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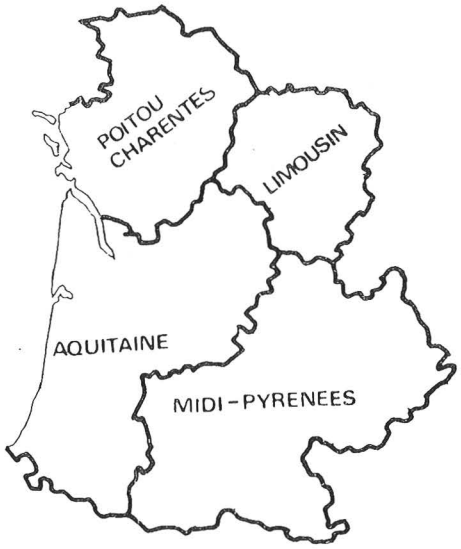

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et de José Gomez de Soto

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Peter HINTON

AN ANALYSIS OF BURIAL RITES AT MÜNSINGEN-RAIN: AN APPROACH TO THE STUDY OF IRON AGE SOCIETY

The La Tène cemetery of Münsingen-Rain, Knolfingen, near Bern is well known for the horizontal stratigraphy used by Hodson [1] to construct a chronology for La Tène artifacts. It seems likely that as well as the temporal variability visible in the contents, layout and structure of the graves, there is an additional social dimension in this and other iron age cemeteries. This was investigated using Hodson's catalogue [2].

Near the famous Münsingen-Rain cemetery is a smaller cemetery Münsingen-Tägermatten: for convenience "Münsingen" below is used to refer only to the Münsingen-Rain site.

THE POTENTIAL OF IRON AGE CEMETERIES

The theory that analyses of cemeteries can lead to an understanding of the social and economic systems and the structure of societies that used them is based on the assumption that people who are treated differently in life are treated differently in death. There is, of course, a vast body of data to support the assumption, but to reach the goal it is necessary to link anthropological theory with the archaeological record [3].

Anthropologists and archaeologists have put forward many arguments for the differences in mortuary practices, a catalogue of the more significant of which has been published by Binford [4]. Seen at its most basic level, burial is a way of getting rid of a potentially unpleasant piece of refuse — the body. Even if this were to be the only aspect of inhumation, there would be scope for variability, for example, due to the environmental conditions at the time of death.

The cause of death may be a significant factor; in war it may not be possible for a community to afford the individual the burial rites he would normally have received. This is particularly so in the case of a mass death, whether it be through war, as with the 34 skeletons at Maiden Castle [5], or other means.

The two most obvious determinants of social relationships, at the same hierarchical level, are sex and age. Binford states that in a survey of 40 non-state organised societies the differentiation due to sex is markedly distinct from that due to other aspects [6], presumably because only recently has sex ceased to be the primary determinant of the division of labour. In the iron age, male and female burials have been found in separate areas at Andelfingen [7], and separate ceme-

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1. F.R. HODSON, The La Tène Cemetery at Münsingen-Rain, *Acta Bernensia* 5 (1968) 5-168.

2. *Ibid.*

3. C.S. PEEBLES, Moundville and surrounding sites: some structural considerations of mortuary practices II, *in* J.BROWN (ed.) *Approaches to the Social Dimensions of Mortuary Practices,* 68-91. Memoirs of the Society for American Archaeology 25 (1971).

4. L.R. BINFORD, Mortuary practices: their study and their potential 11, *in* J. BROWN (ed.) *op. cit.,* 7-29 (*cf.* note 3).

5. R.E.M. WHEELER, *Maiden Castle, Dorset.* Reports of the Research Committee of the Society of Antiquaries of London 12 (1943), 35 ff.

6. BINFORD, *op. cit.* (*cf.* note 4).

teries at Gross Romstedt [8]. At Dreitzsch men were cremated on beech pyres, and women on pine (excavations by K. Simon). That age is also important is shown by the fact that older members who are no longer active in the society of some ethnic groups may not receive proper burial rites [9], and that children are often buried in a place apart or are mourned differently from adults [10]. An example of differential burial rites due to age is found at Dreitzsch, where some young women or older girls were buried with a red-painted mussel shell.

However, sex and age are not the only factors on which social status depends. The other contributory aspects towards social position are not usually immediately visible, but have to be indicated by symbols. Social personality as defined by Radcliffe-Browne [11] is the sum of qualities by which an individual affects society: these may include special skills and talents or other personal attributes, but in more complex systems is composed of artificially derived status. Since status in death should vary directly with the deceased's status in life, symbols present in the grave or the treatment of the body, if understood, will give the archaeologist information on the social position of the occupant whilst alive. The reason for the equation between status in life and death is the duty-status relationship; the more important a person has been in supporting the society, the greater are the obligations felt by the survivors and the greater is the expenditure of energy and the disruption of the subsistence routine by the community [12].

Status systems can be subdivided into those that operate vertically and those that operate horizontally. Vertical systems are those where different social groups are ranked one above the other; horizontal systems are those where different social groups have no organised difference in rank, e.g. task groups, professions and sodalities [13], or individual units produced by segmentary descent systems [14].

In cemetery analysis vertical systems can be identified, as they are usually characterised by uneven distributions of wealth and expenditure of energy on the burial rite, as well as a "pyramidal" (or "conical") shaped society, with only a few prestige burials, and increasingly large sub-populations at descending levels of status. A ranked society should contain a "superordinate dimension" of groups marked by symbols and differential energy expenditure, but unrelated to age or sex, and a "subordinate dimension" of groups similarly designated but whose composition in this case is primarily based on age and sex differences [15]. A stratified society — one where the hierarchy is controlled by differential rights of access to resources and of coercion — also contains both these dimensions.

Horizontal systems are less easy to identify, particularly those components which are produced by segmentary descent systems. These are often marked only by bounded areas for burial [16] which may be recognised by a recurrent artifact type or an orientation different from other parts of the cemetery. As this has not been tested on archaeological cases or on contemporary European societies, the difficulty remains. Because burial rites vary greatly between communities, and similar rites may have very different meanings in different ethnic groups, individual postulates are required for each society [17]. An apparent circular difficulty emerges here; that in recons-

7. U. SCHAAFF, Zur Belegung latenzeitlicher Freidhofe der Schweiz, *Jahrbuch des Romisch-Germanischen Zentralmuseum (Mainz)* 13 (1966) 49.

8. R. HACHMANN, Die Chronologie der jungeren vorromischen Eisenzeit: Studien zum Stand der Forschung im nordlichen Mittel-Europa und Skandinavien, *Bericht der Romisch-Germanischen Kommission* 41 (1960) 1-275.

9. BINFORD, *op. cit.*, (*cf.* note 4).

10. A.R. RADCLIFFE-BROWN, *The Andaman Islanders* (1933). Glencoe, Illinois.

11. *Ibid.*

12. BINFORD, *op. cit.* (*cf.* note 4).

13. J.A. TAINTER, Woodland social change in west-central Illinois, *Mid-Continental Journal of Anthropology* 2 (1977) 67-98.

14. J.A. TAINTER, Spatial organisation and social patterning in the Kaloko cemetery, North Kone, Hawaii, *Archaeology and Physical Geography in Oceania,* 11 (1976) 67-98.

15. C.S. PEEBLES et S.M. KUS, — Some archaeological correlates of ranked societies, 431 ff, *American Antiquity*, 42 (1977) 421-448.

16. TAINTER, *op. cit.* (*cf.* note 14).

17. T.K. EARLE, Reply to "The social anthropology of a neolithic cemetery in the Netherlands" by P. VAN DE VELDE, 51 *Current Archaeology* 20 (1979) 37-55.

tructing a society from the ways in which it buries its dead, one should have some knowledge of the society in order to interpret those rites. Examination of a few isolated graves is insufficient; for this a perspective of the range of possible funerary practices is necessary. Therefore all the graves at Münsingen were used in the following analyses. Illustrations justifying this may be found in the cautionary article by Ucko [18].

