AURIGNACIAN ASSEMBLAGES FROM ABRI PATAUD (DORDOGNE, FRANCE)

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The Abri Pataud is one of a group of classic Upper Palaeolithic rock shelters in and around Les Eyzies (Dordogne), in Southwestern France. While these shelters are justly famous for establishing in the nineteenth century the co-existence of extinct animals, stone tools and ancient forms of man, thereby providing the foundations for Palaeolithic archaeology as a discipline, one may question the contemporary usefulness of the data recovered from the pre-World War I excavations of these shelters for answering any questions about the Upper Palaeolithic itself. As we are all aware, the excavations were often crude, unsupervised and poorly recorded, in particular, large chunks of deposit incorporating several occupation horizons were often excavated as one couche. Reshuffling of the excavated material, both during and after the period of excavation makes the present designations on museum drawers unreliable in many cases. Under such conditions, even questions of the Upper Palaeolithic succession, of the relationships between excavated units in time and space were now likely to be resolved, let along problems of cultural adaptation or definitions of Palaeolithic lifeways.

Excavation at the Abri Pataud in 1958-1964 was undertaken in order to provide a carefully documented control for the earlier excavations at the classic sites. The stratigraphic sequence, consisting basically of thirteen major occupation horizons separated by phases of éboulis accumulation with little occupation debris in most instances has been fully discussed elsewhere (Movius, 1966, 1975). I will simply note that the lowest nine horizons (Levels 14 to 6) were assigned to the Aurignacian, and the upper four (Levels 5 to 2) to the Perigordian IV, Vc (renamed Noaillian), VI and Protomagdalenian respectively. (Level 1, with too few pieces for accurate attribution, was tentatively assigned to the Lower Solutrean).

For the comparison of stone tools from the Abri Pataud with materials from other sites, a system of attribute analysis was introduced in addition to a standard analysis based on the typology of de Sonneville-Bordes and Perrot (1954, et seq.) This typology had a profound influence on the choice of attributes. It was hoped that attribute analysis would allow us to study variation in tool form as well as to discover "natural types" or inherent clusters of significant variables. This system has also been amply described elsewhere (Movius, David, Bricker and Clay, 1968; Movius and Brooks, 1971) and will not be reviewed here except as needed in the presentation of results which follows this introduction.

The primary goal of the analysis, at least at the outset, was the clarification of the relationships between assemblages in time and space. While time and space are not independent or explanatory variables in a system of changing cultural adaptations, they constitute a framework within which we may study culture change variables. Until the framework is fixed, and we know what assemblages occurred 25.000 years ago and what occurred 30.000 years ago, we cannot begin to study process. Unfortunately, as will be shown, at least for the Aurignacian, the use of a single well-excavated sequence as a "control" whereby all those badly excavated and undated assemblages can be put in their proper place on the framework is neither theoretically justified or practicably possible.

I would now like to turn to the specific results of the study of the Aurignacian levels at the Abri Pataud, to illustrate some problems in the study of time-space relationships in the Upper Palaeolithic. Other major aspects of the study involving horizontal locations of tools within the occupation horizons, typological interrelatioships between major tool classes, the relationship between flint type and tool form, and other problems will not be discussed at this time.

The Aurignacian in the old definitions was distinguished from other Upper Palaeolithic assemblage types by five characteristics :

1) a well-developed bone and antler industry with a wide array of bone tools including characteristic special types of large points or sagaies;

2) the production of stole tools on chunks or thick flakes using long thin removals or lamellar retouch. These artifacts included the fossile directeurs of the Aurignacian: carinate scrapers and burins busqués;

3) an irregular blade technology leading to the production of very large blanks where possible. In the open air sites of the Dordogne valley, these blades can exceed 20 cm in length;

4) certain types of very heavy abrupt or semi-abrupt retouch. In retrospect this retouch type is probably technologically related to the large thick irregular blades. Where blades are thinner (but not necessarily narrower) as in Level 7 at the Abri Pataud, this retouch type disappears, and in the Department of the Corrèze, where blades are usually small and thin, this retouch type is correspondingly absent at most but not all sites.

