Chapter X

CONCLUSIONS: A VIEW OF THE SOLUTREAN

On ne saura jamais rien sur la famille de ces temps reculés, sur le groupement des tribus, sur les relations de ces groupes, sur leurs divisions territoriales.


It should be apparent by now that much of the foregoing treatment of the French Solutrean rests on foundations whose solidarity will require further testing. On the basis of the evidence presently available, however, I believe that an attempt to clothe this skeleton with flesh is justifiable. A complete knowledge, in the ethnographic sense, of the cultures of the Old Stone Age or of any other prehistoric period will, by the nature of the evidence itself, always elude us; but an attempt to recreate, at the least, a picture of human groups settled, on the move and at times interacting with other groups is one legitimate aim for prehistorians. This final chapter is both a summary of what has been outlined at length in the body of the paper, and an attempt to illustrate some of the propositions outlined in the chapter dealing with the methodology.

(a) The Development of the Solutrean.

The oft-repeated statement that the Solutrean
represents only a technical idea based on pressure flaking and the proliferation of foliates, can no longer be maintained. Insofar as any of the currently recognized subdivisions of the Upper Palaeolithic represent "cultures" in the ethnographic sense, it is apparent that the claims of the Solutrean to this distinction are as legitimate as any of the others.

Just as New World archaeologists are gradually coming to realize that there seems to be no early antecedents in Northern Asia for the fine pressure-flaked points of the Early Lithic and that therefore a local development in North America can be accepted (e.g., Wormington, 1962: 239), so it will have to be realized that no migration or long-distance diffusion is required for the Solutrean and that a development or evolution in France itself is the most economical interpretation. The principle of Occam's razor is applicable here.

Had the earliest Solutrean in Western Europe been inspired in the first instance by the foliate industries of North Africa or Central Europe, then the first Solutrean manifestations would, logically, have appeared with bifacial foliates. But the fact that in France the bifacial foliate phases are preceded stratigraphically by unmistakably Solutrean levels with unifacial points (the Proto-Solutrean and Lower Solutrean) shows that a different source is to be sought for the origin of this industry. Only the discovery,
which has never been reported, of Solutrean bifacial foliates under a pointe a face plane level, would upset this argument. It is true, of course, that in Spain and in such parts of France as the Pyrenees, Mayenne, Charente, Indre and at Solutré, the laurel leaf phases are the earliest; but this merely reflects a later diffusion of the Solutrean into these regions. The Proto-Solutrean and Lower Solutrean occurrences are fewer and more restricted geographically simply because the Solutreans did not begin their real expansion until Middle Solutrean times. Until then there had been a kind of incubation period.

The difficulty in pinning down the first signs of an archaeological culture is, after all, quite expectable, for the first indications will normally be few and small. This state of affairs in the formative or gestation state of any culture has been admirably described by Spaulding in the essay previously quoted when, in a discussion of culture changes and archaeological interpretations, he states that,

"...a typical mode of cultural change is the achievement of a key invention -- a sort of quantum advance -- followed quickly by a number of functionally related auxiliary innovations. The short periods of rapid change would be separated by relatively long periods of comparative quiescence, although not of total cultural stagnation, of course. It one accepts the view that social systems are devices for operating technological systems (as I do), there is a clear implication that the character of key inventions is technical; they are directed towards the natural environment and have a generative relationship to changes in social organization. This view is
important to archaeology because archaeological
data yield much fuller information on technological
matters than they do on social systems. The
empirical implications of such a developmental
type are clearly enough: assemblages formally
transitional between sequent and sharply distinctive
culture types should be rare, and assemblages well
within the formal boundaries of culture types should
be relatively abundant. I think that the actual
data do show this condition, and I am convinced that
the principle holds good for relationships of less
spectacular dimensions than those of the grand culture
types. It is this clustering tendency which makes
the ambiguously defined "culture period" a useful
concept in spite of its logical imperfections. The
several events marking the opening or closing of the
period are in fact clustered in time so that most
assemblages do not seem to belong to two periods"
(Spaulling, 1960: 454-55).