Fortunately it appears that there are some general similarities between the type of society and the forms of the funerary practices. Binford's survey demonstrates that the average number of dimensions (such as age, death, cause of death, social position and affiliation) which are symbolised may be related to the subsistence strategy [19].

The burial rite is more than a ceremony comemmorating the loss of a member of the society; it is also initiation rite for the deceased's admission into a new society — the dead. Gluckmann explains that "the belief in survival after death is not a response of the individual to death. It is accepted as part of his social heritage and must therefore be related to mortuary and other social customs" [20]. Most rites are ceremonies representing changes of status [21], and there can be little doubt that the rite of passage into the after world in the most profound status change an individual undergoes. For this reason funerary practices include a greater range of attributes of the deceased's social persona than any other ceremony in life; and because the social persona is composed largely of social identities attained through membership of the components of a social system, the burial rites contain the best information for the archaeologist about this social system.

As the status change at death is a significant one, the behaviour change associated with it is very marked. Death has given the individual a new character by the act of touching him, and often causes him to be the treated with dread and horror, and to be associated with danger. This pollutes his possessions as well [22] which may be another reason for the burial of some personal artifacts as grave goods. Often strong emotional connections may be made by the mourners between the deceased and certain possessions, which are best disposed of in this way [23]. In other cases it may well be that grave goods are a bribe to stay dead [24].

Symbols are used as badges to mark the social group to which the deceased belongs; for example at Hallstatt it seems likely that the fibulae have the most important "heraldic" function [25].

Symboling is "the assigning of meaning to form" [26]: the selection of symbols for groups is arbitrary, and varies greatly between peoples, as they need only be known to the population which is to encounter them — of which the group is a part. Fortunately there are some similarities between types of symbols and the aspects to which they refer; these have been tabulated by Binford [27].

Grave-goods tend to have more diverse significance than other symbols in the burial rite, yet some generalisations can be made. Artifacts have been considered as falling into three broad categories: *technomic* items are utilitarian tools and weapons; *sociotechnic* artifacts are primarly symbolic, distinguishing between groups or individuals, e.g. jewellery; and *ideotechnic* items are idols and representations of deities etc. [28] Technomic artifacts could be considered to represent the contribution of the individual to society, by identifying his vocation, or to represent the community's

18. P.J. Ucko, Ethnography and archaeological interpretation of funerary remains, *World Archaeology* 1 (1969) 262-280.

19. Binford, *op. cit.*, table 2 (*cf.* note 4).

20. M. Gluckmann, Mortuary customs and the belief in survival after death among the south-eastern Bantu, *Bantu Studies* 11 (1937) 117-136.

21. A. van Gennep, *The Rites of Passage* (1960). London.

22. R. Hertz, *Death and the Righ Hand* (1960). Aberdeen.

23. Ucko, *op. cit. (cf.* note 18).

24. Binford, *op. cit. (cf.* note 4).

25. F.E. Barth & F.R. Hodson, The Hallstatt cemetery and its documentation: some new evidence, *Antiquaries' Journal* 56 (1976) 159-176.

26. Binford, *op. cit.*, 16 (*cf.* note 4).

27. *Ibid.*, table 4.

28. L.R. Binford, Archaeology as anthropology *in* L. Binford (ed.), *An Archaeological Perspective* (1972) 20-32. New York.

gift from gratitude; whereas sociotechnic items indicate his social personality or position [29]. Furthermore, a study of the sociotechnic assemblage of a cemetery should lead to an understanding of the social structure, because there is a "direct relationship between the nature and the system of status grading within a society and the quantity, form, and structure of sociotechnic components of its archaeological assemblage" [30].

There are some types of symboling through grave-goods which must be examined at a different level. Quantity is obviously significant where it is related to the wealth of the individual or the duty-status obligations of the society; but it may also be that amongst some peoples certain numbers may be of importance. Recurrent motifs may occur on several types of object (both technomic and sociotechnic), indicating status, kin group or social affiliation [31].

Perhaps the greatest problem of all is the incalculable, but presumably large, proportion of the perishable grave-goods of which the archaeologist finds no trace.

METHODS

In order to interpret the symboling in cemeteries, many attributes must be studied. The attributes that can be considered are infinite in number, and their selection is crucial. The classification of individual burials into a vertical or horizontal scheme of social groupings can be compared with the construction of artifact typologies inasmuch as the method, approach and resulting subdivision of populations may be greatly influenced by preconceived ideas of the factors responsible for the groupings.

In the case of Münsingen cemetery a small amount of attribute selection has already been carried out by the excavators through their choice of which aspects of the grave to record. The analysis of cemetery material is only really practical with the use of computer methods [32] which allow such a large a body of data to be processed with comparative ease, speed and cheapness. The coding of the Münsingen catalogue published by Hodson [33] into a form that can be stored and handled by a computer itself involves a degree of selection. In a recent study by Redman, [34] the need for a systematized attribute selection is emphasized, with a warning that however disciplined the approach may be, it is based on knowledge of similar material, insights into the relevance of the attributes of the study, and observation of the patterning already visible in the data. A flow diagram [35] summarises a proposed approach based on Clarke's modification of the term "attribute". He refers to three types: *inessential attributes,* which do not vary greatly with respect to any interpretative dimension: *essential attributes,* which vary considerably with respect to at least one interpretative dimension; and *key attributes,* which are groups of essential attributes which covary [36]. Redman's approach involves the formulation of a model of attributes expected, on the basis of similar work in the field, to be relevant to the study, and the combination of this model and the attributes showing apparent patterning with any interpretive framework (at Münsingen date, cemetery position, age or sex) on preliminary bivariate analysis. This should give a list of essential attributes: the result of which can be used to refine the original selection before cross-tabulating to identify key attributes. Cursory examination of their patterning enables further amendment to the selection at the beginning of the system.

The technique used for this study was similar to Redman's in approach, though varying in detail. The original coding format was designed by Dr John Collis in collaboration with students at Sheffield University, on the basis of published iron age cemeteries.

29. L.R. Binford, Galley Pond Mound *in op. cit.*, 390-420 (*cf.* note 28).

30. Binford, *op. cit. (cf.* note 28).

31. J.E. Doran, Computer analysis of mortuary data from the La Tène cemetery at Münsingen-Rain, *in* F. Hodson *et al.* (eds) *Mathematics ion the Archaeological and Historical Sciences* (1971) 422-431. Edinburgh.

32. S. Shennan, The social organisation at Branc, *Antiquity* 49 (1975) 279-288.

33. Hodson, *op. cit.* (*cf.* note 1).

34. C.L. Redman, Multivariate artifact analysis: a basis for multidimensional interpretations, *in* C. Redman (ed.) *Social Archaeology: Beyond Subsistence and Dating* (1978) 159-192. New York.

35. *Ibid.*, fig. 8.3.

36. D.L. Clarke, The beaker network — social and economic models, *in Glockenbechersymposion* (1976) 459-476. Bussum/Harlem.

This format was not entirely suitable for the data from Münsingen, because of the variability in the burial rite in iron age Europe and the different presentations and standards of cemetery excavation reports, and was therefore redesigned to favour the Münsingen catalogue while remaining compatible with other site reports [37]. Observation of this latter restriction may well have been an error.

The codified data were stored on file to be processed by Sheffield University's ICL 1906s computer. Most of the descriptive and basic analytical statistics were performed using subroutines in the Statistical Package for the Social Sciences (SPSS), version 5.

Some attributes did not vary greatly with any interpretive dimension because they occurred in only a few graves, with differing values. These could not be disregarded because they may refer to the presence of artifacts of symbolic importance which were afforded to a restricted portion of the community; therefore comparison with other cemeteries, and simple examinations of correlation with other variables, the significance of which was tested Chi-squared and Fisher exact tests, were used before rejecting rare attributes. Another test was that of assessing the variability of each attribute, inessential attributes being those with the lowest coefficient of variation. Again the rare values may be of significance, and for this reason these variables were not automatically rejected, although the approach was followed more rigidly in the preparation of data for the clustering program.

