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Autor: Bassin, Laure / Della Casa, Philippe / Deseine, Alexandre
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LAURE BASSIN, PHILIPPE DELLA CASA, ALEXANDRE DESEINE,
BASTIEN JAKOB, LÉONARD KRAMER, FABIO WEGMÜLLER,
SAMUEL VAN WILLIGEN

THE MESO-NEOLITHIC TRANSITION BETWEEN THE ALPS AND THE JURA MOUNTAINS: A STATE OF THE QUESTION IN SWITZERLAND AND THE UPPER RHINE GRABEN*

Keywords: Mesolithikum; Neolithikum; Übergang Mesolithikum-Neolithikum; Neolithisierung. – Mésolithique ; Néolithique ; transition Mésolithique-Néolithique ; néolithisation. – Mesolítico, Neolítico, transizione Mesolítico-Neolítico, neolitzizzazione. – Mesolithic; Neolithic; Mesolithic-Neolithic Transition; Neolithisation.

Zusammenfassung

Der vorliegende Artikel gibt einen Überblick über den Übergang vom Mesolithikum zum Neolithikum in der Schweiz, der sich vom Spätmesolithikum (ca. 6000 calBC) bis zur vollständigen Entfaltung des Neolithikums (ca. 4500 calBC) erstreckt. Durch die Synthese verschiedener regionaler Perspektiven untersucht die Studie die archäologische Landschaft der Schweiz, wobei Schlüsselgebiete wie der Jurabogen, das West- und Ostschweizer Mittelland, der Oberrheingraben, das Rhein- und das Rhonetal sowie

die Zentral- und Südalpen betrachtet werden. Dieser Überblick hebt die Bedeutung des Mesolithikums für das Verständnis von Übergangsprozessen hervor. Er bestätigt die Etablierung der wichtigsten Strömungen der europäischen Neolithisierung in den Nachbarregionen und die Entwicklung spezifischer Situationen mit vielfältigen Einflüssen. Unter Neubetrachtung grundlegender Aspekte zielt der Artikel darauf ab, die Debatte über den mesolithisch-neolithischen Übergangsprozess wieder in Gang zu bringen.

Résumé

Le présent article offre un aperçu de la transition entre le Mésolithique et le Néolithique en Suisse, s'étendant du Mésolithique récent (vers 6000 calBC) au début du Néolithique (vers 4500 calBC). À travers la synthèse de différentes perspectives régionales, l'étude explore le paysage archéologique de la Suisse, en considérant des régions clés telles que l'Arc jurassien, le Plateau suisse occidental et oriental, le Fossé rhénan supérieur, les vallées du Rhin et du Rhône, de même que les Alpes centrales et méri-

dionales. Cet état des lieux souligne l'importance du Mésolithique pour la compréhension des processus de transition. Il confirme l'implantation des principaux courants de la néolithisation européenne dans les régions voisines et le développement de situations spécifiques aux influences multiples. En réexaminant certains aspects fondamentaux, l'article vise à relancer le débat sur le processus de transition Mésolithique-Néolithique.

Riassunto

Questo articolo offre una panoramica della transizione dal Mesolítico al Neolítico in Svizzera, che si estende dal Mesolítico recente (ca. 6000 calBC) all'inizio del Neolítico (ca. 4500 calBC). Sintetizzando diverse prospettive regionali, lo studio esamina il paesaggio archeologico della Svizzera, esaminando aree chiave come l'arco giurassiano, l'altopiano svizzero occidentale e quello orientale, il bassopiano renano, le valli del Reno e del Rodano, le Alpi centrali

e meridionali. Questa panoramica mette in luce l'importanza del Mesolítico per comprendere i processi di transizione. Ciò conferma l'affermazione delle principali tendenze della neolitzizzazione europea nelle regioni limitrofe e lo sviluppo di situazioni specifiche con influenze diverse. Riconsiderando gli aspetti fondamentali, l'articolo si propone di riavviare il dibattito sul processo di transizione Mesolítico-Neolítico.

Summary

This paper presents a review of the transition between the Mesolithic and Neolithic in Switzerland, covering the period from the Late Mesolithic (around 6000 calBC) to the onset of the full Neolithic (around 4500 calBC). By bringing together various regional perspectives, the study explores Switzerland's archaeological landscape, examining key areas like the Jura Arc, the western and eastern parts of the Swiss Plateau, the Upper Rhine Graben, the Rhine and Rhône Valleys and the central and southern Alps. This

overview on the state of research highlights the importance of the Mesolithic to the understanding of transitional processes. It confirms the establishment of the major currents of European Neolithisation in the neighbouring regions and the development of specific situations resulting from multiple influences. By revisiting fundamental aspects, the article aims to reopen the debate on the processes at play in the transition between the Mesolithic and Neolithic periods.

1 Introduction

1.1 Research Framework

Discourses on the transition from the Mesolithic to the Neolithic periods have been recurrent in both regional and European wide perspectives over many years (e.g. Zvelebil 2001; Barnard 2007; Stäuble/Wolfram 2013; Gronenborn 2017; Perrin/Manen 2021; Schier 2022). Though Switzerland is not among the regions with the most spectacular or far-reaching find situations, the topic is present in a series of newer publications (e.g. Della Casa 2000; Nielsen 2003; Cornelissen/Reitmaier 2016; Bassin et al. 2019; Bassin 2020), albeit in geographically and thematically limited settings. This paper aims at presenting an up-to-date state of the research on the transition question, considering all major regions of the country and as many sites pertinent to the discussion as possible. It seems thus important to set a couple of premises for a review such as intended in this contribution, and to introduce some of the major current research issues.

Depending on where one works and which scholarly tradition one follows, chronological and definitional criteria for the presumed transition from a cultural environment called «Mesolithic» to one that can be attributed to the term «Neolithic» diverge. Despite some limitations, particularly from a comparative culture-anthropological or economic perspective, the crossover from a foraging to a food-producing way of life still appears as a major key element of the Meso-Neolithic transition (Weisdorf 2005; Pearsall 2009). Minor elements such as specific pottery or characteristic flint debitage are usually accorded to one or the other side of the transition, though their absence or presence may have very diverse reasons, since material culture can also be e.g. a good of exchange. More recently, biomolecular research has shown clear evidence that in many regions of Europe a genetic shift accompanies the Meso-Neolithic transition (cf. Deguilloux et al. 2012; Hofmanová et al. 2016; Fernández-Domínguez/Reynolds 2017; Rivollat et al. 2020), but the evidence is too patchy for arguments on a regional scale, even more so when human remains are lacking.

Focusing on the way of life has advantages, but also disadvantages: it touches upon a central element of the cultural identity of people, and allows for a nuanced approach to their socio-economic background; however, it necessitates archaeological sources to be queried, i.e. bioarchaeological remains of flora and/or fauna. Due to conditions of conservation and excavation this is often not the case, also in Switzerland.

In this contribution, the chronology of sites and finds is seen as postpositive to the identification of cultural traits, though of course it remains a central element to the overall understanding of the transition process. In order to limit the scale of the study, we choose the timespan 6000 calBC (Late Mesolithic) to 4500 calBC (onset of a full Neolithic on the Swiss plateau) as a framework.

When addressing the topic of the nature of sites, the regional embedding is only one of several factors. We may assume that differing topographical settings led to varying

patterns of resource mobilisation, both in structure and time (e.g. Kramer/Mauvilly 2020). Some site locations seem to be, if not exclusively, tightly linked to specific – Mesolithic or Neolithic – «resource complexes» (cf. Hardenberg et al. 2017), such as the Alpine hunting camps. For many locations, however, this does not apply: the nature of the sites needs to be addressed by a combined argument including structural features and find materials as well as topographical locations, communication axes (lakes, rivers, passes), biotic resources (ecotopes, animals), available raw materials (flint, rock crystal), and possible networks. Such a comprehensive approach is still largely unresolved, though a number of conspicuous cases are by now known and published for Swiss sites (e.g. Arconciel-La Souche FR and Oberriet-Abri Unterkobel SG).

Against the background of the cited challenges and issues, and in the light of an often intermittent research and source situation, overriding scenarios for the Meso-Neolithic transition are difficult to achieve or, more likely, even improbable. With an increasing density of research on the transition topic in many regions of Europe, large-scale patterns seem to be restricted, if at all, to the Linear Pottery Complex (LPC) on the one hand, and the Impresso Cardial Complex (ICC) on the other (cf. Gronenborn/Horejs 2021). In between – and Switzerland lies to a large extent in between these complexes – it is all about resolving a complicated, intertwined archaeological heritage and research tradition. In the Balkans, the term «Mosaic» has been coined for a situation of similar entangled Mesolithic and Neolithic spatial and cultural traditions (Tringham 2000) – a term that, for the time being, could also be appropriate for other regions (cf. Perrin/Manen 2021, map).

1.2 Geographic Situation

The small territory of Switzerland unites a varied landscape with particularly diverse biotopes, from glacial environments in the mountains to Mediterranean like climates on the exposed hillsides. Due to its location in the heart of Europe and at the crossroads of natural transportation routes (the Rhone corridor, the Rhine Valley and various Alpine and Jura passes), Switzerland reflects multiple influences. This extraordinary configuration of natural settings, coupled with investigations conducted at a local cantonal level and not by a centralised federal agency, implies a high regional variability in research and knowledge. To present an overview of the question of the Meso-Neolithic transition in Switzerland, it is necessary to divide the landscape into coherent geographical sections. In this case, the Western Swiss Plateau is described first, followed by the case of the Jura Mountains and surrounding areas to the northwest (including the foothills of the Jura Mountains in the Trois-Lacs region), then the Upper Rhine Plain and the Rhine Valley to the east at the centre of Switzerland, finishing with the Alpine areas of the cantons of Valais and the south of the Alps (Ticino and Grigioni Italiani).

1.3 Current state of thinking about Switzerland and relations with neighbouring regions

The questions related to the processes that led to the Neolithization of the territory corresponding to present-day Switzerland have been hardly addressed during Swiss research from the recent decades. The massive amount of data produced from the lakeside sites has more than occupied researchers during the past few decades. Today this work makes it possible to have a secure chrono-cultural sequencing of the Neolithic lakeside sites plus the establishment of a detailed understanding of the different cultural groups and their relations with neighbouring regions (Voruz 1991; Hafner/Suter 2003; 2005; Stöckli 1995; 2009; 2016).

This advanced knowledge about the greater part of the Swiss Neolithic period has, paradoxically, not led Swiss researchers to ask the same questions as their German, French or Italian counterparts about the processes that led to the introduction or adoption of the Neolithic lifestyle between the Alps and Jura. Admittedly, the lack of consistent assemblages for the Early Neolithic period and the nearly millennium long absence between the last hunter-gatherer camps and the first villages of farmers-herders does not simplify the subject (see below).

Despite an initial disinterest, an early picture emerged during the 1950s. The area located between the Alps and the Jura was then perceived as a region that had long remained on the margins of the two major currents of European Neolithization (Vogt 1964). In general, the preferred hypothesis was the acculturation of the Mesolithic populations of the Swiss Plateau and the Jura through areas of contact with two sources of Neolithization; the Mediterranean (Valais and Ticino to the south) and the Danube (Rhine valley to the north) (Vogt 1969; Sakellaridis 1979). According to this model, the Neolithic economy could only have been established on the Swiss Plateau following a phase of adapting production methods to differing soil and climatic conditions, which were not ideal for agropastoral activities (Vogt 1964). Although the fact remains largely unknown (Stöckli 1990), the transition from the Mesolithic to the Neolithic was a secondary and a later phenomenon initiated from the neighbouring great plains and their alpine and Rhine «outposts» (Gallay 1990).

The 1990s were marked by a renewed interest in the question of Neolithization in Switzerland. This was motivated by the discovery of pottery fragments of the La Hoguette type in Switzerland and the Jura Arc that cannot be attributed to either of the two accepted sources of Neolithization (Jeunesse et al. 1991). At almost the same time, early indications of agricultural activity, identified by palynologists, were identified in the region (Richard 1997; Erny-Rodmann et al. 1997; Tinner et al. 2007; 2008).

A decade later, these finds were followed by the discovery of a terracotta *«pintadera»* at the site Arconciel-La Souche FR, in a context attributable to the Late Mesolithic period. This object testifies to contacts between populations mastering the agropastoral techniques of the Balkan Pen-

insula (within which this type of object is attested from the second half of the seventh millennium calBC) and the Late Mesolithic period in Western Europe (Mauvilly et al. 2008).

This new information made it possible to revive a cautious discussion about the Neolithization of the Swiss Plateau and the Jura. Indeed, the hypothesis about pottery production and agrarian activities in the Mesolithic context confronts us with a taxonomic quantification problem: how to qualify populations who practiced, at any scale, agriculture or animal husbandry (or pottery production) without adopting the Neolithic production methods?

Werner Stöckli adopted a severely defined position in line with a strictly «economic» definition of the Mesolithic period (Stöckli 2016). In his view, indications of the presence of cereal cultivation on the Swiss Plateau at the end of the 7th millennium calBC is simply incompatible with the use of the term «Mesolithic». By giving primacy of the economy over the material culture, he logically proposed a *«a-ceramic Neolithic period»* for Switzerland, corresponding to the period 6500–5400 calBC, subsequently Christian Jeunesse, who as early as 2003, proposed the concept of the *«Initial Neolithic»* for the same period (Jeunesse 2003; 2008).