5) other special tool types, relatively rare at most sites, such as Dufour bladelets, strangled blades, etc.

Conceptions of change through time in the Aurignacian were based on the classic sequence at La Ferrassie, where four superimposed Aurignacian horizons were excavated in the early twentieth century. Four stages of Aurignacian development were

recognized, based at first on the types of bone sagaies found in these four levels (Peyrony, 1933), but later on the relative frequencies of other tool types in the assemblages, espacially scrapers, burins and retouched blades (de Sonneville-Bordes, 1960). To this four unit sequence was added the Aurignacian V of Laugerie Haute and the Aurignacian "0", a term applied both to the old "Perigordian II" and to the assemblages from the Abri Castanet which seriated below the four La Ferrassie Aurignacian levels in Sackett's study (Sackett, 1965, 1966). The Aurignacian III and IV have never been found at another site. Levels of Aurignacian do overlie the "Aurignacian II" level at many sites, but as they are not directly comparable, they have often been grouped under the basket term "évolué".

The Abri Pataud was originally correlated with this sequence on the basis of some rough typological and percentage similarities. Levels 14 and 13, because of the high frequency of Aurignacian retouch categories were correlated with a stage prior to the Aurignacian I, such as that which Sackett had described for Castanet. Level 12 was considered similar to Level 11. Level 11, with an elaborate bone tool industry which included a few questionable fragments of split-base bone points was correlated with the Aurignacian I. Levels 10 and 9, with only 31 and 15 stone tools respectively (exclusive of 9 nuclei and 24 miscellaneous retouched pieces), remain problematic. Level 8, with a high proportion (26 %) of Aurignacian scraper types was assigned to the Aurignacian II as was Level 7, which contained few Aurignacian scrapers but many burins busqués 14 % as well as classic Aurignacian II lozengic sagaies. Level 6, with few Aurignacian scrapers but also few burins busqués, was tentatively classed as évolué owing to its stratigraphic position overlying Level 7.

A detailed study of the Aurignacian Levels at the Abri Pataud, and comparison of these levels with those at La Ferrassie and 5 other multi-level Aurignacian sites in the Southwest area (1) have cast considerable doubt on the establishment of evolutionary sequences for the Aurignacian. In particular, we may note two major problems.

1) a high level of variablitiy within the assemblage makes correlation or statistical comparison difficult. For example, the shape of the working edge of end-scrapers was studied in terms of a series of shape categories defined on the basis of their relationship to an arc of corcle shape (Table 1). The term irregular is a basket category, covering those shapes which cannot be related in any regular way to one or more arcs. In the Aurignacian levels at Pataud, the percentage of irregular end-scrapers was never less than 50 % and in level 8 reached a high of 76 %. Variablitiy in the length, width and thickness of end-scrapers, as measured in terms of range and standard deviation (Table 2) was also high. If we consider only the four levels

(1) Grand Abri de La Ferrassie, Abri Castanet, Abris des Vachons (1 and 2), Grotte des Rois, Grotte de Chanlat, Coumbâ del Bouïtou.

with the largest end-scraper samples (11, 8, 7 and 6), the order of these levels, from longest to shortest end-scrapers is 7, 11, 8, 6. If width of the scraping edge is studied the order is 7, 6, 11, 8. Thickness yields a different order: 6, 8, 11, 7. None of these differences, however are statistically significant, since the higher the standard deviation, the less likely that a test of significant differences between the means will allow rejection of the Null hypothesis at a .05 level of significance. Other attributes appear equally variable within assemblages.