This is most certainly the case with the first
manifestations of the assemblages which we can point to as
representing a genuine Solutrean: the Proto-Solutrean as
found at the three localities of Laugerie-Haute:West,
Badegoule (Dordogne) and the Grotte du Trilobite (Yonne).
They give the impression of appearing suddenly and without
apparent ancestors, although a closer examination reveals
that some likely progenitors are not far away.

In spite of the incidence of flat retouch in the
late Perigordian horizons of France, the position taken here
is that the Solutrean does not seem to be descended from the
Périgordian, although a contact between the two in some
regions should not be ruled out. On the other hand, one of
the hypotheses of this paper is that the Proto-Solutrean
did originate (probably in the lower part of the Rhône Valley)
out of a stock in which a local Aurignacian variant had undergone some influences from a surviving Mousterian; the genesis is probably to be seen represented in such sites as the Grotte de Néron and the Abri du Maras (Ardeche), recently investigated by Combier and his colleagues, and from there the emerging Proto-Solutrean spread out to Northeastern and Southwestern France by routes which are still unidentified.

The beginnings of this expansion seems to have taken place in a period of dry, cold climate at about the boundary between the end of Würm III and the beginning of Würm III-IV (following Bordes' chronology). We know next to nothing of the nature of this Proto-Solutrean spread, or what were the relationships of the Proto-Solutreans with the groups in the regions through which they passed, or what their economy and subsistence patterns were like in detail. Presumably they were small family or band groups.

In Southwestern France the Proto-Solutreans seem to have taken over a deserted or nearly deserted region. Perhaps it was the very intense cold conditions of this time which inhibited settlement and brought about the end of the Final Perigordian occupation. There is no real evidence to support D. Peyrony's belief (1949a) that the Perigordian V in the Périgord region was contemporary with the Lower Solutrean. Certainly the country around Les
Eyzies was thinly occupied during this cold spell; only two Proto-Magdalenian sites are yet known (Laugerie-Haute and Abri Pataud), and although others may eventually come to light, the sampling of sites taken during the last hundred years would seem to indicate that this was never an important or intensive culture. It seems to have been followed by the Aurignacian V, the tail-end of the great Aurignacian sequence, which is separated by an uncertain time span from the Aurignacian IV. It is not too rash to suppose that both the Proto-Magdalenian and the Aurignacian V represent very brief incursions by small hunting groups into the Les Eyzies area. Probably, rather than being survivors of preceding traditions living on in the region, they were immigrants from some other part where they had managed to hang on. The Aurignacian V is also found in the department of Vienne, significantly enough using the same Fontmaure jasper as at Laugerie-Haute (F. Bordes and de Sonneville-Bordes, 1954), and there also seems to have been an Aurignacian V near the Mediterranean at La Salpetriere (Gard) under the Solutrean with pointes a face plane (Escalon de Fonton, 1959: 173).

Perhaps in time the Southwest would again have been peopled by neo-Aurignacians and Proto-Magdalenians. But at about this point, and by routes which are still not clear, the Proto-Solutreans moved in and occupied at least the
sites of Laugerie-Haute (West side) and Badegoule. Apparently they possessed sufficient powers of reproduction, or superior adaptive qualities, or better hunting and combat methods, so that they were able successfully to occupy and hold the region for their descendants. This is speaking figuratively, of course; there is no evidence at all that the Proto-Magdalenian or Aurignacian V people ever came into direct contact with the Proto-Solutreans.\(^1\) The point is that they successfully entered and occupied a region whose climate, though still cold, was improving, and proceeded to hold it intact as a Solutrean province for the next several millennia against the non-Solutrean groups which must have been living on the peripheries of this choice habitat.