Ebbe Nielsen, meanwhile, favoured material culture over economic criteria. Early agricultural evidence certainly suggests that the process of Neolithization was involved in cultural contexts attributable to the Late Mesolithic period. On the other hand, this process does not seem to have any consequences for the material culture still following the Mesolithic traditions. In his view, this fully justifies the use of the term «Mesolithic» (Nielsen 2009a, 2009b). This is the generally accepted position for current research about the Mesolithic period in Switzerland, irrespective if the hypothesis of a *«dispersed order»* for the adoption of elements of the Neolithic package is accepted or not (Bassin et al. 2019). The only difference concerns the horizon characterized by the appearance of so-called evolved armatures attributed by some to the Mesolithic period (Bassin et al. 2019) and by others to the Early Neolithic period (Nielsen 2009a; Jakob et al. 2015). This discrepancy reflects the difficulty to distinguish, in some cases, the evolved armatures of the Late Mesolithic period and certain Neolithic projectile points. The triangular armatures of the Late Mesolithic period and Early Danubian Neolithic period show subtle nuances, such as thicker supports and retouches with a lower angle and covering in the Neolithic context (Bassin 2020). Faced with the uncertainty of these objects, the other archaeological data collected on the sites (small finds, stratigraphy, structures, etc.) sometimes allows refining the attribution as Meso- or Neolithic, but this information may be missing, and interpretations may vary between authors.

In the absence of new discoveries (in-site) and more precise analytical methods (such as sedimentary DNA), the discussion about evidence of early agricultural activity has lost momentum and a stalemate has occurred between the opposing research positions. Currently the topic of discus-

Code	Studies area	Sites	Type of sites	Units/Layers/Ensembles	Radiocarbon data- tion (calBC)	Projectile points
1	Western Swiss Plateau	Alterswil-Flüe FR	Rockshelter, settlement	C. 4, 4a, 4b	5900-5500	Trapeze
2	Western Swiss Plateau	Arconciel-La Souche FR	Rockshelter, settlement	Ens. II	5200-4800	Trapeze and 1 point
				Ens. III	5700-5200	Trapeze and 1 point
3	Western Swiss Plateau	Villeneuve-La Baume FR	Rockshelter, settlement	C. 21/Ens. F (c. 21-19)	4700-4300	No projectile point
				C. 23	5200-4900	No projectile point
4	Western Swiss Plateau	Cheyres-Dessous la Grange FR	Rockshelter, settlement	FA 3	4500-4300	No projectile point
				C. 10	5400-5000	No projectile point
				FA 5/6	5900-5700	Trapeze
5	Western Swiss Plateau	Lausanne-Vidy, Chavannes 11 VD	Open air area, settlement	n.a.	n.a.	Trapeze
6	Western Swiss Plateau	Lausanne-Place Nord de la Cathédrale VD	Open air area, settlement	n.a.	4600-4300	n.a.
7	Western Swiss Plateau	La Tour-de-Trême-Les Part- sis FR	Open air area, settlement	US 17, FA 12, FA 17, FA 26	6200-5700	Trapeze
8	Western Swiss Plateau	Châteaux d'Oex-Sciernes- Picats VD	Rockshelter, settlement	C. 3	6200-5800	Trapeze and 1 point
9	Western Swiss Plateau	Charmey-Les Arolles FR	Rockshelter, settlement	C. 2A, 3	n.a.	Trapeze and 1 point
10	Western Swiss Plateau	Zweisimmen-Riedli Mannenberg BE	Rockshelter, settlement	n.a.	n.a.	Trapeze (and 1-2 points?)
				C. 5, top	4500-3800	Point and trapeze
				C. 5, middle	5600-5200	Point and trapeze
				C. 5, basis	6100-5700	Trapeze
12	Jura Arc	Saint-Ursanne-Les Griponts JU	Rockshelter, settlement	C. 3	5500-4700	Trapeze
13	Jura Arc	Delémont-En La Pran JU	Open air area, settlement	Z. 1	n.a.	Triangular point and tra- peze
				Z. 2-8	n.a.	Point and trapeze
14	Jura Arc	Lutter-Abri St-Joseph (Up- per-Rhine/F)	Rockshelter, settlement	C. 4	5000-4200	Triangular point, point and trapeze
				C. 5	5800-4800	Point and trapeze
				C. 7	5300-5200	Point
15	Jura Arc	Roggengburg-Ritzigrund BL	Rockshelter, settlement	H. I	6000-5700	Trapeze
16	Jura Arc	Liesberg-Liesbergmühle BL	Rockshelter, settlement	Complexe 1	5500-4700	Trapeze and point

Ceramics	Fauna	Interpretation	Other	Ref.
No ceramic	Wild	Late Mesolithic		Mauvilly et al. 2011
No characterized (2 fragments)	Wild	Late Mesolithic		Bassin 2020; Mauvilly 2018
No ceramic	Wild	Late Mesolithic		
Few characteristics with breast shaped decorations	n.a.	Middle Neolithic?	Discoid shell bead	Mauvilly et al. 2010; Spielmann/Mauvilly 2014
No ceramic	n.a.	Late Mesolithic		
No ceramic	No fauna	Neolithic?		Kramer/Mauvilly 2021
No ceramic	n.a.	Late Mesolithic		
No ceramic	n.a.	Late Mesolithic		
n.a.	No fauna	Late Mesolithic		Crotti/Pignat 1995
No characterized	n.a.	Neolithic?		Wolf 1995; Denaire et al. 2011
No ceramic	n.a.	Late Mesolithic		Andrey et al. 2017
No ceramic	Wild	Late Mesolithic		Crotti et al. 2016
No ceramic	Wild	Late Mesolithic	Radiocarbon datation: 6800 ± 200 BC	Bassin 2018; Braillard et al. 2003
No ceramic	n.a.	Late Mesolithic	Sondages trenches	Nielsen 2003; Andrist et al., 1964
LPC	Wild (in maj.)	Early Neolithic		Aimé 1993; Cupillard et al. 1998
La Hoguette	Wild (in maj.)	Late Mesolithic		
No characterized	Wild (in maj.)	Late Mesolithic	From the layers base, rare domestic remains (3 Bos taurus and 4 Ovis aries for all the layer 5)	
No ceramic	Wild	Late Mesolithic		Pousaz et al. 1991
No characterized	n.a.	Early Neolithic?	Axe and adze	Pousaz et al. 2009
No ceramic	n.a.	Late Mesolithic?		
Grossgartach	Wild (in maj.)	Middle Neolithic		Arbogast et al., 2009-2011; Jeunesse et al. 2019
No characterized and 3 Grossgartach sherds	Wild (in maj.)	Late Mesolithic and Early Neolithic?	1 remain of Bos taurus	
No characterized	Wild	Late Mesolithic		
No ceramic	Wild	Late Mesolithic		Jagher 1989; Le Tensorer 1985
No ceramic	Wild	Late Mesolithic		Nielsen 2003; 2009

17	Jura Arc	Nenzlingen-Birsmatten BL	Rockshelter, settlement and grave	AH II-IV/H. 1, 2	6800-5400	Trapeze and point
18	Jura Arc	Liestal-Hurlistrasse BL	Open air area, settlement «Fundschiecht»	(4300-4000)		Triangular point
19	Jura Arc	Le Locle-Col des Roches NE	Rockshelter, settlement	C. 3	5900-5600	Trapeze and point
				C. 4	n.a.	Trapeze
20	Jura Arc	Gampelen-Rundi 4 BE	Open air area, settlement	n.a.	n.a.	Point
21	Jura Arc	Saint-Aubin-Derrière la Croix NE	Open air area, settlement and structure	C. 11a	4800-4600	No projectile point
22	Jura Arc	Onnens-Praz-Berthoud VD	Open air area, settlement	C. 6a	4800-4500	Triangular point, point, and trapeze
				C. 6c, 6b	n.a.	Trapeze and point
23	Jura Arc	Baulmes-Abri de la Cure VD	Rockshelter, settlement	n.a.	n.a.	Point and trapeze
				n.a.	n.a.	Trapeze
24	Jura Arc	Mollendruz-Abri Freymond VD	Rockshelter, settlement	C. 3 inf.	5200-4200	Trapeze and point
				C. 4b	6300-5700	Trapeze
25	Jura Arc	Grotte du Gardon (Ain/F)	Rockshelter, settlement	C. 50, 49	4500-4200	Trapeze and point
				C. 52	4700-4500	Point
				C. 60 to 54	5400-4700	Trapeze and point
26	Upper Rhine Graben	Rosheim-Sainte-Odile (Lower-Rhine/F)	Open air area, settlement	Many structures	n.a.	Triangular point
27	Upper Rhine Graben	Colmar- Route de Rouffach (Upper-Rhine/F)	Open air area, settlement	n.a.	5300	Triangular point and 1 trapeze
28	Upper Rhine Graben	Ensisheim (Upper-Rhine/F)	Open air area, settlement	Loc. 2, 3, 6	5200-4800	Trapeze
				Loc. 5, 11, 15 et 17	6400-5700	Trapeze
29	Upper Rhine Graben	Mulhouse-Est (Upper-Rhine/F)	Open air area, grave	n.a.	5100-5000	Triangular point
30	Upper Rhine Graben	Sierentz-Sandgrube et Tiergarten (Upper-Rhine/F)	Open air area, settlement	n.a.	5000	Triangular point
31	Eastern Swiss Plateau	Schötz 7-Rorbelmoos LU	Open air area, settlement	n.a.	6000	Trapeze
32	Eastern Swiss Plateau	Egolzwil-Station 3 LU	Open air area, settlement	Egolzwil 3	4278-4270 (dendrochronology)	Triangular point

Rössen and Bronze Age (more recent)	Wild (possible some domestic)	Late Mesolithic and Early Neolithic?	Possible remains of <i>Bos taurus</i> and <i>Sus scrofa domesticus</i>	
La Hoguette	n.a.	Early Neolithic	Finds in secondary position, mixed with Upper Neolithic finds	Sedlmeier 2003
La Hoguette?	Wild	Late Mesolithic and Early Neolithic?	Probably two phases: Mesolithic around Cupillard 5900-5600 BC and probably an undated Neolithic 5500/5300-5000 BC, 1 discoid stone bead	Cupillard et al. 1998
No ceramic	Wild	Late Mesolithic		
n.a.	n.a.	Late Mesolithic and Early Neolithic?		Nielsen 1991; Nielsen 2003
No characterized	No fauna	Middle Neolithic	Remains of cereal crops	Wüthrich et al. 2003
No characterized	Wild	Not determined Neolithic	1 grave of a child (4700-4500 BC)	Jakob et al. 2015
No ceramic	Wild	Late Mesolithic		
La Hoguette	n.a.	Late Mesolithic?		Egloff 1966/67; 1978; Leroi-Gourhan et al. 1971
No ceramic	n.a.	Late Mesolithic		
No characterized	n.a.	Middle Neolithic	Axe, discoid shell and bone beads	Crotti/Pignat 1991; Pignat/Winger 1998
	Wild	Late Mesolithic		
St-Uze	Wild and domestic	St-Uze		Perrin 2003; Voruz et al. 2009
No characterized	Wild and domestic	Not determined Neolithic		
Mediterranean «Épicardial» and Limbourg	Wild and domestic	Early Neolithic	Alternation hypothesis between Mesolithic and Neolithic (c.58/c.57 and, from dubious assemblages, c.56/c.54)	
LPC (in maj.) and 3 La Hoguette fragments and 2 no characterized fragments	n.a.	Early Neolithic		Jeunesse/Lefranc 1999, Mauvilly 2000
LPC	n.a.	Early Neolithic		Jeunesse 1991, Mauvilly 1997
Neolithic to roman or undiagnostic (intrusive)	Wild	Late Mesolithic		Denaire et al. 2017
No ceramic	Wild	Late Mesolithic		
LPC	n.a.	Early Neolithic		Jeunesse 1991
LPC	n.a.	Early Neolithic		Jeunesse 1991, Lefranc 2001
No ceramic	Wild	Late Mesolithic		Nielsen 2003
Egolzwil	Wild and domestic	Middle Neolithic	Deer antler harpoon, axe	Wyss 1994; 1996; de Capitani et al. 2013

