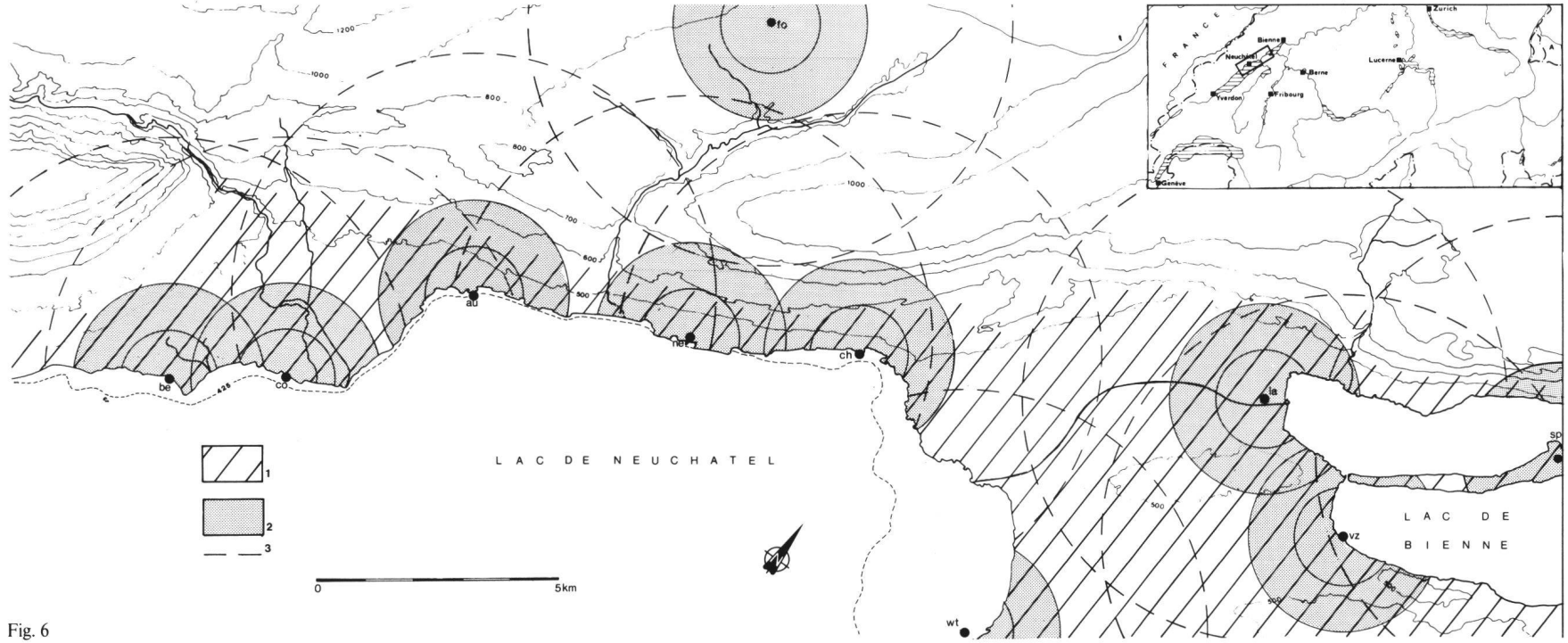
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Fig. 6

principles of *catchment* definition are not useful here because distances between sites are generally less than 5 km or 1 hour walk.

However, dendrochronological research is now starting and only small samples of wood piles have so far been studied. Even if it is not yet possible to assess the duration of each site occupation[7], we can agree that at least in some cases they were not completely synchronic - whereas the beginning and the end of two (or more) sites may fall into the same period, their respective climax were not necessarily contemporaneous, as suggested by EGGER (pers. com.).

Further finer dendrochronological research might allow us to propose different models concerning the relationships between the sites and their *catchments* as well as sites spacing.

Some preliminar considerations

I have attempted to show that the analysis of soils, topography, vegetal communities and general climatic conditions is useful when trying to determine potential land-use during the Late Bronze Age.