One of the attributes used is recorded in wealth units. This variable *wealth* is an approximate measurement of the richness of the artifacts in the grave. This is not the same thing as a measurement of the wealth of the individual buried, though if the arguments outlined briefly above are accepted it can be seen that there should be a good correlation between the relative scores of wealth-units and the economic positions of the individuals in life. Clarke suggests that the expense of an item is determined by the availability of the raw materials, or in the case of foreign manufacture, the finished article, and by the ease with which it can be made [38]. Ease of manufacture is best measured in man-hours. In the assessment of a wealth score for each artifact these two components were taken into consideration, though no complex calculation was undertaken: this would have been unjustified in view of the fact that, for example, fibulae were subdivided according to material alone, and it was assumed that all brooches from each of these subdivisions took equally long to make, and involved the use of equal amounts of metal. In fact there is considerable variability in the size and complexity of most classes of artifacts buried at Münsingen, but to attempt to quantify this would result either in unnecessary detail or a false appearance of accuracy. Another complication, outside the framework of Clarke's approach, is that if, say, an iron age site was in an area where iron was more difficult to obtain than bronze, an iron object would score more than an identical bronze object, unless the object was not normally constructed of bronze. For example a bronze sword would have been of more value than an iron one because of its scarcity; and probably would have had some symbolic function. The only way that such an occurrence could be explained by Clarke's theory is by assuming that more man-hours would have been involved in the item's manufacture because the sword-smith was unused to working in bronze. Fortunately the problem does not arise at Münsingen. The allocation of wealth-units for individual artifacts is shown in table 1.

An alternative method of estimating wealth that has been suggested is a count of the different materials in the grave: silver, bronze, iron, etc. This method is considerably quicker to use than the wealth-scores, but gives a less precise result — although it may be argued that the wealth-scores are over precise. Both techniques were applied to the Münsingen data and the results for each case compared: a correlation of $r = 0.74984$ ($p = 0.00001$) was found, with most of the discrepancy in the poorer graves, where it could be seen that the more informative results were given by the wealth-score. For this reason wealth-units were chosen as the means for assessing wealth in the subsequent analyses.

Forty-three of the attributes were chosen for input into a clustering program. A wide choice of such programs is now available, and the choice of a suitable one is dependent on the form and nature of the data,

37. P.J. HINTON *The Society Buried in the La Tène Cemetery at Münsingen-Rain* (1980) 74 ff. Unpublished B.A. thesis: University of Sheffield.

38. CLARKE, *op. cit.* (*cf.* note 36).

	Material:									
	iron	bronze	silver	gold	electrum	iron and bronze	iron bronze and coral	glass	amber	shale
Artifact:										
fibula	2	3	—	—	—	3	4	—	—	—
torc	3	4	—	—	—	—	—	—	—	—
bracelet	2	3	—	—	—	—	—	2	—	3
armlet	2	3	—	—	—	—	—	—	—	—
anklet	2	3	—	—	—	—	—	3	—	—
finger ring	1	2	4	7	—	—	—	—	—	—
chain belt	4	6	—	—	—	—	—	—	—	—
belt hook	1	2	—	—	—	—	—	—	—	—
bead	1/3	1/2	2	4	3	—	—	1/5	1	—
stud	1	2	—	—	—	—	—	—	—	—
sword	7	—	—	—	—	—	—	—	—	—
sword-ring	1/3	—	—	—	—	—	—	—	—	—
scabbard	4	5	—	—	—	—	—	—	—	—
spear (fittings)	5	—	—	—	—	—	—	—	—	—
shiled (fittings)	6	7	—	—	—	—	—	—	—	—
axe	5	—	—	—	—	—	—	—	—	—
pin	1	2	—	—	—	—	—	—	—	—
	bovine bone: 1									

Table 1 : Allocation of wealth-units by artifact type and material

and the extent of the user's faith in the statistical validity of the various examples. There seems to be little agreement between mathematicians and statisticians on the accuracy and reliability of the selection, which leaves the archaeologist in a difficult position. Tainter made a valuable contribution to the attempts to overcome this difficulty with his paper documenting the successes and failures of clustering programs on mortuary data [39].

The start of these statistical classification procedures is the similarity or distance matrix. This can comprise a tabulation of recurring associations between artifacts in graves [40] or of recurring associations between types of interment [41]. The similarity coefficients contain all the basic information which the analyses summarize and clarify in different ways; and the choice of similarity matrix is determined by whichever "best expresses what one regards as important similarities or differences in the data" [42]; in other words trial and error as well as some degree of prejudgement must play their part. However many types of programs could be rejected because of limitations in the techniques used for the construction of similarity matrices, which precluded their use on the Münsingen material. The most commonly available clustering package available in Clustan, which although it appears in several different forms, always relies on a variety of similarity or distance matrices which can be generated only from numeric or binary data. The data as coded from Münsingen were in all four of the pos-

sible forms: numeric (e.g. number of fibulae), binary (e.g. presence/absence of gold artifacts, male/female), ordered multistate (e.g. age groups, date range) and unordered multistate (e.g. codes for locations in the grave, material of artifacts). There are similarity matrices which can manipulate data in numeric, unordered multistate and binary forms, and are not greatly sensitive to ranked data being input as numeric. The most well-known of these is Gower's similarity coefficient. This is included in at least two published programs.

Mather has published a program for principal coordinates analysis using Gower's coefficient [44] (matrix E) which uses this technique [45]: this was eventually chosen as the one most suitable for the Münsingen material. I am grateful to Roger Richards of Sheffield University Computing Services for transcribing this program for use on the University's 1906s computer, and for modifying it to suit the large number of cases involved. Unfortunately a number of complications arose with the incompatibility of the program structure and the George 4 operating system controlling the computer, and with the abundance of identical values (recording absence of various artifacts). As a result this program was terminated with the output of the distance matrix. This was then fed into Clustan by the Disting parameter [46].

The choice of analysis of the matrix again depends on the form of the data. A polythetic technique was chosen; that is, one which allows many values for each attribute. These approaches are usually agglomerative: starting with as many clusters as cases, and progressively reducing them according to the closest link between cases and groups of cases. The mode of linking can take several forms. *Complete linkage* dictates that juncture occurs when the joining case's attributes reach a threshold of similarity with those of all the cases in an existing cluster. Tainter suggests that there are significant possibilities for this approach but it appears to need refining as some otherwise linking attributes may be eclipsed by a body of others that do not conform to each other [47]. *Single linkage* binds clusters together on the basis of similarity at the desired level of the attributes of any case in the sets. Doran and Hodson (1975) find this approach usually to be unsuccessful [48]. *Average* linkage derives clusters according to the average similarity between the attribute values of a group and its potential new member. This method produced results which were difficult to interpret as extensive stringing occurred. *Ward's method* (error sum of squares), a hierarchical agglomerative technique was also used to analyse the matrix produced by Gower's coefficient, but the resultant clusters were unrelated to any perceivable groups. Since the earlier cluster arrays are identical in both the latter analyses it seems likely that the fault lies with the distance matrix, and that Mather's program is unsuitable for data of this sort.

Factor analysis has become increasingly popular amongst archaeologists recently, largely because of its inclusion in statistical packages. Once again there is the problem of data forms, as outlined by Gowgill: "First, one cannot calculate a correlation coefficient for variables which can only be categorized or given rank, rather than being measured or counted. With those variables which can only be given a rank, order, there is a temptation to treat them as *if* the rank scale were a measurement scale, since they can be handled by the enticingly easy programs for factor analysis, This is by no means necessarily a bad procedure, and it often gives substantially correct results... but it does demand caution [49]." Factor analysis, with Varimax rotation, was applied to a selection of attributes

39. J.A. Tainter, Social inferences and mortuary practices: an experiment in numerical classification, *World Archaeology* 7 (1975) 1-16.
40. Barth et Hodson, *op. cit.* (*cf.* note 25).
41. Tainter, *op. cit.* (*cf.* note 14).
42. G.L. Cowgill, Archaeological applications of factor, cluster, and proximity analysis, 370, *American Antiquity*, 33 367-375.
43. S. Shennan, pers. comm.
44. P.M. Mather, *Computational Methods of Multivariate Analysis in Physical Geography* (1976) 402-406. London.
45. *Ibid.*, 330-331.
46. See D. Wishart *CLUSTAN User Manual (Version 1C)* (1978). Edinburgh.
47. Tainter, *op. cit.*, 5 (*cf.* note 14).
48. J.E. Doran et F.R. Hodson *Mathematics and Computers in Archaeology* (1975). Edinburgh.
49. Cowgill, *op. cit.*, 371-372 (*cf.* note 42).

recording artifact positions (unordered multistate) at Münsingen, producing apparently reasonable results, largely confirmed by the cluster program eventually used. This was generated by converting data concerning 28 attributes into a binary form — presence/absence in the case of artifacts, "extended"/"other" in the case of limb arrangement and flexion, "facing up"/"other" in the case of head position, "disturbed"/"undisturbed", etc. These data were input into Clustan and grouped by Ward's method.