33	Eastern Swiss Plateau	Hitzkirsch-Seematt 4 LU	Open air area, settlement n.a.	n.a.	Point and trapeze	
34	Eastern Swiss Plateau	Fällanden-Usserriet ZH	Open air area, settlement n.a.	n.a.	Trapeze and point	
35	Eastern Swiss Plateau	Wetzikon-Robenhausen-Furtacker ZH	Open air area, settlement n.a.	n.a.	Trapeze	
36	Rhone valley	Sion-La Planta VS	Open air area, settlement C. 6	n.a.	No projectile point	
37	Rhone valley	Sion-Plateau de Tourbillon VS	Open air area, settlement Lowest level	5000-4800	No projectile point	
38	Rhone valley	Sion-Sous-le-Scex VS	Open air area, grave	C. 18	4700-4500	n.a.
			Open air area, settlement C.22-26		5200-4800	n.a.
39	Rhone valley	Bramois-Villa Chammartin VS	Open air area, grave	T. 20	4700-4500	No projectile point
40	Central Southern Alps	Zermatt-Alp Hermetti VS	Rockshelter, settlement	C. 3c	5200-4700	Triangle (probably earlier)
41	Central Southern Alps	Andermatt-Hospental-Moos UR	Open air area, settlement n.a.		n.a. (Bronze Age)	Trapeze
42	Central Southern Alps	Isolino-Biandronno (Varese/I)	Open air area, settlement Fase 1		5200-4800	n.a.
43	Central Southern Alps	Pizzo di Bodio (Varese/I)	Open air area, settlement US 223-326		5200-4800	Trapeze
			US 226-321-331		5400-5200	Trapeze
44	Central Southern Alps	Bellinzona-Castelgrande TI	Open air area, settlement Sit. 13		5200-5000	Trapeze
45	Central Southern Alps	Mesocco-Tec Nev GR	Open air area, settlement Lowest level		7800-5000	Trapeze
46	Central Southern Alps	Bregaglia-Val Forno-Plan Canin GR	Open air area, settlement Fl. 3, Pos. 12, A5		5000-4800	Point
47	Central Southern Alps	Ftan-Val Urschai GR	Rockshelter, settlement	n.a.	4500-4300	n.a.
48	Rhine Valley	Zizers-Friedau GR	Open air area, settlement «Kulturschicht»		4900-4700	Trapeze
49	Rhine Valley	Oberriet-Abri Unterkobel SG	Rockshelter, settlement	Fundeinheit G	5200-4300	No projectile point
				Fundeinheit H	6500-5400	Trapeze
50	Rhine Valley	Koblach-Kummaberg Krinnenbalme (A)	Rockshelter, settlement	n.a.	5000-4700	Trapeze and point
51	Rhine Valley	Mittelberg-Schneiderküren (A)	Rockshelter, settlement	Gravel layer, under drystone wall	5300-5000	No projectile point
52	Rhine Valley	Gächlingen-Goldäcker SH	Open air area, settlement n.a.		5200-4800	Trapeze and point

No characterized	n.a.	Late Mesolithic and Neolithic?	Axe	Nielsen 2003
No ceramic	n.a.	Late Mesolithic		Nielsen 2003
No ceramic	n.a.	Late Mesolithic		Spörri 2000
Neolitico antico padano	Domestic	Early Neolithic	Axe and remains of cereals	Müller 1995
Neolitico antico padano	Domestic	Early Neolithic	Sickle blade	Müller 1995
n.a.	n.a.	Middle Neolithic	Chamblandes graves	Honegger et al. 2011
n.a.	Domestic	Early Neolithic		
No ceramic	n.a.	Middle Neolithic	Chamblandes grave	Mariéthoz 2007
No ceramic	n.a.	Early Neolithic		Curdy et al. 2003
No ceramic	n.a.	Late Mesolithic?		Cornelissen/Reitmaier 2016
Gruppo dell'Isolino	Domestic?	Early Neolithic		Guerreschi 1977; Baioni et al. 2005
Gruppo dell'Isolino	Domestic			Guerreschi 1977; Banchieri/Balista 1991
Gruppo dell'Isolino	Domestic	Early Neolithic	Pintadera	
Gruppo del Vhò?	n.a.	Early Neolithic		Donati/Carazzetti 1987; van Willegen/Carazzetti 2022
Gruppo dell'Isolino	n.a.	Late Mesolithic with Early Neolithic elem.		Della Casa 2000
No ceramic	n.a.	Early Neolithic?		Cornelissen et al. 2012
n.a.	n.a.	Early Neolithic?		Cornelissen/Reitmaier 2016
Grossgartach-Hinkelstein	n.a.	Middle Neolithic		Seifert 2012
No characterized	Wild and domestic	Middle Neolithic		Wegmüller 2022
No ceramic	Wild	Late Mesolithic		
Grossgartach?	Wild and domestic	Mixed assemblages, Late Mesolithic and Neolithic?	Radiocarbon dates on human remains	Laus 2006; Heeb 2012
No ceramic	n.a.	Early Neolithic	Rich Early Mesolithic and Bronze Age layers in the same rock shelter	Posch 2020
LPC with La Hoguette ele- ments	n.a.	Early Neolithic		Altörfer et al. 2018

Fig. 1. The principal Mesolithic and Neolithic sites in Switzerland and the surrounding regions dated between 6000 and 4300 calBC. Field data are cited according to their mention in publications (C., US, H., Sit., Fl., Pos. = layer, Ens = group, Z. = zone, FA = structure, loc. = locus, T. = tomb). The radiocarbon dates are rounded up to 100 years. The projectiles points are simplified as follows: trapeze (trapeze and other geometric bitroncature), point (Bavans type point, *fléchette* and other point with irregular retouche) and triangular points (point with a low angle and covering retouche). The first cited type of armature is often the most common. The abbreviation «n.a.» is for «not available», i.e. no specific published information.

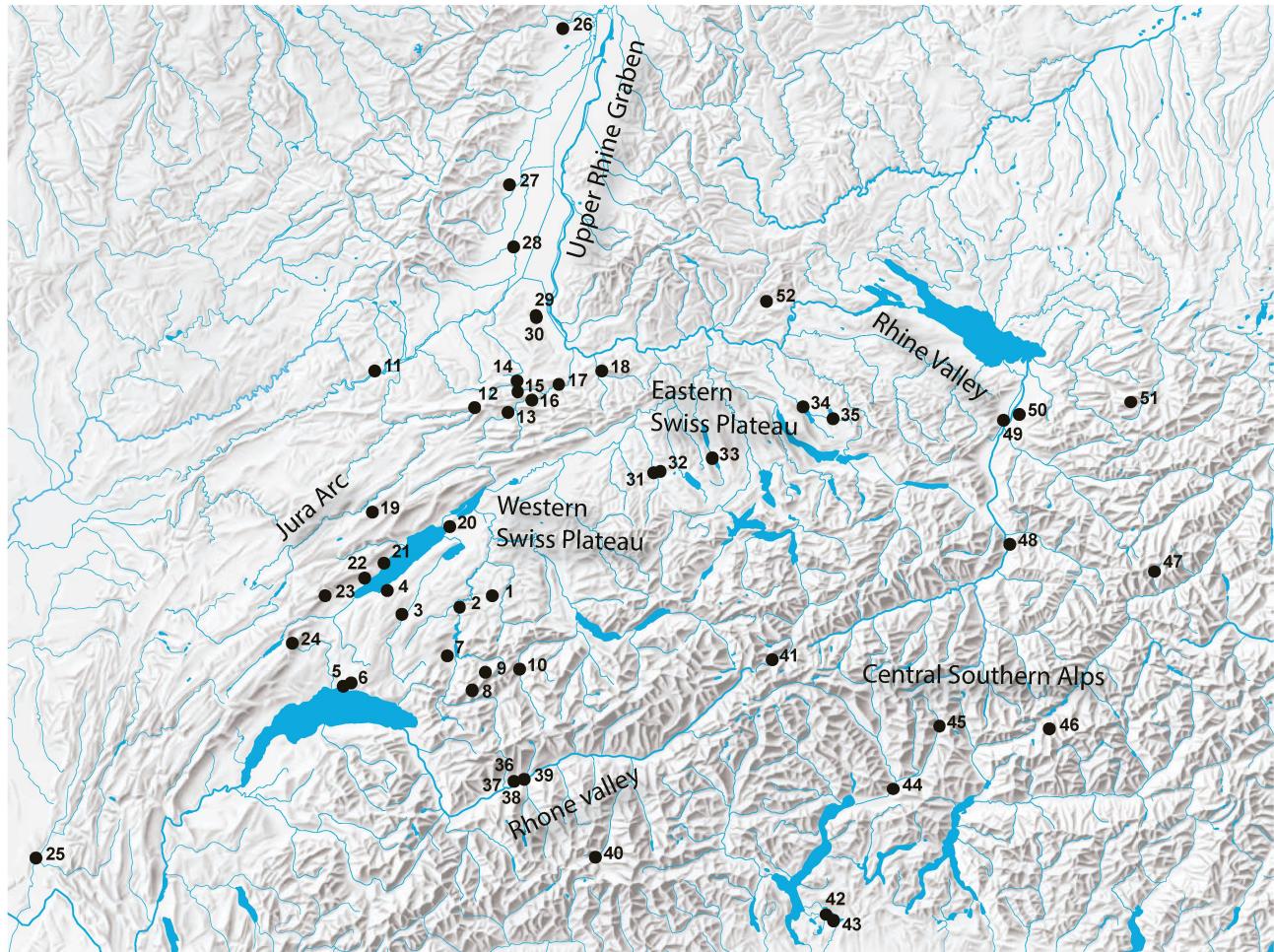


Fig. 2. Map of the sites mentioned in the text and fig. 1. Map F. Wegmüller.

sion is the question of when the transition from the Mesolithic tradition lithic industries to fully Neolithic industries happened. The discussion focuses more concretely on the hypothesis of a continuation of the material culture of the Late Mesolithic up to an advanced stage of the 5th millennium before our era (Jeunesse et al. 2019).

As can be seen, whether early or late, the Neolithization of Switzerland remains the subject of controversies and discreet, but lively debates. This article aims to return to the facts (fig. 1; 2; 3; 4).

2 Western Swiss Plateau

The principal region consists of the western Swiss plateau and the Swiss Romandie pre-Alps, extending from the shores of the Lake of Geneva to the Bernese foothills, covering approximately the Cantons of Vaud, Fribourg and Bern. Several sites in these regions have been dated to around 6000 calBC, but between 5700 to 4500 calBC sites become rarer and have very little information for this period. An exception is the rock shelter site of Arconciel-La

Souche FR, which has produced new information about the end of the Mesolithic period in an area between the pre-Alps and the Trois-Lacs region. The site, excavated from 2003 to 2012, showed a stratigraphic sequence of successive occupational layers within the shelter dated from 7000 to 4800 calBC.

Firstly, several Mesolithic sites, including rock shelters and open-air transitory sites in the pre-Alpine regions, have been the focus of important survey programs led by cantonal archaeology services (Braillard et al. 2003; Crotti/Bullinger 2001) and in the past by Bernese amateurs (Andrist et al. 1964). The abundant presence of siliceous raw materials, even those of poor quality (radiolarites, faulted Cretaceous flint and fine-grained quartzites of the type Ölquarzit), have repeatedly attracted nomadic hunter-gatherers along transportation routes in the limestone valleys and the alpine environment. On the plains, among the regions bordering the mountains, the Mesolithic lithic productions are for the most part from non-homogenous faulted rock which can be found in fluvial or morainic deposits. These materials are also probably found on the Swiss Plateau through exchanges (Bullinger/Pignat 2018). The flints most

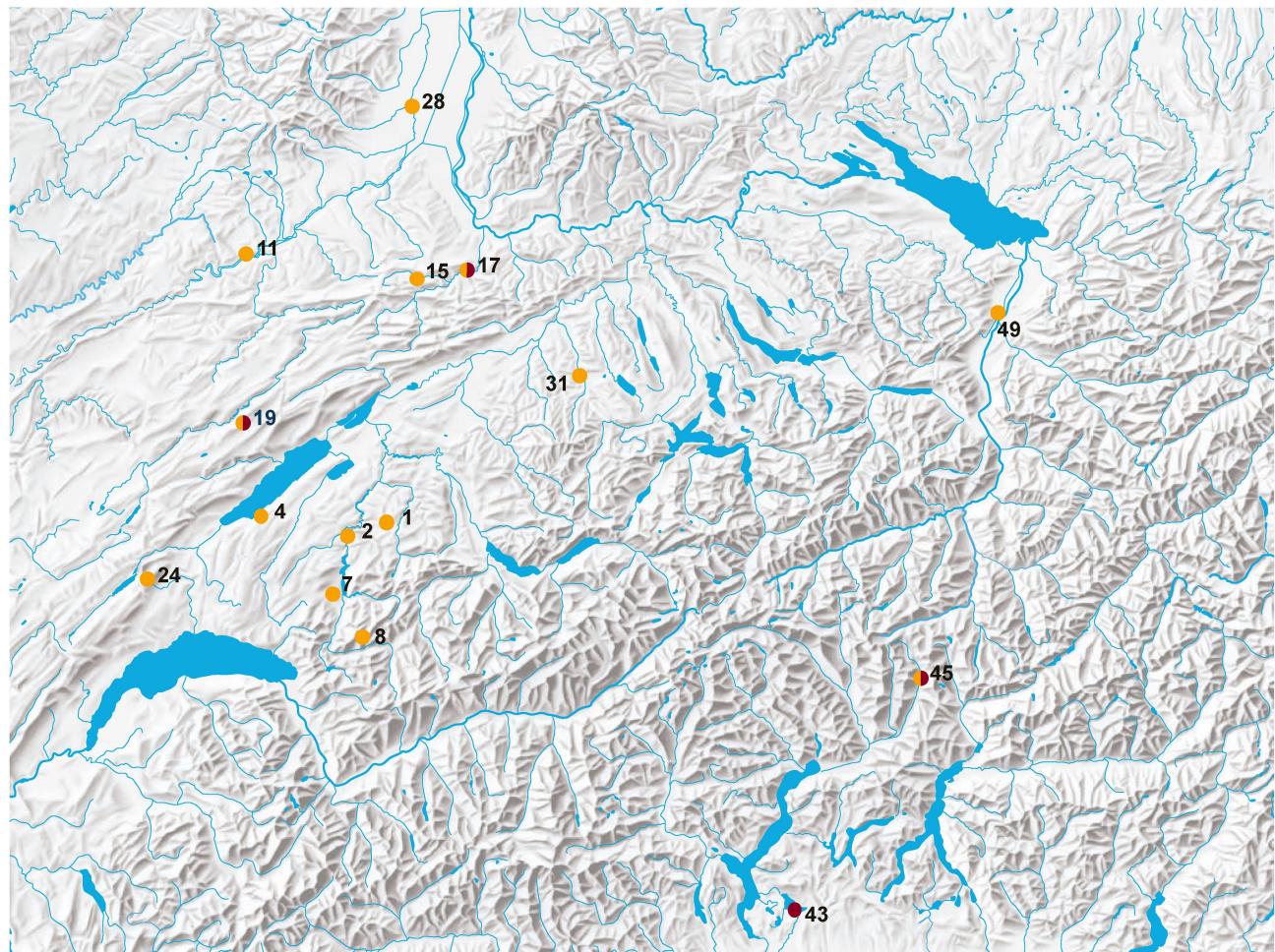


Fig. 3. Map of the principal sites dated between 6000 and 5300 calBC. Mesolithic sites in orange, Neolithic sites in red, site names cf. fig. 1. Map F. Wegmüller.