Catchments or any other kind of spatial units should be defined when trying to propose models of predictive land-use for agriculture/husbandry exploitation systems. In this sense, perhaps two ideas might be kept in mind: the principle of *most return for least effort* (CLARKE 1976, p. 23) as well as CHISHOLM's suggestion that "... at a distance of one kilometer the decline in net return is large enough to be significant as a factor adversely affecting the prosperity of a farming population" (CHISHOLM 1968, p. 65).

As shown for Auvernier-Nord (BORRELLO 1981), the 5 km/1 hr. walk frontiers should be considered as a maximal surface which might be exploited from a single site. However, not all agricultural nor herding activities must necessarely be developed in this whole area; one can easily assess the importance of the lakes' influence up to 550-600 m.a.sl. and the enormous difficulties implied by the development of such activities over those altitudes in the Neuchâtel area because of stepped reliefs, dense forests and thin soils.

I think that at least one interesting assertion has been already made and it concerns potential agriculture resource areas in the sites' sourroundings. The analysis of 1 km and 2 km radii surfaces units (cf. fig. 4) for each Late Bronze Age site of Neuchâtel area has shown that they are well-located in relationship to alluvium-brown soils. It suggests at least *one* important economical reason for sites location: the availability of arable land.

Rules concerning *settlement systems* might then deal with variations of the arable land surface available to each site as a defining factor of spacing between sites as well as of site dimensions (cf. fig. 6). Whether or not the same principles and, perhaps economical reasons (cf. HIGHAM 1969 and p. 4 of this paper) are at the base of the definition of the *settlement system* in the Swiss Jura lakes region, remains to be proved. However, other rules concerning both intra-regional and interregional relationships may also be invoked to justify such *systems*.

Archaeology is the most imaginative *science* I know. Let me suppose that nice predictive models concerning the Swiss Jura lakes region settlement system will be conceived in the future, on the basis of new and serious research.

Fig. 5 *Today's potential vegetal communities.* (Based on J.-L. RICHARD *Carte des communautés végétales potentiels du Canton de Neuchâtel,* unpublished).
1. Pruno-Fraxinetum-Alnetum (riparian forests). 2. Querco-Carpinetum (oak forest with hornbeam). 3. Seslerio-Fagetum (beech forest with Sesleria). 4. Carici-Fagetum (beech forest with sedges). 5. Coronillo-Quercetum (oak brush). 6. Luzulo-Fagion (beech forest with wood rush), 7. Fagetum silvaticum (typical beech forest); 8. Abieti-Fagetum (beech forest with fir). 9. Aceri-Fagetum (beech forest with sycamore). 10. Sphagno-Picetum and Sphagno-Mugetum (peat moss pine forest and peat moss spruce forest).

Fig. 6 *Lake-shore settlement pattern in Neuchâtel area.*
1. Land-up to 550 m.a.s.l. 2. 1 km and 2 km radii surfaces. 3. 5 km radii *catchments* frontiers.

ACKNOWLEDGEMENTS

I would like to thank M. EGLOFF, Curator of the Archaeological Museum, Neuchâtel, for the interest he showed towards my research project. I also thank R. AMMANN, B. ARNOLD, L. CHAIX, L. DUCOMMUN, H. EGGER, J.-L. RICHARD, V. RYCHNER and G. STICKEL for the fruitful exchange of ideas as well as the encouragement and the useful suggestions they gave to me for my future work in the field of prehistoric economies and past land-use. However, I alone am responsible for the final result.

REMARKS

1 This paper is a small part of the preliminary research carried out on prehistoric settlement patterns, settlement systems and land use in the region of Lakes Neuchâtel, Bienne and Morat. It has been read in the *Internationaler Kongress für archäologische Erforschung der Binnengewässer.* Zürich, 12th-14th April 1981. It has been revised on April 1982.

2 Remains of a Late Bronze Age *palafitte* exist also at Colombier-Paradis Plage, c. 1.5 km SW of Auvernier. It is not yet possible to assess its exact chronological position in relationship to the different Late Bronze Age occupations of Auvernier (Auvernier-Brena, Auvernier-Les Graviers, Auvernier-Nord).