2) the second major problem to be noted is that where statistically significant differences do occur between levels, the change is almost always non directional, even within a single site. For example, in four major attributes of the scraping edge : contour, scraper retouch angle, retouch convergence and orientation of the scraping edge on the blank (Table one), Level 7 is closest to Level 14 in one, and intermediate between Levels 11 and 8 in the other three. The frequency of end-scrapers made on the bulbar end of the blade gives an order, from high to low frequency of Levels 14, 8, 11, 6, 7. In terms of the shallow, medium, round categories of scraping edge shape, comparable to those which Sackett used to distinguish Aurignacian I from Aurignacian II (Movius and Brooks, 1971, pp.263-264) Level 14 has the most end-scrapers in the round category, followed by Levels 8, 11, 6 and 7. Even in the frequency of marginal retouch on end-scrapers, supposedly a diagnostic variable for any particular stage in the Aurignacian sequence, the order of Levels from highest to lowest frequency was 14, 11, 6, 8 and 7. All of these differences are statistically significant but do not exhibit directionality.

The overall frequencies of major tool classes also show no consistent pattern, although significant differences are present (Table 3). Percentage of scrapers yields the order (from highest to lowest) Level 11, 8, 14, 7, 6, percentage of Aurignacian scrapers the order 8, 11, 14, 7, 6, percentage of burins (rarely present below Level 8) Level 7, 8, 6 and percentage of retouched blades the order 14, 11, 7, 6, 8. As marginal retouch on blades is supposed to be a characteristic which diminishes steadily through time in the Aurignacian, this last is particularly surprising.

Very few statements can be made about change through time that are consistent for all sites studied. Furthermore, no level at Pataud is strictly comparable to any of the assemblages from La Ferrassie, or to the assemblages from Castanet further up the Vezere River. We can note two trends, however that do appear to be more consistent than most at Castanet, Pataud, the Charente sites of Les Vachons and Les Rois and the Corrèze site of Coumbâ del Bouïtou. Note that these trends have not been discovered by attribute analysis but have been recognized through the application of traditional methods for over 50 years (e.g. Bardon and Bouyssonie, 1907, Peyrony, 1933, 1934).

1) Burins of all types, but especially burins busqués are rarely found at the bottom of Aurignacian sequences except as isolated examples. This finding suggests that the roughly 260 burins in the Aurignacian I level at La Ferrassie actually came from higher up in the sequence. How do we square this finding with the large numbers of bone tools found in Aurignacian I levels, since burins have always been seen as integrally related to the development of Upper Palaeolithic bone and antler technology ? A peculiar type of heavy rounding and polishing wear on end-scraper edges, both at Pataud and at the Corrèze sites of Chanlat and Coumbâ-del-Bouïtou suggests that end-scrapers may have been used in connection with the manufacture of bone tools. Wilmsen (person communication) has suggested that this wear results from use on bone; use on wood produces a characteristic splintering effect also seen on some end-scrapers in the lower levels at many Aurignacian sites.

2) The second trend which may be noted is that where Aurignacian marginal retouch and large thick blades are present at all, they do decrease somewhat from the earliest levels to the later ones. This trend is not entirely a linear one, as noted above, but it does suggest a change in underlying technological variables not fully encompassed by our attribute system. Using a somewhat different attribute system, Joachim Hahn of Tübingen University has postulated a technological change in the manufacture of blades from early to later levels of Aurignacian (Hahn, 1969, 1970). This kind of change, however, may be best revealed in débitage studies.

Beyond these two trends, little overall consistency or directionality within or between sites could be detected in the percentages of various attributes. We cannot use the Abri Pataud as a "control", since there is nothing to which any of its levels can be directly compared. The re-excavation of La Ferrassie suggests that the same lack of continuity and directionality is evident there (Delporte, personal communication). We might expect sedimentological restudies of these old sites together with new C-14 dates to clarify the picture, but instead we are only further confused, as climatic ameliorations reflected at one site such as the one overlying the Aurignacian sequence at Pataud are totally absent from the next.