suitable for controlled and fluid debitage, like those from the Olten region or the Jura Mountains (Affolter 2002), are also present on these sites, although in smaller quantities and reserved for regular bladelets and projectile points. In addition to these various and differing materials, Late Mesolithic lithic industries are generally characterized by trapezes, notched bladelets and thumbnail type scrapers. Secondly, Early and Middle Neolithic period sites are unknown within the study zone. During the first half of the 5th millennium and specifically around 5000 calBC, several dates from hearths lacking finds or having uncertain stratigraphic contexts, attest to human presence in the region but without further possible identification. As early as 4700 calBC a few sites appear, although containing finds without real significance such as non-attributable pottery or of uncertain dates (Boisaubert et al. 2001, 2008). The rock shelter at Villeneuve-La Baume FR offers a rare example of remains dated by radiocarbon method between 4700 and 4300 calBC. A discoid shell bead from this site is similar to the personal ornaments found in a Chamblaines context (see below) and a breast shaped pottery sherd is similar to those discovered at Saint-Aubin-

Derrière la Croix NE (see below Jura Arc) (Spielmann/Mauvilly 2014). These elements provide clues about the sparse Neolithic settlement in this region located between the lakes and the mountains.

Finally, in parallel with these indications of Neolithic occupation, the site at Arconciel-La Souche FR provides a unique sequence of the Late Mesolithic period. The molasse cliff shelter in the Sarine canyon was repeatedly occupied for more than two thousand years. Seven archaeological ensembles have been identified, each consisting of fine layers, and spanning between 300 to 500 years. In addition to the numerous faunal remains (only wild animals), some personal ornaments (Columbella rustica shells from the Mediterranean and pierced deer ivories) and tools made from bone, such as the two harpoons from the shelter, have been found. Three terracotta objects increased this already large material corpus. The oldest, a small ceramic stamp, interpreted as representing a 'pintadera', was discovered within a hearth structure dated between 6200 and 6000 calBC (fig. 5). The current hypothesis evokes links with similar and contemporary objects of south-eastern Europe (Balkans, Greece): the terracotta stamp from

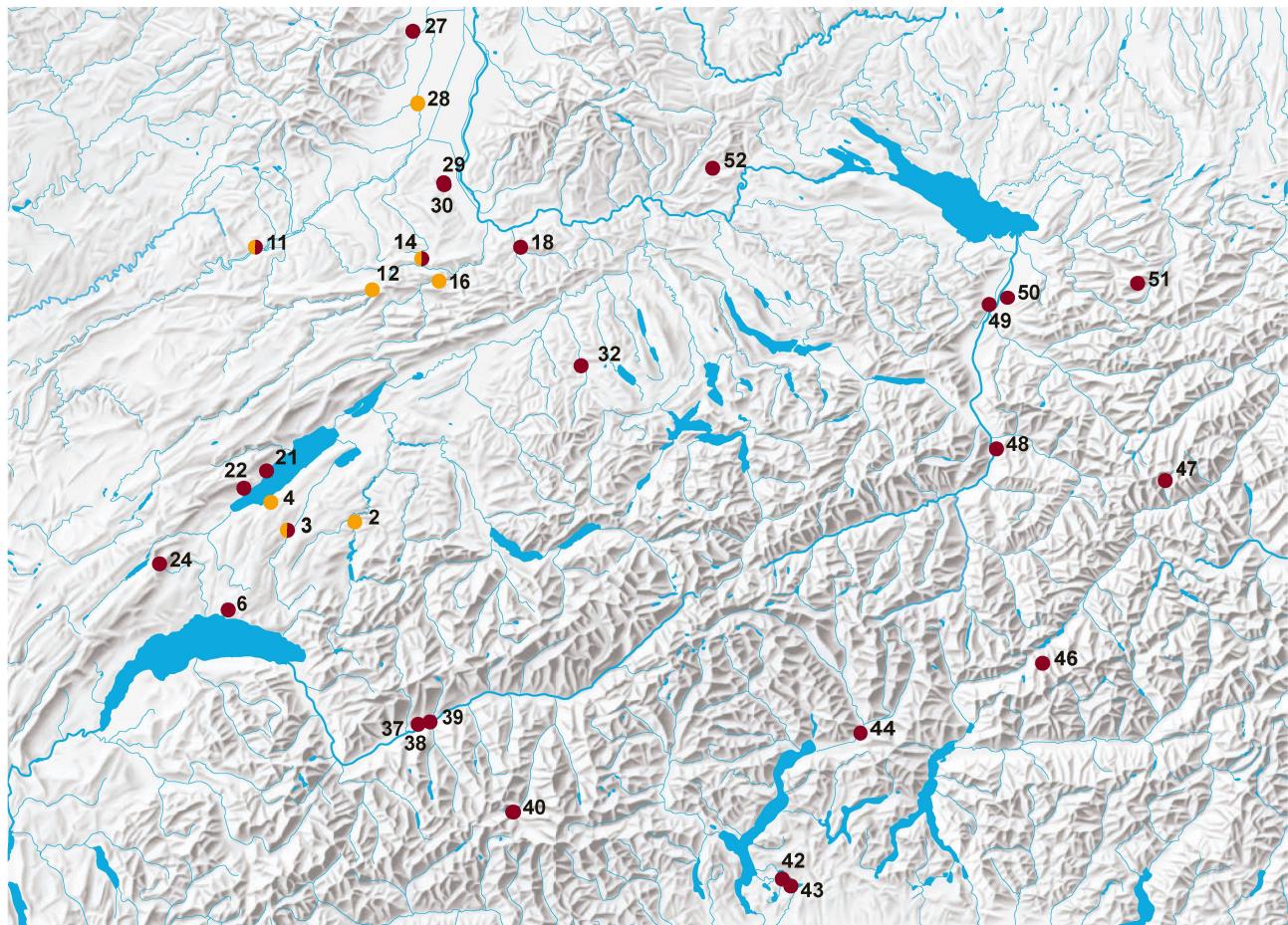


Fig.4. Map of the principal sites dated between 5300 and 4500 calBC. Mesolithic sites in orange, Neolithic sites in red, site names cf. fig. 1. Map F. Wegmüller.

Arconciel-La Souche FR was either imported or made after models from these regions (Mauvilly et al. 2008). Two minuscule fragments of undecorated pottery (not from the same vessel) in the upper levels were dated around 5000 calBC (fig. 6). These two objects are not characteristic and do not correspond to the pottery remains known during this period in the neighbouring regions. Apart from these latter elements, there is no evidence of Neolithic influence in the Arconciel rock shelter. Mesolithic plant macro-remains come exclusively from wild plants. The very rare cereal grains discovered under the shelter have much more recent dates (Antiquity) and are intrusive (Jacomet/Vandorpe 2022). The lithic industry is characteristic of the Mesolithic period with specific features that were observed throughout the layers, including a dominance of small scrapers and a use of raw materials of pre-Alpine origin. Some developments can be observed, but only within the continuity of local traditions. Several nuances appear in the most recent ensembles III and II, dated by several radiocarbon samples as being from 5700 to 5200 calBC and from 5300 to 4800 calBC respectively, which directly concern the period presented here (fig.7). Trapezoids represent the majority of projectile points found. Beginning

in the sixth millennium, these tend to have asymmetrical forms occasionally with inverse or bifacial retouching at the small truncation. Several trapezoid microliths have broken bases (oblique truncations) and appear to have been hafted similar to trapeze projectile points (Bassin et al. 2019). The remaining trapezes show great diversity in form. Rare examples of triangular bladelets, resembling the small Jurassic ‘fléchettes’, were also present. The debitage of certain bladelets appeared more regular by having strictly parallel lines and cutting edges. The working traces were ambiguous, making it impossible to determine if these were produced by indirect percussion or by pressure flaking. However, the small cores and knapped areas with micro facets correspond more to the use of a pressure technique. The continuation of Mesolithic traditions at the Arconciel-La Souche FR site after 5000 calBC reveals that the transition phase was still underway.

In resume, firstly on the Western Plateau, thanks to the site of Arconciel-La Souche FR, the presence of lithic industries with trapezoids and notched bladelets from 6500 calBC, characteristics of the Late Mesolithic, has been observed. Secondly, the Mesolithic traditions of hunting, gathering and lithic production evolve continuously



Fig. 5. Arconciel-La Souche FR. «Pintadera» dated between 6200 and 6000 calBC. Photo Service archéologique de l'Etat de Fribourg (SAEF)/Amt für Archäologie des Kantons Freiburg (AAFR), C. Zaugg.

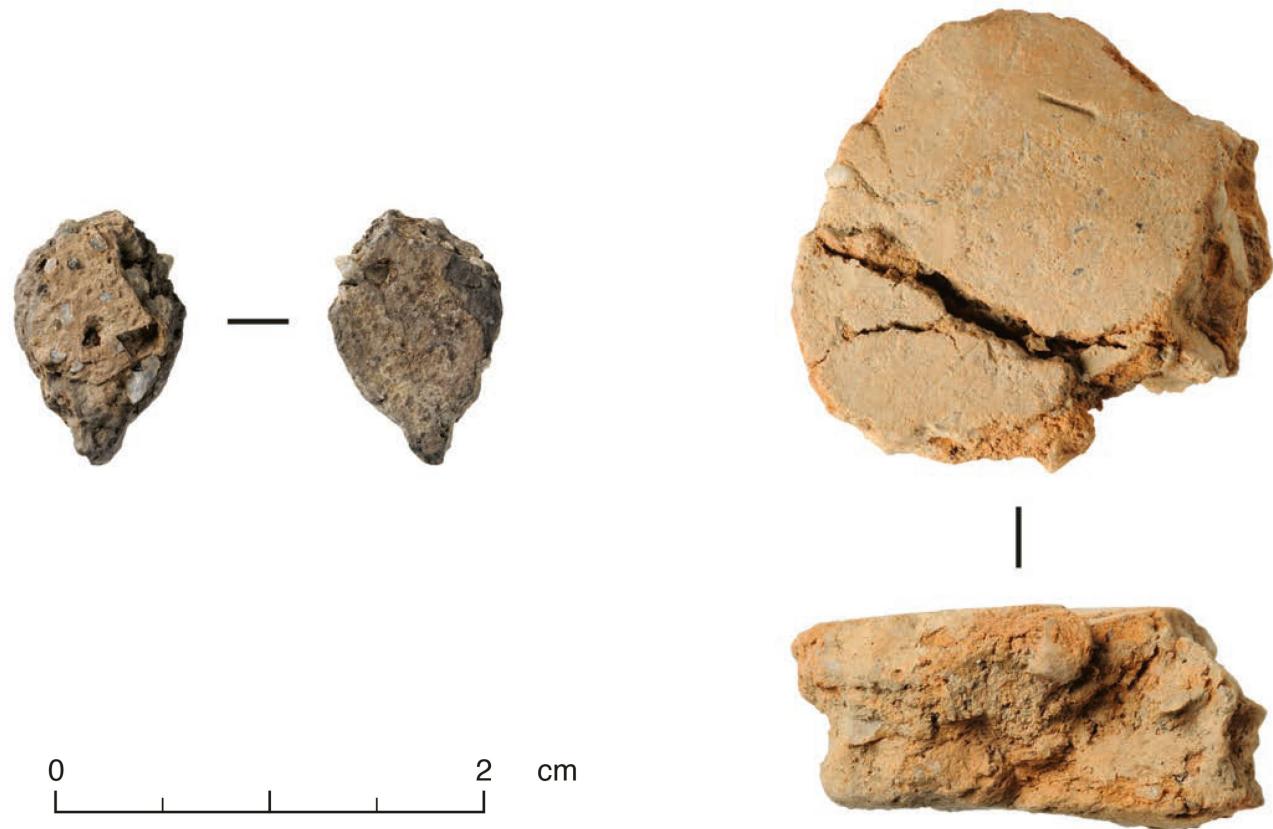


Fig. 6. Arconciel-La Souche FR. The two pottery sherds from Ensemble II. Photo Service archéologique de l'Etat de Fribourg (SAEF)/Amt für Archäologie des Kantons Freiburg (AAFR), C. Zaugg.