POPULATION

In order to place the community which buried its dead in the Münsinger-Rain cemetery in some sort of perspective it is necessary to know its size. 226 graves were discovered in the course of all the excavations. 43 of these were pits containing no grave-goods or skeletal material, but were interpreted as graves for three reasons: because their shape and size was within the range of known graves, because burial without artifacts was a common rite at Münsingen, and because preservation of bone is frequently poor owing to the adverse soil conditions of the cemetery. A less justifiable assumption was that each of these graves contained a single corpse. Of the grave containing skeletal material, there were eleven with two corpses and one with three; multiple graves thus representing 6.6% of those with bones surviving. On this basis perhaps three of the empty graves should be assumed to have contained more than one individual, but since it cannot be absolutely certain that all of these pits were graves it seems sensible to work on the principle that the two biases cancel each other out. The population of the cemetery is therefore taken to be :

$$\underset{\text{(graves)}}{226} + \underset{\substack{\text{(graves with one}\\ \text{"extra" body)}}}{(11\times 1)} + \underset{\substack{\text{(grave with two}\\ \text{"extra" bodies)}}}{(1\times 2)} = 239$$

These are the 239 cases recorded in the computer filestore and used in the analyses, except where it is stated otherwise.

In order to calculate the average population figure it is necessary to know how long the cemetery was in use. The period of use was subdivided into three major chronological phases:

Late La Tène A (corresponding with Hodson phase A) [50]

La Tène B (corresponding with Hodson phase B/D, E, F/H, I/K, L/P)

La Tène C (corresponding with Hodson phases Q/T, U, V)

Absolute dating of these periods is a considerable problem [51], the only certain dates being for the beginning of La Tène A (which precedes the establisment of the cemetery at Münsingen) and for the end of La Tène C. I am grateful to John Collis for providing date ranges for Late La Tène A, La Tène B, and La Tène C of 450-400 BC, 400-250 BC, and 250-100 BC respectively. Using these date ranges the cemetery was taken to have been in use for 350 years, and a generation interval of 25 years was postulated.

The plan of the cemetery as published by its excavator, Weidmer-Stern [52], shows that a large segment of the western area was destroyed by gravel working before the excavations. Bearing in mind that the earliest burials are at the north end of the cemetery and that there is a progression to the south through time (the basis of the horizontal stratigraphy), its seems reasonable to make the suggestion, based on the morphology of other parts of the cemetery, that the density of graves in the missing part was the same as that in the contemporaneous area to the west. Thus a figure of 30 graves is proposed. If these are taken to have had one corpse each the population estimate should be revised to $\frac{269}{(450-100)\div 25} = 19.2$.

It was hypothesised that the population might not have remained stable throughout the cemetery's use. To test this it was necessary to assume that the entire population of the settlement it served was buried at Münsingen. This is justifiable, since there appears to be no descriminatory selection for interment on the grounds of age, sex or social status (see below): any other dimensions determining the right of burial in the

50. HODSON, *op. cit.* (*cf.* note 1).

51. W. DEHN & O.-H. FREY, Southern imports in the Hallstatt and early La Tène chronology of Central Europe, *in* D. et F. RIDGEWAY (eds) *Italy Before the Romans* (1979) 489-511. New York.

52. See HODSON, *op. cit.* (*cf.* note 1).

cemetery are likely to have applied only to a very small proportion of the community. The population for each period was estimated on the basis of the numbers of datable grave. These were

Late La Tène A:
10 graves (including 1 double and 1 triple burial) = 13
La Tène B:
62 graves (including 3 double burials) = 65
La Tène C:
26 graves (including 3 double burials) = 29
Total = 107

The next difficulty is that of attributing the 128 undated graves (132 individuals) to the major phases. A line which seemed to separate the dated graves most evenly was drawn between each phase (see fig. 1), and the undated graves attributed to phases according to the area in which they fell. As the southwards progression through time is a general one, some graves will have been given the wrong date; but it is hoped that the mistakenly dated examples cancel each other out. For all other analyses in this report only clearly dated graves have been used with time as the interpretive dimension. These date-areas were also used to attribute the postulated 30 destroyed graves to La Tène B and La Tène C in the ratio 2:1. Thus the method of estimating average population gave the results:

	dated burials		undated burials		missing burials		
La Tène A:	13	+	15	+	0	=	$\frac{28}{(450-400)\div 25} = 14.0$
La Tène B:	65	+	70	+	20	=	$\frac{155}{(400-250)\div 25} = 25.8$
La Tène C:	29	+	47	+	10	=	$\frac{86}{(250-100)\div 25} = 14.3$

This model of changing population shows an increase of 84% between La Tène A and La Tène B, and a subsequent decrease of 45% in La Tène C. However it is not certain that the cemetery was still in use by the end of this period: it may have been abandoned by 150 BC. In that case the La Tène C population would be $\frac{86}{(250-100)\div 25} = 21.5$, a decrease of only 17 %, indicating a fairly stable population after the first 50 years of the cemetery's use, which makes subsequent "sociometric" analyses [53] using data from the whole cemetery more accurate. *If* this model is correct, and it cannot be tested properly until more work is done on the few finds of this period, then the overall average population is calculated at 22.4.

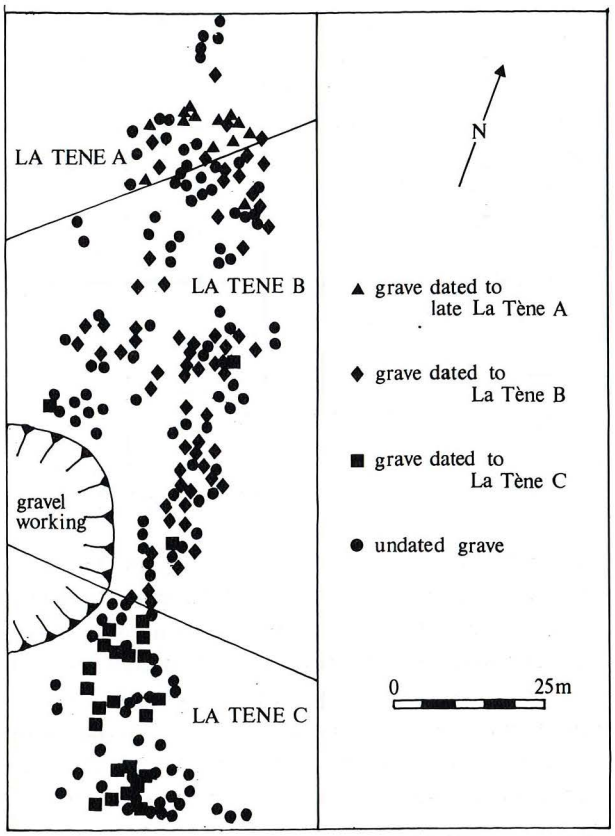

Fig. 1. — Distribution of dated grave, and divisions for undated graves.

Some examination of the accuracy of this model can be conducted by assessing the compatibility with the population structure. This refers to the proportions of the different age groups within the community, and is used to predict its demographic behaviour. For example, a community with a high ratio of young people to old may be considered to be increasing in size, as there is a greater number of people of breeding age than there was in the previous one or two generations. Similarly, a community with a low young: old ratio may be taken to be declining in size, because fewer individuals have been born than in the previous generation or two, and the reproductive potential of the community has therefore decreased.