If we exclude the ephemeral Proto-Solutrean of Northern France, Belgium and England, our knowledge of this industry is limited to what we can glean from the sites of Le Trilobite (Yonne), Laugerie-Haute: West and Badegoule (Dordogne). There is a certain degree of homogeneity in these three Proto-Solutrean industries: worked organic

\(^1\)At one time D. Peyrony believed that the arriving Solutreans had chased out the Proto-Magdalenian tribes, who may then have sought refuge on the right bank of the Dordogne River from Bergerac to the Gironde, where the Solutrean has never been reported (1939-40:705). Nothing to date has substantiated this hypothesis as far as the Proto-Magdalenian place of exile is concerned; and of course, the recent work at Laugerie-Haute: East has shown that the Aurignacian V, not the Proto-Magdalenian as Peyrony thought, was the immediate predecessor of the Solutreans there.
material and art seems lacking, and the characteristic flint implements, while often crude in appearance and with a tendency to be made on heavy flakes or blades, bear the flat retouch which is already well developed; in addition, as far as can be gathered, the proportions of the main implement classes were already fixed in the ratios found in the later Solutrean phases. Indeed, this degree of homogeneity in the face of the geographical distance which separates two of these sites from the third is quite understandable in terms of a proposition recently stated by Piggott:

"Comparative evidence suggests that when a new culture is first implanted in a region, its earlier stages show a general similarity in elements of material culture such as pottery, spread widely over the whole region of settlement, but that as time goes on local traditions arise, with consequent regional variants and styles" (Piggott 1959:67).

This principal is very well illustrated by the Solutrean manifestations through space and time. In the following Lower Solutrean phase, it is still difficult to establish regional variants and styles in spite of the fact that two centres or culture sub-areas can now be seen: the four Gard-Ardèche sites in the Lower Rhône Valley, and the series of five sites on the Vézère, Beune and Couze Valleys in the Southwest. In this phase the characteristic implements, the pointes à face plane, tend to be well made and more delicate, often covered on the upper face with flat retouch,
and, towards the end in Southwestern France, showing a strong tendency to developing into bifacial foliates. The first evidence of worked organic material and of art (including, in the Gard-Ardèche region, paintings and engravings apparently) now appears. The close resemblances in the stone artifacts of the two centres probably indicates some kind of close contact or direct diffusion rather than two independent developments out of a Proto-Solutrean; but this is still not certain, although I favour it and am inclined to see the direction of movement as coming from the Périgord area to the Gard-Ardèche region. Certainly there is now concrete evidence, in the absolute increase in the number of sites occupied, of a denser population grouped, in Southwestern France, around the great stations of Laugerie-Haute, Le Ruth and Le Roc de Combe-Capelle, and in Southeastern France along the Gardon and Ardèche Rivers.

The life-span of the Lower Solutrean is unknown; perhaps a thousand years would be more than enough to cover it. With the Middle Solutrean, bifacial foliates or "laurel leaves" of various forms blossomed suddenly in a manner recalling the "quantum advance" discussed by Spaulding (1960) and mentioned in an earlier chapter, or the "explosive development" following certain inventions described by Bordes (1960:108). The position taken in this paper is that the bifacial foliates developed internally out of the pointes
à face plane without outside stimulus. ¹ Now there seems to have been an outward radiation from the Dordogne region.
One branch went further up the Vézère Valley and into Corrèze, as well as into the département of Lot; a similar wave penetrated for the first time into the northern part of the département of Dordogne and into Charente, and it seems most likely that the typologically Middle Solutrean occupations of the sites in Vienne, Indre and Mayenne are the northernmost extensions of this movement. It is possible, though the steps are still not clear, that one branch of this northern movement of the Middle Solutrean managed to cross (possibly via the "Poitou corridor") to Solutré where it established itself in relative isolation unaffected by the winds of change overtaking the Middle Solutrean in the Southwest. Probably the Middle Solutrean at La Salpêtrière (Gard) also represents a Middle Solutrean incursion from