Fig. 7. Arconciel-La Souche FR. Examples of projectile points from recent layers (6000-4800 calBC). Photo Service archéologique de l'Etat de Fribourg (SAEF)/Amt für Archäologie des Kantons Freiburg (AAFR), C. Zaugg.



Fig. 8. Villeneuve-La Baume FR. Discoid shell bead from Group F. Photo Service archéologique de l'Etat de Fribourg (SAEF)/Amt für Archäologie des Kantons Freiburg (AAFR), N. Jacquet.

until about 4800 calBC. The changes observed concern the armatures (microliths) – the most recent trapezes are more often asymmetrical, with more diversified retouching (sometimes reverse, bifacial or low angle) – and the debitage with an increasingly standardized production of blades by indirect impact and/or pressure. After 5000 calBC, material finds became scarce, but evidence of Neolithic material cultures begins to appear albeit associated with several unconventional pottery sherds and for example at Villeneuve-La Baume FR, with a discoid bead (fig. 8). In the current state of knowledge and in the lack of sites with remains dating from the following centuries, the characteristics of the Mesolithic lithic industries are no longer observed after 4800 calBC.

3 Jura Arc

The second area studied includes the Jura Mountains and the foothills within the Swiss territory. Some examples from neighbouring France are mentioned in order to illustrate the links with the Linear Pottery Complex (LPC) present in Alsace (F). The site of Ensisheim (Upper-Rhine, F) is also described here (see below), illustrating the extent of the Jura specificities in the region.

The Jura Arc region provides many discoveries from the transition of the Mesolithic to the Neolithic periods. However, the site contexts, either shelters with a complex stratigraphy or open-air occupations, in addition to early excavations, often implicate inaccuracies in the dates of successive events. Several sites between 5500 and 4700 calBC in the Jura regions include so-called mixed ensembles, containing both Mesolithic and Neolithic elements. Attempts to clarify the situation of the mixed assemblages require prudence, especially for early excavations.

Around 6000 calBC, in the Jura Mountains, Mesolithic sites show trapezoid lithic products, often asymmetrical, and notched bladelets. Considering the technique of obtaining the small regular bladelets, indirect percussion is the preferred hypothesis. Around 5700–5500 calBC, small triangular points and ‘fléchettes’ appear in the Mesolithic assemblages (Gob 1985; Jaccottet et al. 1997). The question of the origin of these triangular shapes has been debated, but it appears to predate the Neolithic period and originate among the final populations of European hunter-gatherers (Cziesla 2015; Gallay 1995; Gronenborn 1997; Jeunesse 2002). In parallel, from 5500 calBC on, several sites have evidenced La Hoguette pottery, such as Le Locle-Col des Roches NE (Cupillard et al. 1998; Cupillard 2010), Baulmes-Abri de la Cure VD (Crotti/Pignat 1991) and Liestal-Hurlistrasse BL (fig. 9) (Sedlmeier 2003). The peculiarities observed in these regions motivated the definition of a Recent-Final Jurassian Mesolithic period in the Jura Arc (Perrin 2002 and 2003). In neighbouring France, the rock shelters of Bavans (Doubs/F), excavated during the 20th century, are a reference for the Jurassian Mesolithic period with the eponymous projectile points from Bavans and the La Hoguette pottery (Aimé 1993; Cupillard et al. 1998).

Mesolithic traditions continued until around 5000 calBC, or possibly a little later. However, these are interspersed with traits specific to the Neolithic period and are present in varying proportions depending on the site. For example, among the lithic products, larger blade sizes, elongation of the triangular projectile points, and low angle covering retouches have been observed. In addition to sites with La Hoguette type sherds, it is currently still impossible to associate the increasing number of pottery finds with a specific cultural sphere between Jura Mountains and Swiss Plateau for the first half of the 5th millennium calBC, an example being Lutter-Abri Saint-Joseph (Upper-Rhine/F) (Jeunesse et al. 2014). In most cases, these sherds are not associated with clear archaeological contexts, but all show associations with Mesolithic industries (fig. 10) – either



Fig. 9. Liestal-Hurlistrasse BL. La Hoguette pottery sherd. Photo Archäologie Baselland.

directly with objects typical of the Mesolithic period, as potentially intrusive material from lower levels, and as affiliated with Neolithic productions that have maintained Mesolithic traditions. The frequency of sites with levels of Recent-Final Jurassian Mesolithic period containing non-attributable pottery or La Hoguette type, and the translation or adoption of the concept of triangular arrowheads within the LPC occupations of western France, attest to the existence of contacts between the two differing populations around 5000 calBC. However, the reality in the Jura region at that time must have been much more complex than a simple duality between (new) agropastoral populations and (residual) hunter-gatherers.

After 5000 calBC, the situation is not always clear for the small occupation sites in the Jura Mountain valleys, but indications of the Middle Neolithic period become more frequent. Mollendruz-Abri Freymond VD produced Neolithic remains in levels dated between 5200 and 4200 calBC, distinct from those of the Mesolithic period. Within these Neolithic occupations, two phases have been identified: the first includes ‹fléchettes› and non-attributable pottery with little or no decoration. A second phase features small triangular arrowheads with a concave base and pottery with a smooth clay body combining handles and breast shaped decorations below the rim (Crotti/Pignat 1991). The open-air site at Onnens-Praz Berthoud VD, on the Vaud shores of Lake Neuchâtel, has a level dated after 5000 and before 4500 calBC in which small irregular triangular arrowheads with concave base were found, similar to those from Mollendruz, as well as non-attributable pottery (fig. 11) and faunal remains from only wild animals. The site also contained a grave of a child in supine position

(Jakob et al. 2015; Moinat et al. 2007). The lithic industry shows differences to that of the Mesolithic period, especially the invasive retouche and the point shapes (fig. 12). Slightly further east, the site of Saint-Aubin-Derrière La Croix NE on the shore of Lake Neuchâtel includes an occupation site spanning from 4800 to 3800 calBC (Wüthrich et al. 2003). A megalithic phase appears after 4500 calBC. Before that phase, several structures were dated between 4900/4800 and 4500 calBC, and contained only a small quantity of associated material. Nevertheless, the structure number 28, dated between 4900 and 4600 calBC, produced charred cultivated cereals and threshing chaff (Wüthrich et al. 2003). The pottery found in the surrounding area shows various influences from Egolzwil LU, Early Central Switzerland Cortaillod, and Saint-Uze (F) (Denaire et al. 2011). A non-specific local Neolithic material culture thus emerges during the 5th millennium in the Jura region.

It should also be noted that the southern sites in the Jura Mountains present features associated with those in the Rhone corridor, such as trapezoidal projectile points in layers dated to around 5000 calBC, also found with pottery at Mollendruz-Abri Freymond VD (Crotti/Pignat 1983 and 1986; Pignat/Winiger 1998). In contrast, the northern sites in the Jura valleys resemble, at the material level, the Early and Middle Neolithic occupations (in particular LPC and the Grossgartach facies) of the Rhine Valley in France and Germany.

In conclusion, along the Jura Arc, the end of the Mesolithic undergoes a specifically regional development, the Recent-Final Jurassian Mesolithic, with the appearance of triangular points with a concave base (Bavans type projectile point and ‹fléchettes›). The regularization of debitage seems to have taken place by means of indirect percussion. Unlike the rest of Switzerland, the Jura Mountains contain many sites dated around 5000 calBC. However, taphonomic problems and ambiguity of the small finds do not allow to identify the situation of the Late Mesolithic period in this region. In short, we do not know the precise modalities of the change to the Neolithic period in the Jura Arc area during the 5th millennium. The process seems to have taken place slowly, with various influences, either from the Neolithic Danubian culture to the north, or from the Early Mediterranean Neolithic culture to the south.

4 Upper Rhine Graben

At first glance, the geographical area bordering the Swiss Plateau consists of a wide alluvial plain with abundant natural resources offering the appearance of being an area particularly suited for hunter-gatherer sites. However, very few Mesolithic sites have been identified in this region; their absence is possibly due to a research bias.

But thanks to preventive archaeology programs and prehistory specialists in the region, research is experiencing a new boom. The combination of these two factors permitted the recent discovery of the Mesolithic occupations at Ensisheim

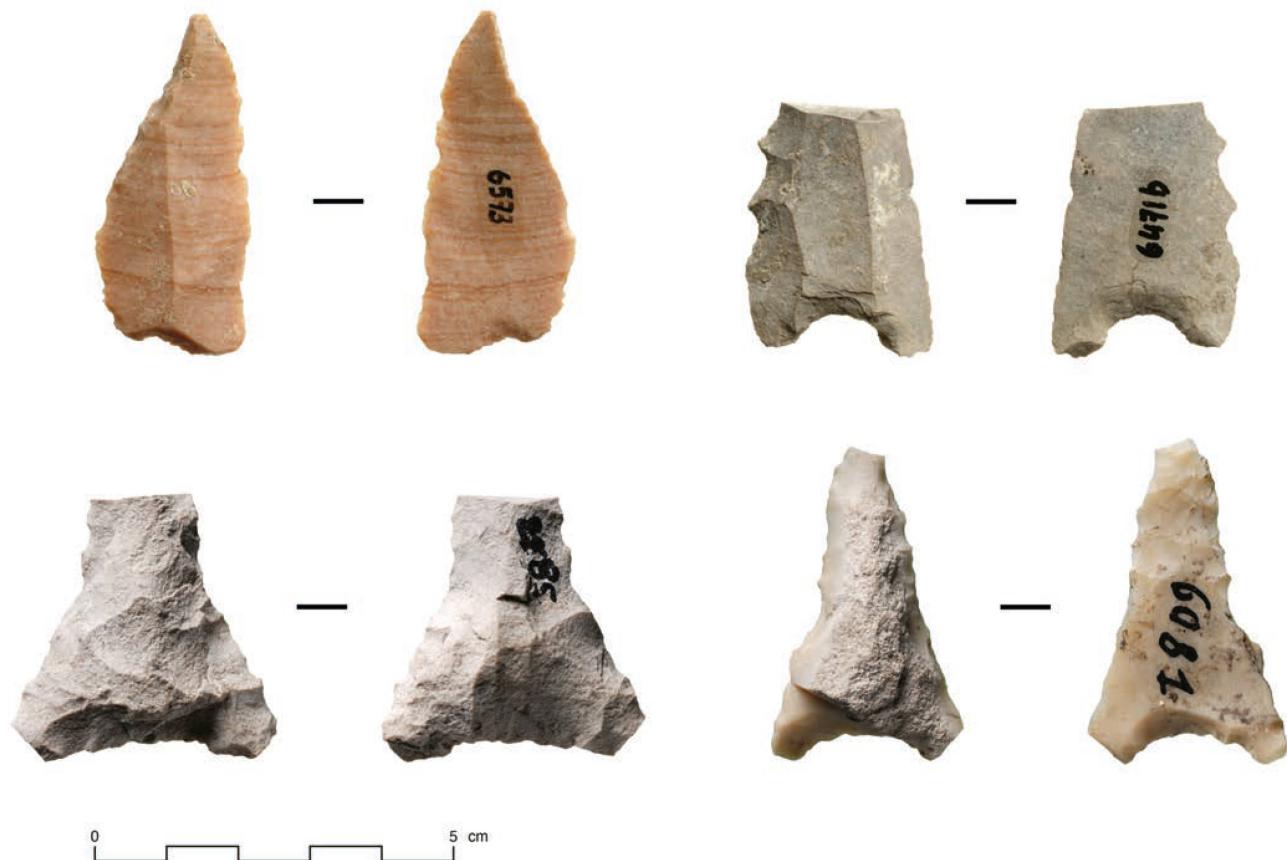


Fig. 10. Lutter-Abri Saint-Joseph (Upper-Rhine, F). Examples of projectile points from layers 7, 5 and 4/5. Photo C. Zaugg.

(Upper-Rhine, F). A preventive archaeology program directed by Muriel Roth-Zehner and carried out by Alsace Archaeology oversaw the excavation of 2.5 hectares of land, containing 18 features and 15 hearths on either side of a paleochannel that had rapidly covered the remains. The small surface of the occupation areas (of 15 and 100 m²) produced a lithic industry consisting mainly of pebbles and a few remains of poorly preserved faunal material.