The principle of demographic structure analysis has

53. TAINTER, *op. cit.*, 70 (*cf.* note 13).

	Age in years						
	0-7	7-14	14-20	20-40	40-60	60+	Total
Date:							
late La Tène A	1	6	1	2	1	0	11
La Tène B	0	1	2	18	5	5	31
La Tène C	0	1	1	5	3	1	11
							(53)
Total (including undated graves)	2	21	4	36	17	10	90

Table 2: Cross-tabulation of age of death by date

been used frequently on living populations, but rarely on dead populations, because of the argument that, say, a high proportion of young individuals in a cemetery would mean only that the average age of death, and not of the living population was low. However Saxe [54] proposes the principle of a *finite* population. He argues that there is a finite number of people in each age group of the living population available to die, and that when any member of any age group dies, then that age group decreases in size and its chance of being struck by the next death is therefore diminished. When all the individuals are buried the cemetery will represent the demographic structure at the time of their deaths. Since death strikes different age groups in a regular pattern, it is not necessary to restrict analysis to an extinct community. In other words a stable population, in the short term, may be assumed — such that the birth and death rates are equal and generations are replaced at a constant rate. Working on this principle long term changes may be deduced from dated segments of the dead population.

The skeletons from Münsingen have been grouped into six age brackets by Hug [55]: under 7 years, 7 to 14 years, 14 to 20 years, 20 to 40 years, 40 to 60 years. The population structure analysis is based on these groupings. Fig. 2 and table 2 show the sizes for these age groups for the three periods, as well as for the entire duration of the cemetery's use. The numbers of children are consistently under-

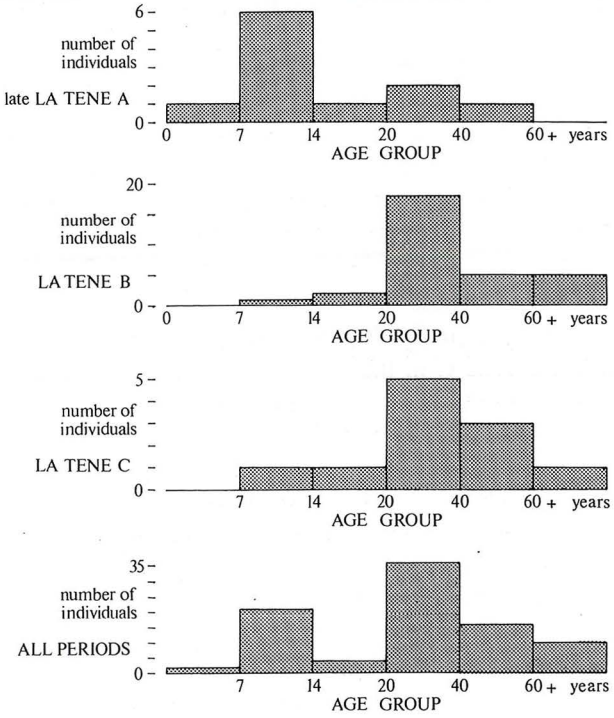

Fig. 2. — Population structure in different periods.

represented because their bones survive the soil conditions less well. Weidmer-Stern identified many graves without skeletal material as those of children [56]; this was based on their size. As the customary rite at Münsigen was extended burial this seems a reasonable assumption, but age and sex data based on skeletal examination alone was included for these analyses. If it is accepted that the number of children is in fact considerably greater than illustrated in fig. 2 compa-

54. A.A. SAXE, Social dimensions of mortuary practices in a mesolithic population from Wadi Halfa, 43-44 *in* J. BROWN (ed.) *op. cit.*, 39-57 (*cf.* note 3). 55. HODSON, *op. cit*, (*cf.* note 1). 56. *Ibid.*

rative population profiles can be built up for the three periods. The modal age range overall is the 20 to 40 group, as it is for La Tène B and C. In La Tène A, however, the modal is the 7 to 14 age group. This and fig. 2 suggest an increasing population in La Tène A: this is supported by the 84% increase found between La Tène A and La Tène B. The La Tène B histogram indicates a fairly demographic structure, possibly in a slight decline. There is no evidence to support the model of a 45% decrease in population; however that of a 17% decline tallies quite well. The La Tène C histogram is similar, suggesting a stable population at the time the cemetery was abandoned. These data suggest a growing population for the first 50 years or so, levelling off to about 25 afterwards. This appears to be due to an increase in the death rate rather than a decrease in the birth rate.

There are other ways to test the validity of accepting this model, and consequently of using the entire cemetery population of model the social structure of the community. Changes in the social structure lead to changes in the burial rite, so a study of the latter should gauge the extent of social change.

CHANGES IN THE BURIAL RITE

Inhumation is the major burial rite, although there are 8 cremations, representing 3.3% of the burials. As the cremations are buried without any grave-goods they are undated, but their occurrence in all areas of the cemetery suggests that this form of burial is not restricted to one period. 10.5% of the graves were recorded as having contained traces of wooden structures such as chambers, biers or coffins: of the dated graves, these were found in 7.7% of La Tène A cases. This suggests little change in the rite, but it is worth noting that coffins were identified in none of the La Tène A graves, in 7.7% of the La Tène B graves, and 13.8% of the La Tène C graves. It would be unwise to infer a great deal from these three results, because of the possibility of the differential preservation of traces of wood. Complete or partial stone packing was found in 6.7% of the total number of graves: of the dated cases packing was found in 15.4% of the La Tène A examples, 10.8% of the La Tène B examples, and 3.4% of the La Tène C examples. The apparent decrease in frequency is not statistically significant ($p = 0.3857$).

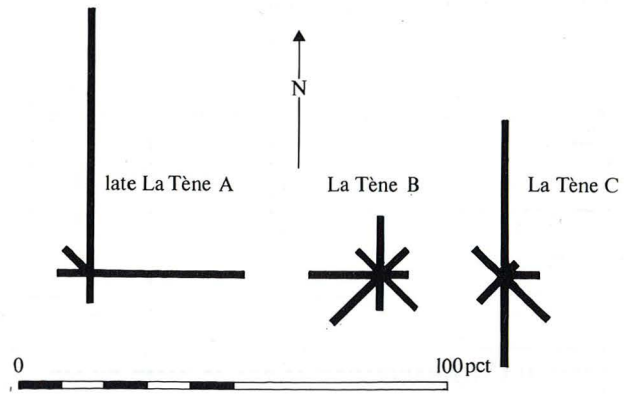

Fig. 3. — Orientation of graves in different periods.

There are four cases of graves disturbed in antiquity, but none are dated.

Another aspect to consider is the treatment of the corpse. Unfortunately Weidmer-Stern did not record the layout of the body in 139 cases. Of the remaining 100, three are flexed and 97 are extended. Two of the flexed bodies are in dated graves, one of which is from the La Tène B period, the other from the La Tène C period, suggesting that layout is not related to date. The head faces upwards in 64.4% of the cases: of the examples dated to La Tène A, B and C the head is turned to one side in 15.4%, 35.4% and 58.3% of the cases respectively. In the latter two periods the head is more often turned to the right than to the left (ratios of 13:4 and 5:4 respectively) but in view of the small number of cases dated to La Tène A this cannot be considered significant. Flexing of the arms is similarly incompletely recorded; again there seems to be no significant change between periods.

Orientation of the graves was recorded by Weidmer-Stern to the nearest of 16 compass points. However, when these are represented graphically it can be seen that there was a tendency to make grosser approximation, as the eight major points are over-represented. Therefore it was decided that an examination of grave orientation should be based on eight groups. These were found to have a significant correlation ($p = 0.0019$) with the three periods. The changes in orientation are illustrated in fig.3.