We are led by this confusion to re-examine the question of consistency in archaeological sequences. When we find neither stability nor directional change in the forms of stone tools, we may well ask whether we should be looking for these characteristics in the first place. It is a basic and often-repeated tenet of human evolution that human adaptation to a particular environment in increasingly technological rather than biological or genetic. In a model of a Palaeolithic cultural system, therefore, we may assume that material culture was one interface between man and the rest of the ecosystem, that it represents a solution, using available materials, to the problems of food

acquisition, clothing, and shelter. At the same time, we may assume that material culture reflects particular cultural emphasis or ethnic identities in aesthetic or ideographic terms. The fact that in the Upper Palaeolithic, for the first time, we find a high level of regional diversity has suggested that the latter (ethnic identity) should be most clearly reflected in the material culture and has led to a search for cultural identity in the archaeological record. On the basis of the preceding analysis, however, we may question to what extent ethnic identity, which should be consistent for a limited time and space, is reflected in Aurignacian stone tools. Furthermore, the archaeologically expected pattern of stylistic change, where a feature appears in small quantities, reaches a maximum and then dies out is absent from the data of this study.

If what is largely reflected in the tools in the level of adaptation to the environment, we may also question to what extent this adaptation should be expected either to remain stable or to change slowly over time in a particular direction. We might consider the relevance of a group of theories from biogeography dealing with stability and diversity in ecological systems. These could suggest new directions for the study of human cultural adaptations.

Major contributors to this body of theory include MacArthur (1972), Holling (1969), Slobodkin and Sanders (1969) and Sanders (1968, 1969) among others. MacArthur (1972, pp.170-182) separates three variables in an environment; stability and/or predictability, in terms of the environment consistently meeting the needs of a particular species or group of species; productivity, or the total amount of available nutrients; and habitat structure, or the diversity of resources available to a particular species group. Species diversity wich is a measure of the diversity of biological and behavioral adaptations, is directly related to each of these variables, particularly to predictability or stability. Holling (1969, 1973), Slobodkin and Sander (1969) and Sanders (1968, 1969) present convincing, logically derived reasons for the empirical observation that species diversity is highly correlated with stable or predictable environment as well as with relatively productive ones. In some cases, less productive environments which are stable may even be richer in species than their more productive but unstable counterpart (Slobodkin and Sanders, 1969).

For man, as well as for other primate species, those environments which are predictable tend also to be either very poor, unproductive environments, such as central deserts, or very productive ones, such as tropical forests. A glance at a "cultural" or linguistic map of the world suggest a broad parallel: the cultural or linguistic group which cover the largest amount of territory are found in highly unpredictable environments such as the arctic and the desert margins, while the parts of the map most densely studded with names tend to be those environments which are both highly productive and predictable in human terms, e.g. the tropical forests of west Africa.

The temperate zones are intermediate in productivity but also moderately unpredictable. Furthermore, the type of unpredictibility is not entirely one of cyclical fluctuation, which can be met by a consistently flexible adaptation on the part of organism, but one of highly irregular and relatively severe fluctuations, at least in Europe. Climatic studies show that, if anything, this pattern of irregular fluctuation was even greater during the Würm (Cooke, 1973; Dansgaard et al., 1971; Mörner, 1973). In human terms, we might imagine a fluctuation represented by thirty years of dependable reindeer migrations, followed by two years in which they did not pass a given area at all. Biogeographical theory (e.g. Holling, 1973) suggests that this type of environmental situation is correlated with highly resilient adaptations which are broad enough to persist, in differing forms, through all the vicissitudes of environmental change.

Persistence, or resilience, is not the same as long-term stability; indeed resilience and stability seem to be inversely related. Consequently we should not expect to find stable adaptations over long periods of time or consistency in space, in this particular situation. It is interesting that a similar lack of regional consistency and temporal directionality was noted by Klein for the Kostienki area (Klein, 1969) which was apparently also rich in large herd animals but probably highly unpredictable.

This paper has summarized the results of a study showing that the Aurignacian stone tool assemblages from the Abri Pataud are extremely diverse and do not exhibit the type of directional change between levels that wa associate with underlying stylistic variables. If, therefore, the stone tools reflect human adaptation to the environment, or function, to a greater degree than style, we might consult an independently derived body of theory from biogeography which deals with adaptation in a broad sense. Note that unlike environmental determinism, biogeography does not try to predict the specific form of an adaptation, only the relative numbers of different adaptations in a given environment together with their stability over time and their range in space. From the instability in the human environment in midlatitude Europe during the Würm, we expect to find highly variable manifestations of a single, broadly persisting tradition, in other words, a resilient adaptation, rather than a stable one. This hypothesis appears to be verified for the Aurignacian.