Three stages of occupation were revealed by the 21 dates obtained by radiocarbon method. Significantly, most of the dates obtained show an almost continuous occupation during the first half of the Late Mesolithic period, from 6400 to 5700 calBC. Five of the dates place three specific occupation layers between 5200 and 4800 calBC: namely features 2, 3 and 6.

These three occupation features or layers are interesting for this paper. They were discovered near the paleochannel of the river Ill, covered about 30 m² and produced between 150 and 200 lithic pieces. Poorly preserved faunal remains revealed the presence of deer, wild boar and aurochs. There were also rounded stones and fragments showing signs of exposure to heat. The lithic productions discovered within these features/layers are consistent with regards to the composition of the tools, the debitage techniques used and the types of raw materials employed.

The lithic artefacts have undergone petrographic analysis (Jehanne Affolter), technological attribute analysis (Alexandre Deseine) and functional examination (Colas Guéret). The two latter procedures are still underway but are representative of a general trend.

For these late occupations, the raw materials are Muschelkalk flints from Wehr or Lörrach, and Malm flints from Auggen in Germany or, to a lesser extent, from the Pleigne and Olten areas in the Franco-Swiss Jura.

The tools are composed of two main categories: long symmetrical trapezoids used as projectile points (fig. 13), and roughly made bladelets used for butchery activity. A few small scrapers are included in the group of tools. The numerous refits within these lithic productions (attesting to links between two of the three features) made it possible to understand the debitage methods used: a frontal debitage with indirect percussion, the striking platform maintained by the removal of small flakes from the platform. The other surfaces of the core were not worked (fig. 14). The combination of petrographic, technological and traceological analyses makes it possible to have a particularly precise understanding of the economical use of the raw materials. Five radiocarbon dates place these occupations between 5200 and 4800 calBC. This corresponds to an overall hiatus identified by researchers studying the Neolithic period on



Fig. 11. Onnens-Praz Berthoud VD. Ceramic from layer 6a. Photo Cantonal Museum of Archaeology and History, Lausanne, J. Bullinger.



Fig. 12. Onnens-Praz Berthoud VD. Triangular arrowheads from layer 6a. Photo Cantonal Museum of Archaeology and History, Lausanne, S. Ansermet.

the plain of Alsace (Denaire et al. 2017). The absence of Neolithic occupations during this interval has been remarked on for many years. This hiatus also coincides with a cultural change, and a transition between the early and the middle phases of the local Neolithic culture. It would appear the three features from the Ensisheim site partially fill this hiatus. The five dates do not seem to be aberrant or the result of contamination. The three occupation levels/features appear well preserved by the evidence of refitting (between

20 and 30%). First functional analyses also highlighted well conserved use scars. The artefact scatter studies showed the spatial coherence of the three occupation levels, as well as links between feature 3 and 6 through refitted pieces and conjoining flakes.

All the evidence points to well-preserved and undisturbed open-air occupation levels. The lifestyle and material culture of the Mesolithic hunter-gatherers appears to have survived the first phase of Neolithization in this part of Europe. Several scenarios and hypotheses have been formulated and new research perspectives will have to be explored in order to better understand the phenomenon of Neolithization in this part of Europe.

The location of the Upper Rhine Plain (Graben) is particularly interesting since several Early Neolithic sites are known between the foothills of the Jura Mountains and Colmar, with dates close to those of the Ensisheim site (Jeunesse 1991; Mauvilly 1993). Settlements and burial grounds from sites such as Mulhouse-Est (Upper-Rhine/F), Sierentz-Sandgrube (Upper-Rhine/F) or Colmar-Route de Rouffach (Upper-Rhine/F) are dated between 5300 and 5000 calBC, and all have the characteristics of the Neolithic LPC (house plans, burial types, etc.). The projectile points found in these contexts are principally triangular points with invasive low-angle bifacial retouches (Mauvilly 1997). However, some trapezoid shapes and the presence in some pits of La Hoguette type pottery reveal the situation is more complex than it first appears, confirmed by the continuity observed at Ensisheim. In this region, adjacent to the Jura rock shelters, sites with a more Mesolithic tendency coexist with Neolithic villages and burial grounds.

The current state of knowledge permits the proposal of a scenario that can evolve at the pace of the research carried out. Obviously, in Ensisheim, the presence of finished flint products made from Malm flint, which is found in the Jura Mountains, implies that groups of hunter-gatherers roamed this mountainous and forested region. The on-site debitage of the Muschelkalk flint, unlike the Malm flint, appears in the form of worn-out tools, and seems to indicate a supply of raw materials in two stages, upstream of the installation at Ensisheim. The groups alternated between the plain and the mountain range. This does seem logical since these two biotopes can be considered as being complementary. But there is also a visible influence from the LPC populations who arrived a few decades earlier, around 5300–5200 calBC (Denaire et al. 2017).

With the arrival of these new agropastoral populations in the Rhine Graben, the hunter-gatherers may have been forced to live closer to or even within the mountain ranges. This would then explain the survival of the Mesolithic hunter-gatherers' lifestyle despite the arrival of the first agropastoral populations in the area. The gap in occupation evidence between the end of the LPC and the beginning of the Hinkelstein facies (Denaire et al. 2017) would have provided an opportunity for groups of hunter-gatherers to re-occupy at least some parts of the Rhine plain, or in any case to be able to move freely through the region.

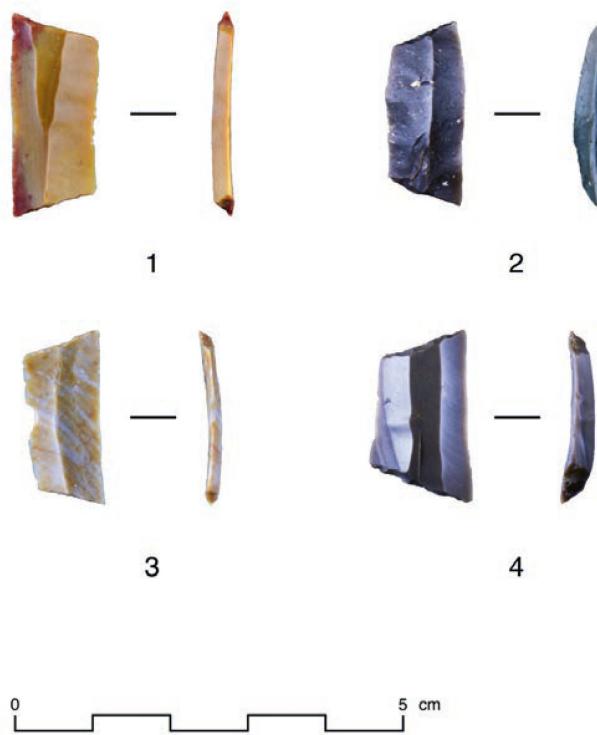


Fig. 13. Ensisheim (Upper-Rhine, F). Examples of projectile points from the Mesolithic *locus*. Photo A. Deseine.

5 Rhine Valley

The Alpine Rhine Valley forms a natural corridor between the Lake of Constance region, the eastern Swiss Plateau and the Grisons Alps with connections to the North Italian region. The importance of this region in terms of transportation geography is emphasised by the presence of multiple prehistoric sites from the Late Neolithic period (see Heeb 2012). In contrast, there are only a few finds from the Mesolithic and the Early Neolithic periods. Typologically, the site at Oberschaan-Moos SG (Huber 2004) and the Blumenrain site in Appenzell AI are both from the Early Mesolithic period (Rigert et al. 2009 and personal communication Ebbe Nielsen), however the finds were not found in secure contexts and thus lack absolute dates.

A greater number of sites, mainly from the Early Mesolithic period, have been identified in the Kleinwalsertal area in Vorarlberg (A) (Posch 2020), some of which are certainly related to the exploitation of locally occurring radiolarite (Bachnetzer 2017). The rock shelter at Mittelberg-Schneiderküren (A) provided a radiocarbon dating of 5300–5050 calBC, although the site did not contain significant finds or artefacts.

Late Mesolithic to Middle Neolithic finds, which are relevant to the present question, come from the rock shelters at Oberriet-Abri Unterkobel SG and the Koblach-Kummaberg Krinnenbalme (A).

Oberriet-Abri Unterkobel SG, partially excavated in 2011–2012 during a rescue excavation, has a 4.5 m thick stratigraphy with finds spanning from the Early Mesolithic to the Roman period (Wegmüller 2022). The Mesolithic layers can be divided into two periods, the Early Mesolithic layer I dates between 8200 and 7100 calBC, and the Late Mesolithic layer H between 6500 and 5400 calBC. During the Mesolithic, the faunal remains in the successive occupation layers provide information on hunting of wild boars, deer and fur bearing animals, as well as various activities such as processing wood and antler, foraging wild fruits as well as sedges or reeds. Radiolarites available in the region were used as lithic raw materials. Radiolarite from the Kleinwalsertal, flint from the Jura (Lägern), as well as Ölquarzite from Central Switzerland were also present. The use of raw materials from the southern Alpine regions points to transalpine relational networks (Affolter 2022).

The Mesolithic layers are followed by the layer G. In this layer, in addition to a larger proportion of wild animal bones (especially deer), domesticated animals (cattle, sheep/goat) appear for the first time (Stopp/Zürcher 2022). The presence of a pottery sherd indicates the Neolithic character of this layer (Oberhängli 2022). The quantity of lithic artefacts decreases significantly, although the individual elements are clearly larger in size. Within layer G, several structures made of heavily burnt clay are particularly striking. The greater part of the find material is associated with these Middle Neolithic burnt structures, which provided a dating frame of 4700–4500 calBC (Wegmüller 2022).

Two radiocarbon dates show a time range between 5500 and 5000 calBC. The one date provided by a wild animal bone could be clearly assigned to the Late Mesolithic layers (5534–5385 calBC). A fragment of charcoal dated to 5210–4960 calBC was not clearly related to find bearing layers but originates from the transition period between layers H and G (Hajdas/Wegmüller 2022).

The Kummaberg site (Koblach [A]) is located east of the Rhine near the Oberriet-Abri Unterkobel SG. In the 1950s, test pits were dug at various places (Vonbank 1955; Laus 2006). Archaeological layers, measuring several metres in depth, were discovered at the sites Koblach-Kummaberg Krinnenbalme and Rheinbalme (A), ranging from the Mesolithic period to the Bronze Age. Unfortunately, the poor documentation from these sites makes an exact stratigraphic placement of the finds impossible (Laus 2006). The Mesolithic lithic finds consist of triangular shapes, backed blades, a segment and several trapezoids, which suggests human presence during the Early and Late Mesolithic periods. Two harpoons from the Rheinbalme site date to the Late Mesolithic period. From Koblach-Kummaberg Krinnenbalme, sherds attributed to the Grossgartach facies are the oldest typologically assignable pottery elements from the Neolithic period (Heeb 2012). Absolute radiocarbon dating was provided by samples from various skeletal remains of several individuals found within the excavated layers. Intact burials were not found; most of the

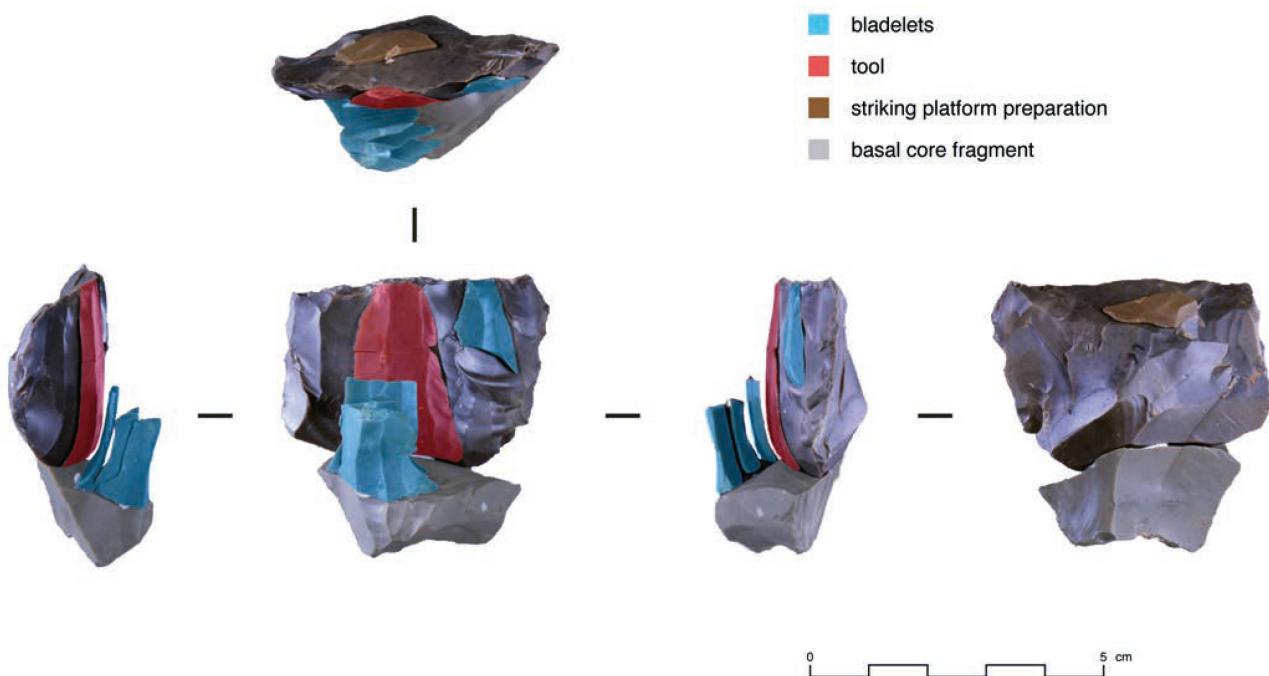


Fig. 14. Ensisheim (Upper-Rhine, F). Example of «refitting» from the Mesolithic locus. Photo A. Deseine.