The final dimension of the burial rite to consider is the nature and quantity of the grave-goods. That the nature of the artifacts varies with time has already been stated; without this feature the north-south

	Age in years							
	0-7	7-14	14-20	20-40	40-60	60+	unknown	total
SEX:								
Male	0	0	0	13	11	7	0	31
Female	0	0	3	23	5	1	3	35
Unknown	2	21	1	0	1	2	146	173
Total	2	21	4	36	17	10	149	239

Table 3: Cross-tabulation of age of death by sex

growth of the cemetery could not have been detected and the refined artifact chronology subsequently established. For the most part the changes are stylistic, and therefore not visible with the detail of these analyses, which are largely restricted to the use of data on presence/absence, material, and position in the grave of each functional type. The stylistic information is described in detail, and summarized in tabular form by Hodson [57]. No attempt has been made to duplicate that research in the framework of this study.

The quantity of grave-goods was measured by the system of wealth-scores (see table 1). The patterns of wealth distribution in each period are similar, the greatest number of cases falling in the lowest wealth category and decaying exponentially. The two richest graves are both dated to La Tène C when there was a greater proportion of graves without finds; this is evidence for a greater range of wealth, but otherwise there appears to be little change in quantity of artifacts in the burial rite.

None of the tests for change in the burial rite, whether grave facilities, orientation, treatment of the body or artifact assemblage cast doubt on the hypothesis that all periods of the cemetery may be examined together for analyses of the social structure.

CAUSE OF DEATH

The sex of 66 burials has been identified by physical anthropology (as opposed to preconceptions based on the grave good assemblage). 31 of these are male and 35 female. Table 3 shows a cross-tabulation of the age of death by sex (note that the high number of unsexed burials aged 7 to 14 years is due to an over-exact interpretation of "child"). The difference between the sexes is significant ($p = 0.0058$, excluding "missing values") when all three periods are considered together. This pattern is confirmed by the data from La Tène B: there are insufficient burials from La Tène A and C where both sex and age are known (4 and 10 respectively) for analyses of these periods to be reliable. Fig. 4 demonstrates that the age of death for women tends to be younger than that for men. In both cases the modal is the young adult (20 to 40) bracket, but a more precise measure is needed. Obviously the average age of death cannot be calculated because the figures are ranked rather than numeric, and because the number of children is artificially small owing to their lack of resistance to decay and the difficulty of identifying the sex of immature individuals. However, a "contrived average" can be calculated by taking the age of death at the mid-point of the age-brackets: the result is 46.1 years for men and 31.7 for women. The different ages of death indicate that there are different causes of death for each sex. To formulate a hypothesis of what these factors are it is necessary to identify periods of unusual danger for each sex. For men the pattern is similar to that of our society, except that the average life expectancy (of an adult) is perhaps slightly lower — although seven examples lived a surprisingly long time. There seem to be no times to unusual stress, rather the pattern seems to reflect the age structure of the finite population. In our society women tend to live longer, yet at Münsingen 65.7% died between the ages of 20 and 40. Death at this time is most likely to be due to child-birth or related difficulties: this hypothesis is supported by the moderation of the death rate around the time of the menopause (*c.* 40 years old) and the sharp increase at the time of

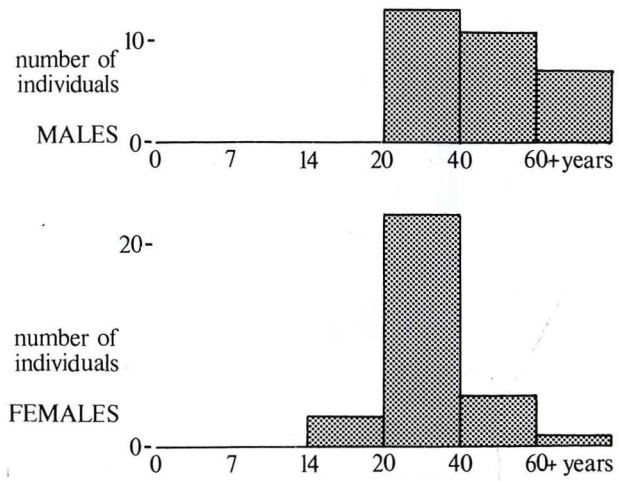

Fig. 4. — Age of death for males and females.

menarche (*c.* 20 years old). I am suggesting a shorter time of fertility than for our society, where the extension of this period has emerged quite recently.

GRAVE-GOODS ACTING AS SYMBOLS

Certain grave-goods are found exclusively with the burials of one element of the society; others are found predominantly in the graves of a particular social group. Age is not apparently symbolized by grave structure or orientation, though there are hints that there may have been a separate burial area for children in La Tène A [58]. Age does not seem to be strongly denoted by symbolic artifacts. Child graves, however, tend to have different grave-good assemblages from those of adults. The most prominent symbol is the glass bead: 88.9% of the graves where they are present contain child burials. 72.7% of the graves containing amber also belong to children. A very noticeable feature of this group is the variability of the artifact assemblage: the graves frequently contain pottery or metal trinkets and adult-sized jewellery worn on the "wrong" part of the body. Many of these items are best interpreted as favourite toys, and probably fit into Ucko's category of artifacts with personal connotations too strong for the survivors to retain the possessions [59].

Sex is a very strongly symbolized dimension at Münsingen, though it is represented only by grave-goods. Six types of artifacts are found exclusively in graves of males: a sword is present in 35.5% of men's graves, sword-rings (Koppelringe) in 22.6%, a spear in 22.6%, a scabbard in 9.7%, a shield in 3.3% and an axe in 3.3%. The last two examples should not be taken as conclusive as they are present in insufficient quantities, and also because of the existence of wooden shields in the La Tène period with may not be preserved at Münsingen. Bovine bones are also exclusive to male burials, present in 9.7% of the examples: it is improbable that these are purely symbolic, but more likely that they are food for the journey to the afterlife and part of the "warrior" burial rite (see below). Five types of artifacts occur only with the burials of women: anklets (always in pairs) are found in 37.1% of women's graves, a torc in 17.1%, a belt hook in 8.6%, amber beads in 8.6%, and glass beads in 5.7%. Amber and glass in any form are absent from all adult male graves.

Bracelets are predominantly symbols of female burials, 88.5% of graves where they are found are those of women. 85% of skeletons with rings on the right hand are female, as are 70% of those with rings on the left hand. Although graves containing fibulae are only slightly more often those of women (56.6%) the actual numbers of brooches seem to be significant. The average number in a woman's grave is 4.3, in a man's grave the figure is 1.2.

Data on the artifacts from each grave were fed into a factor analysis program. Factor 1 was responsible for a high proportion of the variance and indicated a distinct group of graves: those containing a sword, sword-rings, a scabbard, a spear or bovine bones, and lacking bracelets, anklets and torcs. Factor 2 emphasized anklets, bracelets, finger rings, fibulae and torcs; factor 3 was defined by the chain belt, finger rings, pins and fibulae, and the lack of torcs and anklets. Factor 1 clearly defines the exclusively male "warrior" burial rite. Factor 2 gives a strong weighting to assemblages containing artifacts which are symbols of women, but in fact appears to favour child graves. Factor 3 defines burials containing artifacts which are found in the graves of either sex, though favouring women. Factor 4 repeats factor 1 to a large extent but relates to "warrior" graves with a larger proportion of non-symbolic artifacts.

57. *Ibid.*, pl. 123.

58. HINTON, *op. cit.*, fig. 7 (*cf.* note 37).

59. UCKO, *op. cit.* (*cf.* note 18).

The analysis shows that there are few artifacts acting individually as symbols at Münsingen, but that there is a more complex system dependent on assemblages of grave-goods. The "warrior" grave is typified by two slightly different types of grave group, depending on the quantity of less diagnostic artifacts; graves of women and men who dot not fall into this class form a continuum, with children's graves tending to have an assemblage similar to that of women, although more restricted. It should be remembered that the application of factor analysis to data in this form is not strictly valid.

DISTRIBUTION OF STATUS

Since the wealth-scores are based on the artifacts found in the grave, any argument for particular symbols of wealth would be circular. The richest graves contain at least one gold or silver ring, but it is partly because of this that they have been given a high score. Therefore it must remain an assumption that different types and quantities of grave-goods are symbols of status. There are no bounded areas for different wealth-groups, although there are suggestions of small clusters. Because of the range of wealth-scores it is assumed that status is more strongly symbolized than sex and age.