Finally, it should be noted that while biogeography has provided a testable explanatory hypothesis for the Aurignacian of Southwestern France, its general role in the explanation of cultural and/or archaeological variability is problematic, particularly in regard to the fact that culture is not genetically transmitted. In those sectors of an assemblage which are more influenced by underlying stylistic variables, such as the

decoration on pottery and to some extent, the form of projectile points, it is expected that biogeographic theory would not apply. Where style is less important, however, the value of biogeographic theory is that is provides an independent set of hypotheses which are probably valid in some way for human adaptations but which are not derived in any way from anthropological data. For example, "the level of species diversity in a community is partly derivable from the physical properties of the environment" through predictions of "the physiological properties that would be expected from animals in these environments ... combined with elementary propositions about the evolutionary process" (Slobodkin and Sanders, 1968, p.83). Through testing, these hypotheses can provide models which may both explain and predict aspects of the archaeological record.

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Table 1 : Frequencies of Selected Attributes by Level[1]

Attribute	Percentage by level				
	14	11	8	7	6
End-scraper Front contour					
Regular	49.0	41.3	23.5	50.7	31.8
Irregular	51.0	58.7	76.5	49.3	68.2
	N=51	N=225	N=51	N=142	N=88
End-scraper Front Contour (Regular only)					
Arc of circle	32.0	28.0	8.3	25.0	7.7
Asymmetrical	36.0	40.9	25.0	40.3	15.4
Blunt Point	16.0	24.7	50.0	23.6	53.8
Flattened	16.0	6.4	16.7	11.1	23.1
	N=25	N=93	N=12	N=72	N=28
Scraper Retouch Angle					
Acute	21.6	9.3	13.7	25.3	7.9
Medium	62.7	55.5	64.7	56.4	70.5
Steep, Perpendicular and overhanging	15.7	35.1	21.6	18.3	21.5
	N=51	N=225	N=51	N=142	N=88
Scraper Retouch Pattern					
Convergent	11.8	8.4	5.9	7.0	2.3
Semi-convergent	29.4	18.2	31.4	23.9	26.1
Non-convergent	58.8	73.3	62.7	69.0	71.6
	N=51	N=225	N=51	N=142	N=88
Orientation of Scraper Edge on Blank					
Symmetrical	51.0	44.0	47.1	37.3	43.2
Asymmetrical	49.0	56.0	52.9	62.7	57.8
	N=51	N=225	N=51	N=142	N=88
Orientation of Scraper Edge on Blank (Asymmetrical only)					
Left asymmetrical	15.7	23.5	33.3	24.6	30.6
Right asymmetrical	33.3	32.5	19.6	38.1	26.1
	N=25	N=126	N=27	N=89	N=50

(1) The small end-scraper samples from Levels 13, 12, 10 and 9 are omitted.

Table 1 : (Continued)

Attribute	Percentage by level				
	14	11	8	7	6
Roundness Category					
Shallow	13.7	29.3	33.3	52.1	38.6
Medium	37.3	34.2	27.5	34.5	31.8
Round	49.0	36.5	39.2	13.4	29.5
	N=51	N=225	N=51	N=142	N=88
End-scrapers made on Proximal (Bulbar) as opposed to Distal End of Blank (1)	48.2	22.6	25.8	4.9	7.6
	N=27	N=146	N=31	N=103	N=66
Marginal Retouch (2)					
Present	83.3	76.4	50.0	40.9	64.5
	N=36	N=191	N=38	N=115	N=76
Marginal Retouch Type (Pieces with Marginal Retouch only)					
Aurignacian	36.7	33.6	21.1	0.0	8.2
Other	63.3	66.4	78.9	100.0	91.8
	N=30	N=146	N=19	N=47	N=49

(1) N reflects the total number of ends for which this characteristic could be determined.

(2) N reflects the total number of pieces with one or more end-scraper ends excluding combination tools (where an end-scraper is combined with another tool class such as a burin on e single piece).