3 Some pottery and bronze material has been found near Préfargier, c. 2.3 km SE of Champréveyres. Unfortunately this is not enough evidence to assert the existence of a Late Bronze Age site there.

4 Even accepting that Late Bronze Age sites in Cortaillod Bay were settled in relationship to a level of Lake Neuchâtel lower than today, their exact position is not yet know. On the basis of new research carried out in winter '81 and '82 by the Service Cantonal d'Archéologie, Neuchâtel, one can assume that erosion has strongly disturbed the archeological levels, but at least a part of the *village Est* was settled at 426.40 m.a.sl. VIOLLIER's information (1930) quoted by MAGNY (1979b: 178) is not clear enough to allow an exact estimation of a former level of the lake.

5 The catchment of the Late Bronze Age site of St-Pierre Island (TSCHUMI 1953, p. 169; VON KAENEL et al. 1977-79) is not examined here. We do not have data concerning the level of Lake Bienne at the time of the settlement - it is, therefore, impossible to evaluate the potential land use of the surface sourrounding this site. The limits within an area of 1, 2 and 5 km around (fig. 6) are shown here in order to explain that this site could have shared, at least, a part of the Seeland with Vinelz and Le Landeron.

6 This is the case of Neuchâtel-Le Crêt, partially surveyed in 1969 and today completely destroyed because of modern building.

7 This will be possible at least for Cortaillod where all piles will be analysed after Service Cantonal d'Archéologie, Neuchâtel, excavations (1981-84).

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PROOF OF ILLUSTRATIONS

All the maps (figures) were drawn by the author.

ABSTRACT

Preliminary research into the relationship between lake/shore settlements and resource areas in the Neuchâtel area suggests that only some of the principles of *site catchment analysis* can be used to define settlement patterns and settlement systems in a lake ecosystem.

Models of lake/shore location and spacing between sites during the Late Bronze Age are built on the basis of variables (soils, land-forms, vegetation) and data concerning the variations in the level of the lake.

The choice of Late Bronze Age sites is related to the possibility of gaining new data; either those derived from the actual survey in the area in question or those based on dendrochronology.

ZUSAMMENFASSUNG

Die ersten Untersuchungen über die Zusammenhänge zwischen den Siedlungen der Bronzezeit und ihrer natürlichen Umgebung wurden im Raume Neuchâtel (Schweiz) durchgeführt.

Die Untersuchungen führten in etwa zum Prinzip der sogenannten site catchment analysis. «Catchment» wurde von englischen Archäologen als das von den Bewohnern einer Siedlung zur Gewinnung natürlicher Ressourcen beanspruchte Gebiet umschrieben. Diese Methode hat also zum Ziel, die Zusammenhänge zwischen der Siedlung und ihrer Umgebung aufzudecken, wobei man von einer möglichen Dimension von 5 km Radius (1 Stunde Fussmarsch) rund um die Siedlung ausgeht.

Über diese starre Abgrenzung landwirtschaftlicher Einheiten der Spätbronzezeit der Gegend von Neuchâtel hinaus versucht man auch die Art, die Qualität und die Ausdehnung der vorhandenen Ressourcen zu untersuchen, ferner die ökologischen Faktoren, die durch die Lage der Siedlung zu ihrem möglichen nutzbaren Gebiet bestimmt werden. Auch die Beschaffenheit der Siedlung an sich sowie die Übertragung dieser Beobachtungen auf die regionale Ebene zwischen den gleichzeitigen Siedlungen werden in die Untersuchung einbezogen.

Aufgrund der vorhandenen Daten sowie deren Interpretation muss angenommen werden, dass die Lage der Siedlungen hauptsächlich von der Existenz grosser landwirtschaftlich nutzbarer Flächen abhängt, wie sie vor allem auf Schwemmland und Braunerde gefunden werden können. Die «catchments» zeigen sich verschieden in Form und Grösse, haben aber die gleichen Gebiete natürlicher Ressourcen (Äcker, Weiden und Wald).