This range is from 0 to 116. There are 88 graves without grave-goods at one end of this range; the grave at the other extreme contains 16 bronze fibulae, two silver rings, two bronze rings, four bracelets, four anklets, a bronze chain-belt and a glass and amber necklace. This range of wealth demonstrates that status was not evenly divided — that the society was not egalitarian.

Fig. 5 shows how wealth was grouped into four brackets (very poor, poor, rich and very rich) for subsequent analyses. The first of these was an examination of the relationship between wealth and age. Shennan describes how the distribution of wealth by age group may be used to discover the mechanisms by which individuals are afforded status, of which there are two basic types: ascribed status which is inherited, and achieved status which is gained by service to the community [60]. Children are unlikely to have been able

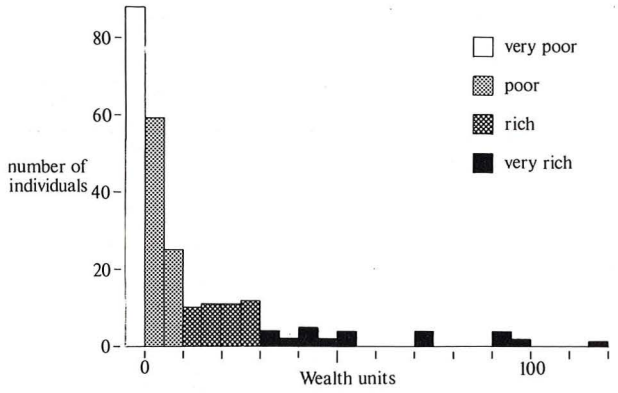

Fig. 5. — Wealth distribution.

to achieve status because of their physical and mental immaturity, and because their shorter life has given them less opportunities. On the other hand, if status is ascribed at birth then, assuming that the generational replacement is constant the ratio of poor to rich graves should be the same in each age group. Table 4 shows these proportions at Münsingen. There is no significant correlation between wealth and age ($p = 0.8489$). This also demonstrates that the richer individuals did not have a greater chance of reaching old age, as they did at Branč [61].

It can be seen from these data that in the society buried at Münsingen status was almost always ascribed. The only evidence for opportunities to achieve status is that provided by the indications of specialist groups.

The relationship between wealth and sex is shown in table 5. A strong correlation between the two was found ($p = 0.0145$). The average wealth-score for women is 24.0, for men 9.1. 90.9 % of the very rich graves are those with female burials, and the one male burial is only just included in this category (greater than 30 wealth-units), with a score of 31. 71.0% of the graves in the rich and very rich classes are those of women. The predominance (71%) of women in the rich categories and their predominance in the young adult category (63.9%) explains the decline of rich graves with increasing age groups referred to above.

At first this seems to indicate that women have a higher status that men. At this point we have to abandon the assumption that wealth is always equivalent to status, partly because the degree of difference between the sexes suggests that the quantity of grave-goods may be a symbol denoting sex, and because the

60. SHENNAN, *op. cit.* (*cf.* note 32).

61. *Ibid.*

	Age in years						
	0-7	7-14	14-20	20-40	40-60	60+	Total
Wealth group:							
Very poor	0	1	0	4	3	2	10
Poor	1	10	3	11	8	5	38
Rich	1	6	0	13	4	2	26
Very rich	0	4	1	8	2	1	16
Total	2	21	4	36	17	10	90

Table 4: Cross-tabulation of age of death by wealth group

alternative is to postulate a matriarchal society — for which there is no ethnographical or historical parallel [62].

MARRIAGE CUSTOMS

An alternative interpretation of this phenomenon is that the woman is being used to display her husband's wealth; that she is a symbol of his status. If it is accepted that a richly ornamented woman is a status symbol for a man, then it is possible to explain the burial of so much wealth by the man on the death of his wife (which would normally have preceded his own at Münsingen) as a display his wealth, similar to that of a potlatch. However it is difficult to understand why a man that rich would not himself be buried with a rich assemblage of grave-goods symbolizing both his wealth and the obligations of others incurred by his status.

In view of this difficulty it seems best to abandon the hypothesis. Another suggests itself: that a woman is wearing her bridewealth in the form of jewellery. However, the function of bridewealth is to pay the man for the upkeep of his wife, so even if he prefers to use this as a symbol of his wealth by displaying it on his wife while alive, it is unlikely that he would allow her to take it to the grave.

It seems more reasonable to assume that the woman's ornaments are her own property, but symbolize someting other than wealth and status. The indicated dimension is not sex, as some burials of women are without grave-goods; or of age, because

62. J. Collis, *pers. comm.*

	SEX:		
	Male	Female	Total
Wealth group:			
Very poor	5	4	9
Poor	17	9	26
Rich	8	12	20
Very rich	1	10	11
Total	31	35	66

Table 5: Cross-tabulation of sex by wealth group

there is no correlation between artifacts and adult age-groups. A possible explanation is that an exogamous marriage system was practised by the Münsingen community, and that jewellery was used to indicate the woman's place of origin, or her integration with the Münsingen community. It the former is the case the woman would tend to have more symbols associated with her place of birth than the man, as he would be recognized as a member of the community by virtue of his sex. Similarly, if the latter hypothesis is correct the fact that the man belonged to the community would be obvious, whereas the woman would have to be more strongly signalled. Both these hypotheses would explain why women have more "badges", but neither has been tested. The best way of doing this would be to examine the grave-goods at Münsingen for recurrent motifs or styles, and see if they cluster in a way suggestive of a single group (representing the community buried at Münsingen), or of several (representing a number of neighbouring settlements).

The large number of deaths amongst women during the period of fertility should give some indication of the age at which women were expected to marry. Unfortunately all that can be said is that childbearing falls between the ages of 20 and 40. It can be argued that the age of marriage may have been earlier: this would not be apparent in the cemetery record as it would fall before the childbirth occurs.

It is also postulated that monogamy was practised by the community. This hypothesis is based largely on the roughly equal proportions of each sex. This may be tested by spatial distribution: one would expect either double graves of a man woman (which might also indicate simultaneous death) or pairs of burials of individuals of opposite sex in close association. Unfortunately there are too many unsexed burials for this to be conclusive. A preliminary examination shows that there are no clusters of graves of either sex, but to determine whether the pattern is random or paired it would be necessary to undertake a nearest-neighbour analysis such as that used on the cemetery at Elsloo [63].

SOCIAL GROUPS

The discrete nature of the group of "warrior" graves suggests an important distinction by the society at Münsingen. This is also shown by the cluster analysis: the group fuses at the twelve cluster level (dissimilarity coefficient = 0.020). Since there is no equivalent well-defined group of female graves, and the "warrior" group fuses with the other male burials with artifacts only at the three cluster level, the factor responsible for this group is not sex. Whereas other groups and factors may be difficult to explain because of the sociotechnic nature of their artifacts, the large technomic component of the "warrior" graves seems at first a strong enough indication of their social function to warrant the use of this term.

A hypothesis was formulated that since "warrior" graves are not symbols of male burial, they are representative of a group practising a specialist craft. As not all male burials are those of "warriors", a test would be to see if there is a significant correlation between age and "warrior" burials, indicating men killed during a period of military service. In fact the correlation between adult age groups and "warrior" burials is far from significant ($p = 0.4941$). Further evidence to support the model a specialist group comes from the lack of any record of skeletal damage likely to have been caused in battle; demonstrating that the representation of all age groups is not the result of the whole male population being called upon to fight in occasional periods of stress.

