

die Bebauung vorhandenen Platz abhängig sei. Damit müssen wir uns teilweise einverstanden erklären, ich weise jedoch darauf hin, daß die sich annähernd wiederholende Orientierung der Häuser, die mehrmals an ein und derselben Stelle wiederaufgebaut wurden, von der frühesten Siedlung ihren Anfang nimmt, in der die Orientierung wahrscheinlich in Erwägung regionaler und überregionaler Gründe absichtlich gewählt wurde. Dem Autor zufolge gibt es indessen keinen Grund zur Annahme, daß derartige Voraussetzungen, vor allem klimatisch bedingte, irgendeine Rolle bei der Orientierung der Bauten gespielt haben. Mit der Allgemeingültigkeit dieser Schlußfolgerung kann ich mich nicht einverstanden erklären. Sie widerspricht den bereits von anderen Forschern publizierten Beobachtungen (Lichter erwähnt sie nicht, obzwar das Literaturverzeichnis die entsprechenden Titel enthält), wie auch der von mir (1992) vorgenommenen eingehenden Analyse der Orientierung des großen Hauses von Slatina-Sofia.

Die Angaben des Verfassers bringen nichts Neues für die Diskussion über die Herkunft der Langhäuser aus der Kultur der Linienbandkeramik in Mitteleuropa (S. 77–80), und darum enthalte ich mich des Kommentars zu diesem letzten Teil des Buches.

Das rezensierte Buch ist das Ergebnis einer weitangelegten Sammeltätigkeit des Verf., indessen ist die in den Publikationen vorhandene Information nicht immer präzise genug entnommen. Eine synthetische Erforschung der Angaben über das neolithische und chalkolithische Bauwesen in Südosteuropa ist notwendig, allerdings gestatten es mir die bereits gemachten Bemerkungen nicht anzunehmen, daß die rezensierte Untersuchung diese Notwendigkeit befriedigt. Es wurde auch die Möglichkeit vertan, eine funktionierende Klassifizierung der prähistorischen Bauten aus der untersuchten Region zu schaffen. Immerhin muß ich meine Erwartung betonen, daß das Buch von C. Lichter das Interesse an einer eingehenderen und präziseren Untersuchung der neolithisch-chalkolithischen Architektur in Südosteuropa wecken wird.

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STEPHEN J. SHENNAN, Bronze Age copper producers of the Eastern Alps: excavations at St. Veit-Klinglberg. With contributions by T. Acott, C. E. Buck, R. Evershed, F. J. Green, R. Gale, W. Günther, K. Knowles, A. J. Legge, C. D. Litton, H. Moesta, R. Mrazek, W. H. Paar, A. Quinlan and H. P. Romanow. Universitätsforschungen zur Prähistorischen Archäologie, Band 27. Aus dem Institut für Ur- und Frühgeschichte der Universität Wien. In Kommission bei Dr. Rudolf Habelt GmbH, Bonn 1995. ISBN 3-7749-2731-6. 397 pages, 133 figures, 27 plates, 5 appendices, summary in German.

From Thomsen and Worsaae to Reinecke, Childe, and beyond, the production and use of metal has played an eminent role in modeling the development of the later European prehistory. In recent surveys of the Central European Early Bronze Age (particularly, in the two articles published in 1993, one in the *Journal of European Archaeology*, the other in the *Journal of World Prehistory*), Stephen Shennan has argued that metallurgy was related to the processes of social and economic change in a rather oblique way. This period witnessed the overcoming of technological limitations imposed by the oxide-ore oriented metallurgy of the Copper Age. Techniques were developed to smelt the sulfide ores, allowing the exploitation of large new sources. This, coupled with the more-or-less contemporary development of tin bronze, eventually led to production, availability and utilization of metal on a much greater scale.

One of the assumptions underlying Shennan's argument is that, as the new technology became available, copper could not be readily monopolized in the regions that contained the main ore sources. Mining and smelting were carried out by small, autonomous groups, motivated by economic gain. The key to the change was that metal underwent a process of commodification. Political centralization and control followed some time later during the course of the Bronze Age.

In "Bronze Age copper producers of the Eastern Alps: excavations at St. Veit-Klinglberg", Shennan presents the results of a multidisciplinary field project which provided a substantial part of the information upon which his model of evolution of the Central European Early Bronze Age has been based. Roughly three quarters of the book are devoted to description and analysis of the data recovered by the excavation. The remaining part places the site in its regional context and relates it to the wider issues of the Bronze Age research. The analyses occasionally supply more detail than the original model can accommodate, prompting its elaboration and modification. They highlight a few areas where further investigation will be necessary before a focused picture can be obtained. These, I believe, are clear signs of useful and illuminating research.

The Early to Middle Bronze Age hilltop settlement of Klinglberg is located near St. Veit, in the Alpine valley of the Salzach, some 50 km south of Salzburg, at the southern edge of the Mitterberg ore region. About one fifth of the entire site was exposed over the course of five seasons (1985–1989), some 700 m² according to figure 2.1 (the exact size of the excavated area is not reported). Chapters 2 to 10 constitute a detailed excavation report, organized under topics such as methodology, stratigraphy and dating, description of excavated areas and structural remains within them, analyses of pottery and other categories of artifacts, as well as of environmental and subsistence-related data.