bones were missing. A fragment of a cervical vertebra from the Rheinbalme site dates to 7550–7300 calBC and thus to the Early Mesolithic period. Two other skeletal remains (a premolar and a calcaneus) provided Middle Neolithic dates of 4920–4730 and 4960–4790 calBC (Laus 2006). Various Early Neolithic settlements are known in the Upper Rhine region to the east of Lake Constance (Altorfer et al. 2018). Extensive and well-documented finds come from the site of Gählingen-Goldäcker SH in the Klettgau region. The remains of a Neolithic settlement were excavated in a large-scale rescue archaeology program during 2001 to 2006. A total of 23 buildings was documented, but due to the severe disturbances resulting from intensive modern ploughing and erosion, the settlement sequence could not be clearly established. Two thirds of the house structures could be attributed to the Early Neolithic through the types and shapes of floor plans, the remaining were identified as belonging to the Middle Neolithic period (Altorfer et al. 2018). The Early Neolithic pottery finds from this site are of Linear Band type, with a few examples being a local production of La Hoguette type pottery (Hartmann 2018). Two of the four absolute dates from the settlement are Early Neolithic (5207–4833 calBC, 5202–4799 calBC). An exceptionally large inventory of flint artefacts indicates a particular situation of exploitation and processing of local flint deposits within the vicinity of the settlement. This is emphasised by the presence of several flint nodule deposits within the site (Altorfer et al. 2018).

The settlement at Zizers-Friedau GR was discovered in 2002–2003. It lies about 2 m below the present surface level. Individual post holes were found, but house-floor

plans could not be reconstructed. Based on the pottery finds, the site is attributed to the Grossgartach-Hinkelstein facies. The lithic raw materials mainly consisted of a local radiolarite, with additional rock crystals from the Alps and flint from Northern Italy, Bavaria and Central Switzerland. Two radiocarbon dates place the finds within a time range of 4900 to 4700 calBC (Seifert 2012).

Concerning eastern Switzerland and more specifically the Rhine Valley, the rock shelter sites at Oberriet SG and at Koblach (A) show evidence of a continuous occupation of the region from the Early Mesolithic to the Bronze Age periods. Late Mesolithic elements are present in each case but finds that can be securely attributed to the Early Neolithic period are missing. In the two rock shelters and those in the Kleinwalsertal region (A) absolute dates from a time range between 5500 and 5000 calBC are available, but they cannot be clearly related to archaeological structures or characteristic find material. Undoubtedly Early Neolithic sites are found in the High Rhine Valley west of Lake Constance, with the site at Gählingen SH, which is assigned to the Linear Pottery culture and also show corresponding absolute dates. The presence of La Hoguette pottery is also conspicuous here. In the Alpenheintal itself, Neolithic finds are only found again in the Middle Neolithic layers at Zizers-Friedau GR which are formally assigned to the Grossgartach-Hinkelstein complex, absolute dates being around 4800 calBC.

6 Eastern Swiss Plateau

Many open-air sites with successive occupation levels have been discovered in the marshy regions of Central Switzerland between Napf and Rigi, and notably around the Wauwilermoos. These sites only have a relative chronology and lack absolute dating. The current state of information shows that the known finds from the 6th millennium sites on the Eastern Swiss Plateau mainly belong to the Mesolithic tradition, presenting knapped lithic objects and faunal remains of wild animals. For example, at the settlement site of Schötz-Robelmoos station 7 LU and Fällanden-Usserriet ZH, lithic productions with trapezoids were found, sometimes with reverse retouching; some of the triangular points could be associated with the Jura cultural sphere (e.g. Bavans type points); preserved faunal remains were only occasionally found (Nielsen 2003). Some triangular points had covering retouches, and undecorated pottery sherds similar to those from the site at Hitzkirsch-Seematt 4 LU show the possible presence of more recent occupation levels (Nielsen 2003).

A similar situation to the one encountered at the Wauwilermoos appears around the lake of Pfäffikon ZH, particularly at Wetzikon-Robenhausen-Furtacker ZH. The stratigraphy of the site is unclear: three layers contain lithic material from the late Palaeolithic period (3) and the Early and Late Mesolithic periods (2 and 1) (Spörri 2000). Trapezoidal shapes and Montbani type blades are rare, Early Neolithic forms are unknown – neither from the excavations at Furtacker, nor from the numerous surface finds from around the lake. In this region, the site of Fällanden-Usserriet ZH is understood as being transitory between the Meso- and Neolithic periods because of the presence of asymmetrical points; there is no radiocarbon date available, and the isolated Neolithic surface finds are not associated with a stratigraphy (Nielsen 1997). Most of the lithic productions are made of Jurassic chert from Lägern and to a lesser extent from the deposits at Olten. Pollen is exceptionally well preserved in these marshy regions. Palynological sequences from these principally natural environments reveal the presence of cereals already in the middle of the 6th millennium calBC (Nielsen 2012; Tinner et al. 2007). Because of these discoveries, several authors use the term «Frühneolithikum» (Early Neolithic) for sites dating before 6000 calBC (Nielsen 2009a; Stöckli 2016). The evidence of cereals at very ancient dates is a factor to be considered in a polymorphic perception of the Neolithization process. However, the term Mesolithic is also used for sites dating before 5500–5000 calBC that show a material culture and subsistence lifestyle based primarily on hunting and gathering (Jeunesse et al. 2019). At the western end of the Seeland, the open-air site of Gampelen-Rundi 4 BE produced several triangular points similar to those of the Jura region, as well as notched bladelets. Of interest is the small corpus of points exhibiting different shapes, though these are not dated. A projectile point with covering retouch and concave sides is a type also found at Lutter-Abri St-Joseph (Upper-Rhine, F).

This site emphasises the proximity between the Trois-Lacs region and the Jura Arc region (Nielsen 1997).

Central Switzerland is renowned for the discovery of one of the oldest Swiss prehistoric pile dwellings, Egolzwil-Station 3 LU, in the canton of Lucerne (Wyss 1994; 1996). Discovered in 1929, excavated in the 1950s and 1980s, this site is still one of the oldest examples of an entirely Neolithic occupation in Switzerland. It was, however, clearly established after the first Neolithic finds of the Rhine Valley, Ticino and Valais, with dendrochronological dating between 4282 and 4274 calBC and radiocarbon dating in the second half of the 5th millennium calBC (Doppler 2007; Seifert et al. 2013).

In summary, the Mesolithic sites in the eastern part of the Swiss Plateau testify to relations with the Jura region and are connected to the Recent-Final Jurassian Mesolithic period. However, there are no dated sites between these and the first known Swiss Prehistoric pile dwellings at Egolzwil at the end of the 5th millennium.

7 Rhone Valley

A distinction is made between the lowland occupation sites observed in the cantons of Vaud and Valais in the Rhone Valley, and those of the Alpine and high-altitude valleys presented in the next chapter concerning the upper Valais, Ticino and Grisons Alps. In the Rhone Valley, upstream from Lake Geneva, there is currently little information about the Late Mesolithic period and no publications on the subject.

For the Neolithic period the Valais is one of the few Swiss regions providing information about the ancient Neolithic period. However, this Early Neolithic period remains largely unexplored, with influences yet to be determined. The open-air occupation sites discovered in several locations in the city of Sion (La Planta, Tourbillon and Suisse-Scex VS) yielded remains of hearths, animal bones and a few pottery sherds (Gallay et al. 1983; Honegger et al. 2011). The oldest dates are around 5300 to 4800 calBC. The oldest Neolithic layers produced domesticated faunal remains, charred cereal grains and very few pottery sherds, most likely of North Italian influence (Chaix 1997; Curdy/Chaix 2009; Denaire et al. 2011; Martin 2015; Müller 1995; Voruz et al. 2009). Subsequently, after 4700 calBC, some indications from the Rhone corridor (Saint-Uze group) are associated with «Vasi a Bocca Quadrata» (VBQ) influences that attest to the persistence of links with the northern Italian regions (Honegger et al. 2011). The greater part of the lithic production consists of debitage on hyaline quartz, though certain special tools show the use of imported flint blades (mainly from France and Italy).

The first ChamblanDES type tombs discovered in Sion date from around 4700 calBC. This phenomenon began in neighbouring Alpine regions and gradually spread over all the Swiss territory. The first burials, dated before 4500 calBC, contained very little material (Honegger et al. 2011, Moinat et al. 2007).

The Rhone Valley is obviously part of the Mediterranean Neolithization process dating to the end of the 6th millennium, well before the rest of the Swiss territory was concerned. However, influences and exchanges existed with the Swiss Plateau as evidenced by the arrow shafts discovered on the Schnidejoch pass, between the Valais Alps and the Bernese Pre-Alps, dated between 4800 and 4600 calBC (Hafner/Schwörer 2018). Sites currently being excavated or studied with lithic industries and pottery sherds dating before 4800 calBC will certainly bring new perspectives to the unique situation of the Valais.

To summarize, it is still not possible to determine when the Mesolithic period ends and when the Neolithic period begins in the Rhone Valley. Nevertheless, along with the LPC sites around Lake Constance, the Rhone Valley in the Valais has produced the first examples of Neolithic occupation in Switzerland, around 5000 calBC. The remains are quite rare, but, for example, several sites in Sion present a majority of domestic fauna (bovine and caprine). In the current state of the data, it seems that these sites can be linked to the Neolithic influences from the Southern Alps, Italy or France, though this merits future clarification.

8 Central and Southern Alps

The central and eastern Swiss Alpine region has been visited by Mesolithic hunter-gatherers from the onset of the postglacial period, just as they did in much of the Alps. A recent article by Cornelissen/Reitmaier (2016) gives an extended view of the subject, so only the most pertinent situations are discussed here. Late Mesolithic sites tend to be less frequent than those of the 9th–7th millennium, but are present wherever specific field survey has been carried out, e.g. in the Gotthard region or in some upper zones of the Grisons Alps, in particular the Silvretta massif (Della Casa 2018; Cornelissen/Reitmaier 2016, fig. 1). The orientation towards open plateaus and passages is conspicuous, and certainly largely relates to seasonal movements in hunting activities (Kompatscher/Kompatscher 2007).

Close to St. Gotthard Pass, the Andermatt-Hospental-Moos UR site on the Ursen valley floor (1500 m.a.s.l.) yielded an abundant lithic industry worked on-site with few typologically distinct projectile points entirely made of (local) rock crystal (Cornelissen/Reitmaier 2016, fig. 7). A (Late) Mesolithic occupation is presumed despite the fact that all ¹⁴C dates from the site are of younger (Bronze Age) date. Further to the east, charcoal from the Bregaglia-Val Forno-Plan Canin GR site produced a consistent Mesolithic ¹⁴C sequence including an early 5th millennium calBC date, however from an insecure context. Ftan-Abri Urschai GR (~2300 m.a.s.l.) is one of the few Swiss Alpine sites with faunal remains (seemingly only wild species) and pottery sherds. The context dates 4500/4300 calBC (Cornelissen/Reitmaier 2016) – this is probably for the time being as close as we get to the subject of transition in the Alpine uplands.

The question of the exact provenance and transit routes for the Early central (Valais) and south (Ticino) Alpine Neolithic (see below) remains a matter of debate (van Willigen/Carazzetti 2022). The pottery shows evident similarities to the Primo Neolitico Padano, in particular the Isolino di Varese and Vhò groups. Seen the marked intra-Alpine situation of the upper Rhone Valley, it is hypothesised that first Neolithic populations could have reached the Valais by crossing north-south passages such as the Theodul pass and the Col d'Hérens, transit routes well attested for younger periods.

Not far from this passage, the Zermatt-Alp Hermettji VS (2600 m.a.s.l.) produced an occupational stratigraphy from the Mesolithic to the Bronze Age, with several ¹⁴C dates ranging 5300–4700 calBC (layer 3c), and thus attributed to the Neolithic by the excavators (Curdé et al. 2003). The lithic industry consists largely of non-diagnostic rock crystal flakes, very similar to the older Mesolithic layers – nothing indicates a Neolithic occupation *sensu stricto*.