There are 18 graves in this class, representing 17.5% of the total population, as opposed to the overall average of 33% for the middle La Tène cemeteries of Switzerland [64]. Roughly half (47%) of the skeletally sexed burials are male; if it is assumed that this ratio is repeated in the unsexed, and that roughly half of a stable population is adult [65], then the adult male population may be predicted to be 56. "Warrior" burials represent 32.1% of this figure. Thus it could be proposed that one adult male in three specialized in fighting. On the other hand there is a more attractive explanation. Since the cemetery was is use for twelve to fourteen generations (350-400 years) and there are 18 "warriors" burials, there was probably only one "warrior" at any time, who was replaced on his death. One drawback to this interpretation is that there is only one grave in this group dated to La Tène C. This may be because by this time swords from the Münsingen area were being deposited at the site of La Tène on the death of their owners: numbers of swords at La Tène increased dramatically during the middle La Tène [66]. However it should also be noted that eight of the 18 "warrior" graves are undated, although their position in the cemetery suggests an early La Tène date. The "warrior" might be interpreted as a champion for the community, but it seems more likely that this obviously important social position was that of the chieftain (using the term in a non-specialized sense). This belief is supported by the fact that there is no other group so strongly symbolized in the cemetery

63. P. VAN DE VELDE, *op. cit.* (*cf.* note 17).

64. H. LORENZ, Totenbrauchtum und Tract: Untersuchungen zur regionalen Gliederung in der frühen Latenezeit, *Bericht der Romisch-Germanischen Kommission,* 59 (1978) 1-380.

65. SHENNAN, *op. cit.* (*cf.* note 32).

66. J.M. DE NAVARRO, Scabbards and the swords found in them, *The Finds from the Site of La Tène 1,* (1972) 225, 247, London.

(the groups are determined by presence/absence of grave-goods at the two cluster level above) as one would expect the leaders to be, and by the fact that the "warrior" assemblage is composed of artifacts of masculine connotations, in a society which appears to be patriarchal. The lack of evidence for wounds caused in battle suggests that the men were not warriors, but that the military burial rite symbolizes a strong and powerful leader. Athenaeus, like Caesar generalizing about the Celts, mentions that skill in war was an important element in leadership, which was also determined by wealth and nobility [67].

In complex societies such as those of the La Tène period there must have been considerable craft specialization. There is very little evidence of this in the cemetery at Münsingen in the form of technomic artifacts other than those in the "warrior" graves. The only other grave containing goods indicative of social function was that of a woman between 20 and 60 years old. Weidmer-Stern records that "in this grave of an adult, human milk teeth covered the body right down to the feet" [68]. The fact that the teeth were only of children suggests that it is unlikely that the woman was a dentist, even though the excavator, Wiedmer-Stern, notes that her own teeth were in exceptionally good condition. A preferable hypothesis is that she was a nurse or child-minder of some description: it is possible that this is symbolized by the grave-goods since the assemblage has a very high factor 2 score and falls within a cluster of child graves when case scores for factor 2 are plotted against factor 3.

The cluster analysis is still informative at the ten cluster level (dissimilarity coefficient = 0.632). The binary frequencies ratio (the percentage of cases in the cluster in which 1 is recorded divided by the percentage of cases in which it occurs overall) indicates the variables generating each cluster. The results of cross-tabulations and factor analysis detailed above enable the frequencies ratio as well as the case numbers to be used to identify the social groups detected by cluster analysis. The ten clusters area: poor females; poor males and children; rich children and young females buried with beads; rich children and young females burials without beads; rich adult females; rich adult males; very rich females; very rich males; very rich males buried in a flexed position and in a wooden chamber or coffin; and "warriors". The social significance of most of these groups is self-explanatory. The young females in the "rich children and young females" groups are either in the 14 to 20 or the 20 to 40 years age group, and it seems probable that these represent the unmarried girls of the community, rather than married women born elsewhere. The significance of the beads is unknown. The very rich males buried in a flexed position and in a wooden structure appear to be slightly richer than the group to which they fuse at the seven cluster level (dissimilarity coefficient = 0.867). It seems likely that this distinction is either one of slightly differential wealth distribution or a horizontal social distinction. The evidence for this suggestion is purely circumstantial: four ranks of adult males under the leader is extremely improbable in such a small community. In view of this it is postulated that the society at Münsingen was led by a male "warrior", below which there were three ranks of males and females most easily identified by differential wealth distribution, and two ranks of children.

On the basis of the analysis detailed above the community buried at Münsingen is interpreted as having a population stabilizing at about 24 in La Tène B and C. The society appears to be stratified with status for the most part ascribed, and practising an exogamous marriage system with virilocal residence. The term "stratified" is preferred to "ranked" since, although the criteria for a ranked society specified by Peebles and Kus [69] are met by the Münsingen community with the superordinate level being visible in the cluster analysis with a dissimilarity coefficient of 2.020 and the subordinate with a dissimilarity coefficient of 1.322, the classes of the society seem to be determined by access to wealth, the definitive difference between ranked and stratified societies. From this we can postulate that there were more people in the society than high status positions, and hence that there was competition [70].

67. J.J. TIERNEY, The Celtic ethnography of Posidonius, *Proceedings of the Roual Irish Academy,* C 60 (1960) 189-275.

68. HODSON, *op. cit.* (*cf.* note 1).

69. PEEBLES et KUS, *op. cit.* (*cf.* note 15).

70. W.T. SANDERS et B.J. PRICE, *Mesoamerica* (1968), 43. New York.

Four major strata are envisaged in the vertical system, as outlined above. It is very easy to rank the three female classes in a conical system: 7 "very rich" individuals, 24 "rich" individuals, 57 "poor" individuals. The two groups of "very rich" male graves present a problem. It the richer group is taken to be the true representative of that category, and the poorer to be the equivalent of the female "rich" group, then the previous "rich" graves must be added to the number of those in the rank below: this produces a conical stratification of 14, 39 and 54 individuals. This coincides closely with the female ranks, especially when a proportion of the "rich child and young female" cluster is added to the "rich" females. This sort of minor manipulation is justifiable when it is remembered that the titles for these groups are selected purely for their convenience. The conical structure of wealth distribution is clearly shown in fig. 5, which indicates that the likelihood of the clusters being resolved into correct rank position on the basis of this approach is very high. When the three ranks for each sex are combined, and those of children included, the "very rich" individuals number 21, "rich" individuals 90, and "poor" 111. Above all of these ranks come the class of "warriors" — the leaders — numbering 17. The absence of one of the 18 graves identified above is explained by the loss of some of its artifacts, which will have biassed the computer's interpretation of its assemblage.

The coincidence of the three ranks below the leader with wealth demonstrates the relationship between the individual's status and the energy expenditure of the community expressed in the grave-goods and grave structures. The exception is the "warrior" burial, which has a comparatively low wealth-score. This is partly a product of the tendency for burials of women to be richer than those of men, but it is also probable that the number of wealth-units estimated to represent the value of labour and materials involved in weapons was too small. An extremely easily quantified indication of the extent of energy used in the burial rite would be the volume of earth excavated for the grave. Unfortunately, although the depth of most graves was recorded, Weidmer-Stern rarely measured their length and breadth: this is one of the few omissions of importance in his notes.

At this stage it becomes uneconomical to conduct further, more penetrating analyses on Münsingen-Rain in isolation: its nature will be better understood when its role in the social system involving all the local communities is determined. Most archaeologists are now prepared to accept the oppida of Central Europe in the first and second centuries BC as urban, thus to further this line of examination of social organization attempts need to be made to establish links between Münsingen and nearby urban or major organized settlements. This must be the next area of research.

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ADDITIF

Bien que M. Peter Hinton n'ait pu être présent à Angoulême, l'intérêt de son étude, rédigée depuis quelque temps déjà et demeurée inédite jusqu'alors, et à nous proposée par notre collègue John Collis, nous a paru justifier son insertion dans les Actes du Colloque.

Nous attirons toutefois l'attention du lecteur sur quelques articles, non cités par l'auteur, et qui permettront de compléter son propos :

— P. Sankot, Le rite funéraire des nécropoles laténiennes en Champagne, dans : *Études Celtiques,* t. XV, 1976-77, fasc. 1, p. 49 s.

— S. Martin-Kilcher, Das keltische Gräberfeld von Vevey VD, dans : *Jahrbuch der Schweizerischen Gesellschaft für Ur- und Frühgeschichte,* Bd. 64, 1981; p. 106-154. N.D.L.R.