¹In a recent paper (1961) Kozlowski argues that bifacial foliates must have been introduced into the French Solutrean suddenly from outside, since (a) there are no transitional forms between pointes à face planes and bifacial foliates, (b) the bifacial foliates appear with the retouche en pelure already well developed. These arguments overlook the facts that (a) there are transitional forms known, as already described, and their fawness is explicable in terms of the explosive popularity of the new laurel leaves, and (b) flat retouch, even the retouche en pelure, is known on the pointes à face plane of the Lower and even Proto-Solutrean. Kozlowski admits that it is hard to be precise about the foreign agency which "introduced" the foliates into the Solutrean, since the Aterian is absent in Spain and the Szeletian is absent in Western Germany and Eastern France.
Southwestern France where the evolution from the Lower Solutrean had taken place, rather than an indigenous evolution in situ. Finally, sometime during the Middle Solutrean phase the Solutreans first occupied the sites in the Pyrenees and overflowed into Spain.

The number of Middle Solutrean sites in France (between twenty and thirty are known, as compared with the ten or so Lower Solutrean ones) suggests the rapid growth of the Solutrean populations; it may also give a clue to the pressures behind the rapid territorial expansion.

Apparently towards the end of the Middle Solutrean there began the climatic amelioration which was so characteristic a feature of the Upper and Final Solutrean. And about this point, too, we notice what seems to be an infusion of new elements into the Southwestern Solutrean: the "Grimaldian" micro-tools seen especially in Dordogne and Corrèze which seem to have sparked off the Upper Solutrean in that region. It is hard not to interpret this new increment as the result of diffusion from the Mediterranean region where they had long been familiar; as already noted, shouldered points and microblades lie under and over the Solutrean in the Gard-Ardèche area, and the Middle Solutrean of La Salpêtrière (Gard) suggests an agent for the transmission. Perhaps, too, the improving climate in the Southwest encouraged a more direct exchange at this time. It is a
pity that more attention has not been paid to the occasional maritime shells found in Solutrean sites at this critical junction; we do know that many of those at Badagoule came from the Atlantic (Cheynier, 1949:207) (none is mentioned from the Mediterranean), but possibly Viré was correct in attributing some from Lacave (Lot) to both the Atlantic and Mediterranean (Viré, 1905b).

At any rate, another spurt or quantum advance took place in the Southwestern Solutrean as shouldered points became popular; first in small, simple forms, and later developing into very elaborately retouched forms which were often quite elongated. Willow leaves appeared also in this phase, although their origin is obscure; they may have originated in the Pyrenees or in Cantabria. But the notable thing is that the shouldered point fashion spread only in certain directions. It seems never to have gotten north of the département of Vienne (where the site of La Taperie probably represents the northernmost occupied site with shouldered points), nor did it reach Solutre; and, most curious of all, the old Solutrean province of the Lower Rhone Valley did not adopt them either. Had the Middle Solutrean at La Salpêtrière been displaced entirely by the bearers of the local Salpetrian industries? But the Upper Solutrean did expand southward from Dordogne into the French Pyrenees (especially at the western end) and over into
Cantabria and Asturias, forming as it spread small pockets of local colonies whose tempo of growth was not closely geared to that of Southwestern France. The "Iberian facies" of the Spanish Solutrean, found mainly on the Mediterranean side of the peninsula, also developed along different lines, probably influenced to a large extent by the local microlithic industries which are usually subsumed under the name Gravettian.

We have no direct proof, but it is entirely possible that the Indre and Mayenne sites, as well as Solutre and La Salpêtrière, continued with typologically Middle Solutrean assemblages while the Upper and even Final Solutrean was developing in the area of greatest cultural flux, the Périgord region. This is an essential problem to resolve in future investigations.