In the Alpine valleys still, few sites are known. One of the most debated situations is that of Mesocco-Tec Nev GR in the upper Mesolcina (Della Casa 2000; Cornelissen/Reitmaier 2016). This rich site at 700 m.a.s.l. was excavated in the 1970s with insufficient resolution to allow for a detailed analysis. Various zones of activity are attested, along with abundant material culture. The lithic industry (~4000 pieces) includes all stages of the debitage, and among the microlithic items backed points, triangles and trapezes occur (Della Casa 2000, fig. 2.70), which is a clear indicator of a mixed assemblage with Early and Late Mesolithic elements (7800/7500–5300/5000 calBC). The raw material consists of 43% of central-alpine rock crystal, and 57% of various pre-alpine silices; a provenance of the latter from geological deposits north of Lago di Varese remains the most plausible hypothesis. A small group of pottery sherds (77 pieces) features shapes and decorations typical of the North Italian Early Neolithic period, comparable overall to the finds from the Sion VS sites (see above) or from Bellinzona-Castelgrande TI. These are the only Neolithic elements on the site, indicative of (close) contacts between the diverse communities. The low-quality radiocarbon date from a charcoal assemblage (5100–4600 calBC) brings no additional information (Della Casa 2000, fig. 2.86).

In the Alpine part of the Ticino valley, Bellinzona-Castelgrande TI has in the loessal fills of the hillock with an Early Neolithic occupation level with typical pottery at the base of the stratigraphy (Donati/Carazzetti 1987; van Willigen/Carazzetti 2022). Again, only one consistent ¹⁴C date is available for the period concerned: 5300–5100 calBC. Vegetation history based on palynology attests for the presence of cereal cultures from the 6th millennium in the south-Alpine region (Tinner et al. 2007), thus Castelgrande is usually seen as the first clearly Neolithic imprint on the southern border of the Swiss Alps. The first occupation levels of Bellinzona- Castelgrande TI are marked by the presence of pottery finds showing affinities with the Vhò group, well attested in neighbouring Lombardy (I) (van Willigen/Carazzetti 2022). These ancient Neolithic

levels are covered by several occupation layers dated to the second half of the 5th millennium calBC and attributable to the second phase of the VBQ.

The situation in the neighbouring region of Varesotto is unclear. The Late Mesolithic period is attested by some surface discoveries (Biagi 1980–1981). The beginning of the Neolithic period could be represented by the Gruppo Isolino, a cultural group currently attested only at two sites (Isolino-Biandronno and Pizzo di Bodio, both Varese [I]) and the radiocarbon dates fall between the end of the 6th and the middle of the 5th millennium calBC (Pedrotti et al. 2022). Therefore, reliable data on the processes related to the Mesolithic-Neolithic transition are absent. The persistence of the trapezes and the microburin technique in the assemblages attributed to the ancient Neolithic period however suggests that the acculturation phenomena played a role in this transition.

The end of the Mesolithic period in the high alpine valleys is attested by several examples of high-altitude sites. Transportation routes through natural passes and valleys are thus revealed to be aligned along the mountain ranges. However, the networks remain difficult to trace clearly and the origin of the first signs of Neolithization is not clear. Around 5000 calBC, pottery finds with relations to northern Italy are observed in occupation sites in the southern Alps. Still, the ancient Neolithic period of these Italian regions is unknown and does not permit an obvious comparative analysis.

9 Discussion and Conclusions

Current data for the entire Swiss territory and its boundaries does not permit an answer to the question of «When does the production economy appear in Switzerland?». In the light of the recent debates among the scientific community, this seems to be a moot point: apart from the areas where we note, for a very limited period and region, a «neo-political advance» through demic colonization (such as in the LPC area), transition processes are complex and diverse. Switzerland, due to its geographical location, is no exception here.

The occupation of the territory, the possible borders or areas of Mesolithic-Neolithic contact and the economic changes are demonstrated by a case-by-case basis yet remain difficult to coherently interpret from the information from the archaeological sites. The chronological framework cannot be clearly fixed, on the one hand highlighting the fragility of the distinction of a clear limit in time in terms of historical periodization, and on the other hand illustrating the difficulties in interpreting the processes of social and economic changes in the study area. The observation, although provisional, being there is no chronological limit between Mesolithic and Neolithic, rather a multitude of cultural interactions staggered in time – it seems useful to return here to the concept of «mosaics» evoked in our introduction (Tringham 2000) – leading only belatedly to a more stable state in the second

half of the 5th millennia BCE (e.g. the assemblage at Egolzwil-Station 3 LU).

While it is not yet possible to achieve an in-depth discourse on the Mesolithic-Neolithic transition processes in Switzerland, the material studies give a first impression of the situation of populations between 6000 and 4500 calBC. By limiting the research to the characteristics of material assemblages, the discourse is included within the general context of research based on material culture for defining prehistoric periods (Jeunesse et al. 2019). However, there are opportunities to integrate data on subsistence systems by dissociating from the fixed idea of what constitutes a prehistoric period and focusing more on cultural changes and the implications for early societies. Therefore, this assessment is divided into two parts: a first part which synthesizes the results of the regional studies mentioned so far and a conclusion in the form of a proposal of avenues for reflection on further research.

9.1 Results from the regional summaries

The geographical distribution of the sites of the Late Mesolithic and Early Neolithic periods plays an important role in the characteristics of each. Indeed, the situation differs between the mountainous reliefs of the Jura Arc, the Swiss Plateau and the large valleys connected to regions with earlier Neolithic occupations (Rhine, Rhone, Ticino). The Late Mesolithic period is not documented everywhere in Switzerland, but, when attested, it is often by visible evidence of persistence traditions of a Mesolithic occupation dated up to around 5000 calBC, characterized by lithic industries with trapezoids and notched bladelets, produced from stone gathered within a regional radius (less than 100 km). After 5000 calBC, information is sparse and, with most of the time, presents unique examples that lack known parallels.

In the Jura Arc region, from 5700/5500 calBC, the phenomenon of the Recent-Final Jurassian Mesolithic appears. It is characterized by triangular projectile points and has, for the most recent sites (5500/5300–5000 calBC), La Hoguette or «indigenous» pottery sherds (Jeunesse et al. 2019). The Recent-Final Jurassian Mesolithic also shows evidence of persistence, after 5000 calBC, south of the massif, by Cardial pottery and, to the north, LPC pottery influences.

In the regions bordering those of LPC (around Lake Constance and along the Rhine Valley), the end of the Mesolithic period is faintly anticipated with the appearance of pottery and settlements that can be attached to this complex just before 5000 calBC (5300/5000 calBC). This is also the case for the first Neolithic sites of the Rhone and Ticino valleys, where the pottery production, not always characteristic, is for the moment rather affiliated with the different facies of the Early/Middle Italian Neolithic.

As for the Swiss Plateau, it is necessary to wait until 4300 calBC to observe recognizable Neolithic occupations at the lakeside villages of Egolzwil-Station 3 LU. From that

moment, a very specific Middle Neolithic culture develops (for example the Cortaillod site in the Trois Lacs region), with clear features distinct from other European Neolithic complexes.

Material data sets discovered in Switzerland simultaneously highlight strong regional specificities and a significant diversity of influences from the confluence between the Danubian and Mediterranean Neolithization currents. The mountainous reliefs play complex roles, in the case of the Jura Mountains, forming a cradle for a specific, indigenous Late Mesolithic group and, in the Alps, creating dynamic transportation routes, especially in the valleys. Between the two, the Swiss Plateau provides evidence of the continuation of the Late Mesolithic period before the appearance, several hundred years later, of a specific Neolithic environment. Meanwhile, the information is scattered, either with uncharacteristic small finds or with isolated objects of Danubian origins (van Willigen 2018). Consequently, a visualization of the fragmentation of the territory appears, with areas delegated to persistent Mesolithic characteristics, in temporal and spatial proximity, and probably maintaining contacts, as the Valais passes testify, and other areas where Neolithic features were either transformed, partially adopted or fully adopted. The sites at foot of the Jura Mountains such as Onnens-Praz-Berthoud VD and Saint-Aubin-Derrière la Croix NE plus the Rhine valley provide examples.

The difficulty of interpreting the sparse and not always diagnostic data is encouraging for the renewal of the approaches for studying the Mesolithic-Neolithic transition. This complicated context, with regional traditions and external influences, provides an ideal situation for developing new models of reflection, with targeted research objectives, in order to understand the processes of evolution of prehistoric societies.

9.2 Assessment

This assessment of the important facts concerning the question of the transition from the Mesolithic to the Neolithic periods between the Alps and the Jura shows that, in broad terms, our knowledge has not evolved dramatically in recent decades.

Thus, recent work confirms that the two major currents of the European Neolithization (Danubian and Mediterranean) are firmly established in the marginal regions such as the Rhine Valley, Valais and Ticino, a situation recognised for some time. However, no recent discoveries indicate that these two currents had penetrated the Jura and the Swiss Plateau in a sustainable manner. The limits seem to be stabilized for several centuries on the Rhine to the north and on the Valais-Ticino axis to the south.

But what happens in the immense «No man's land» that lies in between? It is probably on this subject that the work carried out since the 2000s has yielded significant results. The most important being the habilitation thesis of Ebbe Nielsen, published in 2009 (Nielsen 2009a), which al-

lowed access to a considerable amount of documentation that had remained largely unpublished until then. This work clearly shows that the Swiss Plateau and its borderlands presented a dense human occupation at the end of the Mesolithic period.

At the same time, several leading excavation projects have focused on the period with work carried out on the sites of Château-d'Œx VD in the early 1990s (Crotti/Pignat 1993), Arconciel-La Souche FR from 1997 to 2012 (Mauvilly 2018; Bassin et al. 2019) and Lutter-Abri St-Joseph (Upper-Rhine, F) between 2005 and 2011 (Jeunesse et al. 2019), to which must be added the preventive excavations of Onnens-Praz-Berthoud VD from 1997 to 2004 (Jakob et al. 2015) and more recently that at Ensisheim (Upper-Rhine, F).

Thanks to this work, Mesolithic communities have become key players in the discussion about the Mesolithic-Neolithic transition and this point provides the main advance in research in the recent decades. It is now possible to follow their evolution up until the first centuries of the 5th millennium and the dynamics of the relations that these communities maintained with neighbouring Neolithic groups.

The Neolithic period on the Swiss Plateau, meanwhile, remains firm in its chronological position. Indeed, the Neolithic ensembles (livestock, agriculture and pottery) prior to Egolzwil- Station 3 LU and Zurich-Kleiner Hafner ZH remain extremely rare, so currently it is impossible to obtain a precise idea of a Neolithic «pre-Egolzwil», if it even existed.

It is likely that during the 5th millennium Mesolithic communities continued to maintain contacts with Neolithic groups, while maintaining their way of life and their traditional techniques. The motivations that lead them to adopt – perhaps more or less quickly depending on the groups – the pottery and the production economy, and the forms that these transitions take, are still poorly understood. The process nevertheless led to the appearance of a few settlements with original architecture around 4300 calBC, in which agriculture and livestock were an integral part of the economy.

Unlike what has been observed in some neighbouring regions, the Neolithization of the Swiss Plateau was not a rapid process nor a triumphant advance. It is perhaps its slowness that makes the Neolithization of this region so difficult to grasp, but also it provides an opportunity since it offers the possibility of following a complex process, so to speak, «in slow motion». This unique situation is what sets this region apart from others.

How can we move beyond this current research situation for the future? What seems obvious is that it is not at the level of individual sites, despite the quantity of material, that relevant questions can be addressed. Rather, it is necessary to define a network that includes spatial, chronological and economic data at the level of geographical regions, or structures of socio-cultural resources. It is therefore evident that more specific information from palynological, anthracological, and general archaeo-biolog-

ical data, is needed in order to address a systemic overview of natural environments and the economic activities taking place in them. The missing information is due in a large part to the difficult preservation conditions, particularly in dry land sites and regions with acidic soil. However, the lack of targeted research strategies and the fragmented approaches by the regional (cantonal) agencies, which is often limited to prevention only, also weigh heavily on the balance sheet. As with other Prehistoric periods, such as the Palaeolithic period or the Iron Age, few research teams are looking at Mesolithic issues in Switzerland. We hope to be able to relaunch the debate with this article by demonstrating the interest of some fundamental issues in the transition process.

Laure Bassin
InSitu-Archéologie SA
Rue Oscar Bider 54
CH - 1950 Sion
laure.bassin@gmail.com

Philippe Della Casa
University of Zurich, Institute of Archaeology
Dept. of Prehistoric Archaeology
Karl-Schmid-Str. 4
CH - 8006 Zurich
philippe.dellacasa@uzh.ch

Alexandre Deseine
University of Paris 1
Panthéon-Sorbonne UMR 8068 Temps
Archeodunum SA
alexandre.deseine@gmail.com

Bastien Jakob
Parc et musée d'archéologie,
Espace Paul Vouga
CH - 2068 Hauterive
Bastien.Jakob@ne.ch

Léonard Kramer
State Service for Archaeology, Canton of Fribourg
Obere Matte 13
CH - 1700 Freiburg
leonard.kramer@fr.ch

Fabio Wegmüller
University of Zurich, Institute of Archaeology
Dept. of Prehistoric Archaeology
Karl-Schmid-Str. 4
CH - 8006 Zurich
fabio.wegmueller@uzh.ch

Samuel van Willigen
InSitu-Archéologie SA
Rue Oscar Bider 54
CH - 1950 Sion
Samuel.vanWilligen@institu-archeo.ch

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