Ein explizites Modell der Lage der in Frage kommenden Siedlungen kann durch das Vorhandensein landwirtschaftlich nutzbarer Gebiete in unmittelbarer Siedlungsnähe beschrieben werden: das Vorhandensein kultivierbarer Erde beeinflusst die Distanz wischen den verschiedenen Siedlungen sowie die Ausdehnung ihrer *«catchments»*.

RÉSUMÉ

Des recherches préliminaires sur les relations existant entre les habitats littoraux du Bronze final et leur environnement ont été effectuées dans la région de Neuchâtel (Suisse).

Ces recherches ont conduit à quelques considérations sur le principe du *«site catchment analysis»*. Le *«catchment»* a été défini par les archéologues anglo-saxons comme l'aire habituellement exploitée par les habitants d'un site pour l'obtention des ressources nécessaires à leur subsistance. Cette méthode a donc pour but de découvrir les rapports entre un site et son arrière-pays en partant de la détermination d'un territoire potentiel d'exploitation, défini par un rayon de 5 km (1 heure de marche) autour du site même.

Outre la validité d'une telle frontière pour le détermination du *terroir* des communautés agricoles du Bronze final de la région de Neuchâtel, on examine ici les possibilités de definir les types, la qualité et l'extension des diverses ressources existantes; les paramètres économiques qui peuvent être déduits de la localisation d'un site par rapport à son territoire potentiel d'exploitation, ainsi que des données provenant du site même; la valeur de telles observations à l'échelle régionale, c'est-à-dire quand on a affaire à plusieurs sites considérés comme contemporains.

Les données à disposition et les observations effectuées à leur sujet suggèrent que la localisation des *palafittes* est fonction principalement de l'existence de larges surfaces agricoles, représentées ici par les alluvions et les sols bruns. Les *«catchments»* s'avèrent variables en forme et en grandeur mais possèdent les mêmes aires de ressources potentielles (surfaces agricoles, surfaces de pâturage, forêt).

RIASSUNTO

Oltre alla validità di una tale frontiera per la definizione di un territorio per le comunità agricole del Bronzo finale della regione di Neuchâtel, vengono esaminate le possibilità di definire i tipi, le qualità e l'estensione delle diverse risorse esistenti; i parametri economici che possono essere dedotti dalla localizzazione di un sito in rapporto al suo territorio potenziale e ai dati ottenuti sul sito stesso; il valore di tali osservazioni a livello regionale, cioè quando un gruppo di siti contemporanei sono presi in considerazione insieme.

I dati fino ad ora disponibili e le osservazioni effettuate in base ad essi suggeriscono che la localizzazione delle *palafitte* dipende principalmente dalla esistenza di ampie superfici agricole, rappresentate dalla alluvioni e dai suoli bruni. I *«catchment»* si rivelano variabili in forma ed in dimensioni ma possiedono sempre le stesse aree di risorse potenziali (terreni agricoli, pascoli, foreste).

Un *modello* della localizzazione dei siti in questione può essere quindi proposto, in rapporto alla disponibilità dei terreni agricoli vicini ad ogni insediamento; l'esistenza dei suoli adatti all'agricoltura e di conseguenza, sulla dimensione dei loro *«catchment»* o territori potenziali di sfruttamento economico.

Una serie di ricerche preliminari sui rapporti esistenti tra gli insediamenti del Bronzo finale e il loro ambiente sono state effettuate nella regione di Neuchâtel (Svizzera).

Tali ricerche hanno permesso alcune considerazioni sul principo del *«site catchment analysis»*. Il *«catchment»* è stato definito dagli archeologi anglosassoni come l'area abitualmente sfruttata dagli abitanti di un sito per l'ottenimento delle rissorse necessarie alla loro sussistenza. Il metodo del *«site catchment analysis»* ha dunque come finalità quella di scoprire i rapporti tra un insediamento e il suo entroterra, partendo dalla determinazione di un territorio potenziale di sfruttamento definito da un raggio di 5 km o di 1 ora di marcia intorno al sito stesso.