This is the period when we see distinct culture areas and sub-areas appearing in the hitherto fairly homogeneous Solutrean assemblages. They began to speciate, to use a biological analogy, and regional specializations became more firmly established. The site of Le Placard (Charente) seems to have specialized heavily in fine shouldered points, for example, while Jean-Blancs and Fourneau du Diable went in for very elongated willow leaves; some sites in the Pyrenees and in Spain developed regional variants of bifacial foliates, especially those with symmetrical and asymmetrical concave
bases. Worked bone, antler and ivory had become common, as had sculptures, engravings and bas-reliefs, and wall paintings may belong here to a greater extent than is usually accepted. Certainly the eyed needle had been invented or adopted, though its geographical distribution is irregular. It is not hard to imagine a process along the lines of genetic drift taking place in such separate culture areas as the Pyrenees, Southwestern France and Solutre, with each group or cluster of groups working out its own interpretation of the basic Middle Solutrean culture it had inherited, and in time growing more and more apart and culturally distinct.

The end of the Solutrean is difficult to establish. The Final Solutrean which has been isolated in the present paper can be identified with certainty only at some sites in Southwestern France where pointes a face plane seem to have disappeared entirely, as well, perhaps, as backed bladelets. The Solutrean in this region was succeeded by an early Magdalenian which was quite different in tradition (the Magdalenian 0 and I at Laugerie-Haute), and there seems to be little direct continuity between it and the Solutrean; there seems to have been an actual displacement of population rather than an absorption of one by the other. The milder climate of the Solutrean continued into the Early Magdalenian, so a climatic factor in the change-over can probably be ruled out.
But elsewhere in France than in the Southwest there may well have been Solutrean-Magdalenian contacts and exchanges. Indeed, one of the intriguing problems of the Solutrean is to establish whether the last of the Solutreans did exist as enclaves in a world which was rapidly becoming a Magdalenian one. D. Peyrony used to maintain that the latest Solutreans in Charente and Northern Dordogne were contemporaries of the earliest Magdalenians along the Vezère who had displaced them (D. Peyrony, 1932a:86-87; 1950). His reasoning was based mainly on his observations that in the Vezère and Couze valleys at such sites as Laugerie-Haute, Pech de la Boissière, Badegoule and Jean-Blancs, the "Magdalenien ancien" was superimposed directly on the "Solutrean supérieur", whereas in such northern and western sites as Fourneau du Lièble, Le Placard, etc., the Upper Solutrean was succeeded by the Middle or Late Magdalenian; this implied, he suggested, that the Solutreans in the latter areas had been successful in holding off the invading Magdalenians for a longer time. This viewpoint has also been adopted by Pradel (1950:470) when he postulates that in the West-Central part of France the Solutreans and Magdalenians had coexisted until Magdalenian III times, and that it was the Magdalenians of La Marche (Vienna) who had barred Upper Solutrean expansion northward further than La Tannerie. J. Combier (1960) in his chronological table also implies that
the "Solutrean moyen et superieur" of the Rhone Valley were contemporary with the Magdalenian I and II in the Périgord and neighbouring regions. On the face of it, of course, this might not be impossible, but no cases of stratigraphic overlap are known anywhere, and de Sonneville-Bordes has recently (1960:495-96) rejected Peyrony's hypothesis as based on misinterpretation of the evidence. This rejection may also weaken any claims that the latest Solutrean in the Pyrenees and Cantabria outlasted the Périgord Solutrean and survived into Magdalenian times; for in the Pyrenees and Spain the first Magdalenian seems to be Magdalenian IV, directly superimposed in some sites (e.g., Istaritz) on a "Solutrean tardif". Clearly, only some absolute dates can clear up this problem.