Much attention and technological refinement (including stratigraphic excavation and computer-aided Harris matrix construction) was invested in disentangling the stratigraphy, an unrewarding task on a site which has been heavily affected by erosion and colluviation. Similar can be said of the thoughtfully designed and thoroughly carried out radiocarbon dating program (a contribution by Buck, Litton and Shennan), which relied on AMS dating of short-lived samples: the kinks in the calibration curve that occur during the first half of the second millennium B. C. are responsible for relatively imprecise absolute dates. Bayesian statistics were used to combine radiocarbon determinations with stratigraphic information for the greatest possible accuracy. It is sobering to see that despite all the care, technology, and analytical sophistication, one is still left with wide temporal margins (roughly between 1800 and 1400 B. C.) within which to fit the two main occupation phases of Klinglberg. In conventional terms, the earlier phase belongs to the final part of the Early Bronze Age, the later phase to the Middle Bronze Age.

Several independent lines of evidence suggest that most areas within the site were used for generalized domestic activities during both occupation phases. Architectural remains are fairly modest. The settlement consisted of a number of domestic units, each organized in a similar way. Post-built houses characterized the earlier phase, while building technique apparently changed to structures on sleeper beams during the later phase. It seems that the 100 m long and 2 m wide dry-stone wall, that enclosed the settlement on its most accessible side, also was erected during the later phase.

Knowles and Quinlan provide the compositional, technological, formal, functional and spatial analysis of pottery. The assemblage consists of over 50 000 shards, most of which belong to a locally made, slag-tempered coarse ware. Petrologic and neutron activation analysis show that a small fraction of shards are extraneous, coming from vessels that may have been imported from the area around Passau on the Danube.

Why slag was used for temper is an interesting question, especially since Knowles and Quinlan dismiss purely functional reasons for it (although it does not seem, from what is written, that all possibilities of functional explanation have been exhausted). Two non-functional explanations are proposed instead: that it was an expression of the copper producers group identity, and/or sympathetic magic. The first seems unlikely, because, once a vessel is made, the temper remains invisible, and as such it is not at all a suitable medium for carrying and transmitting social information. The second implies that the Klinglberg potters believed that slag, coming from fire, would magically improve thermal properties of the pottery: an attractive hypothesis, but one extremely hard to test archaeologically.

While the evidence of on-site metallurgic activities is scarce, the use of copper-smelting slag as temper, as well as the common presence of fragments of raw copper, clearly link the inhabi-

tants of Klinglberg to copper production. The list of other non-pottery finds is rather short and unimpressive. Shennan ascribes great importance to a single amber bead find, which he considers a direct piece of evidence for the long-presumed but seldom demonstrated copper-for-amber exchange.

Green, Legge, Gale and Evershed provide summaries of various categories of environmental and subsistence-related information (macrobotanical, faunal, and organic residual analysis). Of particular interest is the indication that cereals were regularly consumed at the site, but apparently were not processed there. This suggests that staple foods were imported into the settlement, which would have major implications for organization of production and economy in general.

In Chapter 11, the focus of attention shifts from the site proper to the Mitterberg copper ores and their exploitation. This chapter, like the preceding one, consists of a series of short contributions. Günther discusses the mining history, with the specific focus on the vicinity of Klinglberg. Pare and Mrazek describe the mineralogy of the ore sources. Based on compositional analyses of slags and raw copper fragments, Moesta investigates the smelting process, while Romanow sources the raw metal to a number of different mineralisation zones within the Mitterberg region.

In the final two Chapters (12 and 13), Shennan pulls together the most relevant information provided by different lines of archaeological evidence (Chapter 12, translated into German, serves as the summary of the book). He carefully constructs the picture of Klinglberg as one of several small communities of women, men and children, engaged in copper production, with little sign of wealth or social differentiation, but with multiple exchange links to the outside world. The evidence may be somewhat tenuous in certain details (for instance, in demonstrating the presence of women at the site), but is quite robust regarding all main issues. He then proceeds to place the site into its wider spatial and temporal context. His discussion is an extension of the ideas already referred to at the beginning of this review. It revolves about three inter-related issues that are of crucial importance for the understanding of the European Bronze Age: advances in metallurgy, economic organization and social change.

Shennan argues that the settling of the upper Salzach valley constitutes a part of a wider pattern of population expansion that took place during the later part of the Early Bronze Age. This overall growth of consumer population made copper production economically worthwhile. Motives for production became increasingly commercial (the replacement of "ring ingots" by "rib ingots" may be reflecting the shift in value of metal from primarily "symbolic" to primarily "commodity"). Shennan presumes economic specialization of the Klinglberg copper producers, whose basic subsistence needs were met partially through exchange of their products for food. Whether they were employed in metal production full-time, part-time, or seasonally, is an archaeologically elusive issue. Output estimates, although speculative, suggest that Mitterberg was indeed an important copper producing region.

Economic viability of copper production is seen as closely related to technological advances in metallurgy. The short-lived exploitation of the Mitterberg around 3000 B.C. was restricted to small quantities of oxide ore that were soon exhausted. When exploitation was renewed around 2000 B.C., it involved smelting of sulfide ores, which implied that mining had gone beyond the weathered ore of the surface zone. The smelting process itself remains open to argument. Compositional analyses suggest the employment of a relatively simple "slagging" procedure which allowed use of lower grade ores and reduced chalcopyrite directly to metal, rather than the technologically more complex and demanding, strongly reducing "matte" process.

The Early Bronze Age evidence contradicts the assumption that a social elite could easily monopolize this production and use it as a power base. To the contrary, neither the access to the ore sources, nor the production of metal, seem to have been controlled by a central authority. Defensive location and fortification of small settlements suggests raiding among independent, competitive communities. For a while, it seems, the Early Bronze Age metal producers were able to pursue their own interests without coercion.

By the end of the Middle Bronze Age, the hilltops were abandoned and the settlements re-located into the valleys. Copper mining continued during the Late Bronze Age on an even larger scale. Among the different stimuli which may have contributed to this shift in settlement pattern, Shennan singles out social integration under the authority of powerful "chiefs" as the most likely explanation.

"Bronze Age copper producers of the Eastern Alps" is a worthy contribution to the field of later European prehistory, in aspects that range from specific to general. For those working in the region, it represents another well-documented element that now can be used in modeling regional developments. A number of professional specialists (particularly those interested in mining and metallurgy, pottery analysis, paleobotanical remains, and radiocarbon dating) will find a host of welcome information, as well as exemplary analytical approaches. Finally, for those that are more generally interested in the later prehistory of Europe, Shennan and his collaborators put some interesting new twists on how we may look at the emergence of the Central European Bronze Age.

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ZDENKO ŽERAVICA, *Äxte und Beile aus Dalmatien und anderen Teilen Kroatiens, Montenegro, Bosnien und Herzegovina*. Prähistorische Bronzefunde, Abteilung IX, Band 18. Franz Steiner Verlag, Stuttgart 1993. ISBN 3-515-05926-1. 136 Seiten, 49 Tafeln und 1 Karte.

Der achtzehnte Band der Abteilung Äxte und Beile der Reihe Prähistorische Bronzefunde ist einem der Forschung schwer zugänglichen Teil der Balkanhalbinsel gewidmet. Die Kupfer-, Bronze- und Eisenfunde werfen neues Licht auf die Problematik der frühen ostadriatischen Metallurgie. Wichtig ist, daß im Band nicht nur die Erzeugnisse der frühen Metallproduktion, sondern auch zahlreiche Gußformen vorgelegt werden, was auf das Vorhandensein lokaler Metallurgiezentren schließen läßt.

Die Zeitspanne des erfaßten Fundgutes ist sehr breit und reicht von der Kupferzeit bis in die Eisenzeit. Die frühe Kupferzeit scheint in den behandelten Gebieten nicht besonders metallreich gewesen zu sein, zumal nur wenige Metallgeräte der Typen Pločnik, Čoka, Cresztur und Nádudvar (mit Marken) im Band Platz gefunden haben. Zum Teil gehören sie der Vinča-Pločnik-Stufe an, zum Teil der darauffolgenden Zeit. Am Fluß Vrbas entlang verläuft, dem Autor zufolge, die westliche Grenze des Verbreitungsgebietes des Typs Pločnik. Bekanntlich stammt das östlichste Fundstück dieser Art aus dem Hortfund von Karbuna in der Nähe von Kişinev in der Moldau. Hiermit ist ein ziemlich umfangreicher Verbreitungsbereich umrissen. Es ist auffallend, wie wenig differenziert die Typologie der frühesten Hammeräxte im ganzen Gebiet ist. Das deutet darauf hin, daß die ersten Schwergeräte vom Typ Pločnik wahrscheinlich einem einzigen, wenn gleich heute nicht bekannten Produktionszentrum entstammen. Weitere Metallurgiezentren sind aber kurz danach auf der ganzen Balkanhalbinsel entstanden, da uns schon zur Gumelnița-Zeit eine Vielfalt an Hammeräxten und Schwerbeilen entgegentritt. Kurz danach, schon in der Bodrogkeresztúr-Zeit, kommt es wieder zu einem überregional ausgeglichenen typologischen Bild.

Das im Band erfaßte Fundgut der Hochkupferzeit ist zahlreicher und mannigfaltiger, was dem bekannten Metallurgierekord um 3800 B. C. entspricht. Kreuzschneidige Hammeräxte der Typen Jasladany und Kladari sind vertreten. Der Typ Ariuşţ scheint den Westen der Balkanhalbinsel nicht erreicht zu haben.

Die frühesten Schaftlochäxte kommen im Westen der Halbinsel bereits in der klassischen Vučedol-Zeit vor. Der interessante Typ Baniabic, im Norden des Arbeitsgebietes verbreitet, wird als eine Ausgangsform für die lokale Entwicklung der Schaftlochäxte angesprochen. Eine weitere lokale Variante der Schaftlochäxte, der Typ Corbasca, ist für Mitteldalmatien kennzeichnend.