But the existence of a number of shared traits in the later Solutrean and the first half of the Magdalenian makes it unwise to throw out entirely all possibility of some kind of contact or interchange. The similarity in worked bone, antler and ivory (especially in the pieces notched with "marques de chasse"), the presence of eyed needles, perhaps backed bladelets and, more than anything else, the forms of art, all suggest some kind of connection. Breuil has pointed out that the engravings on the Solutrean slabs at Badegoule (from Cheynier's Solutrean III) are astonishingly like the Magdalenian art at Angles-sur-l'Anglin (Vienna)
(Breuil and Lantier, 1951:196), while in Dordogne and Charente the sâgales with lancet-shaped bases of the Magdalenian I are also found, with eyed needles in Dordogne, in the Solutrean supérieur (Breuil, 1954:61). The similarity in the style of the engraved slabs found in the Final Solutrean and Proto-Magdalenian (in Cheynier’s sense of the word) at the sites of Sâdégoule and Abri Lachaud has already been noted. And of course, the great similarity in style between the Solutrean sculptured friezes at Fourneau du Diable and Roc de Sers, and the Magdalenian ones at Cap-Blanc, Angles-sur-l’Anglin and (?) La Chaire a Calvin, has often been pointed out. It was D. Peyrony’s opinion (1950) that the latest Solutreans had learned this sculpture from the Magdalenian III-IV groups with which they were in contact. It is hard to dismiss all these common features as coincidence. All in all, I am inclined to see some kind of direct contact between Solutreans and Magdalenians in some region, and even entertain the idea of some degree of coexistence; but this was probably limited to the diffusion of certain ideas rather than to the total assimilation of the remaining Solutreans by the incoming Magdalenians.

In reviewing the Solutrean over a period of two or possibly three millenia in France, certain impressions are uppermost:

(1) There is a great deal of conservatism in the
ordinary tools of the assemblages (including both stone tools and those of antler and bone), as contrasted with the rapid
changes and stylistic instability in the characteristically
Solutrean types such as foliates and "points". One gets the
feeling that most of their experimental inclinations were
channelled into this latter medium.

(2) There seems to have been little infusion of
elements from outside the Solutrean world during this period,
except for the postulated Mediterranean elements at the end
of the Middle Solutrean, and (possibly) the traits adopted
from the Magdalenians at the end; but this latter point is
not at all certain.

(3) The area of expansion of the Solutrean is
curiously limited. As emphasized repeatedly, it never
expanded outside France and the Iberian Peninsula, unless
one is prepared to accept the Proto-Solutrean hints in
Belgium and England. But, more than this, its range inside
France is remarkably restricted. It is possible that its
failure to flourish in the loess lands of the north was due
(as Bordes has suggested in conversation) to the fact that
they were the Badlands of the period when loess was forming,
living conditions were unattractive and fauna was scarce.
Nor did they get beyond Corrèze into the Massif Central,
although the Perigordians and Magdalenians did. As already
noted, the Rhone River seems to have been a barrier of some
kind preventing expansion further east or into Italy. The region of Landes seems to have been a kind of Sahara during the Upper Palaeolithic and until the Mesolithic, and this may help explain the scarcity of Solutrean there; and some climatic factor may also account for the absence of Solutrean in Lot-et-Garonne, where, it should be recalled, the Upper Palaeolithic occupation was always relatively light. Even in the Dordogne Valley the Solutrean is mysteriously absent downstream from the junction with the Couze, unless the dubious site of Grand-Moulin (Gironde) is accepted as Solutrean.

Indeed, the second and third impressions outlined above are probably related; there are few innovations from outside the Solutrean world just because the Solutrean remained isolated and (until the Upper Solutrean at least) lived in groups which had very few contacts with other Upper Palaeolithic populations.

1According to a recent paper (Leonardi, 1959), a bifacial foliate resembling a thick Solutrean laurel leaf was found associated with a "Gravettian" industry in the cave of Trena in the Venetian Plain of Italy (ibid., fig.19 no.1); and a piece described as a Solutrean like pointe à face plane occurred in an Aeneolithic level in the nearby cave of Perin (ibid., fig.24). The latter piece is not really much like any of the French pointe à face plane types, judging from the illustration, and its Solutrean origin is unlikely. But the foliate could be Solutrean, and if so perhaps represents a curio of stray transported by a wandering group of "Gravettians" rather than by Solutrean migrants into Italy. At any rate, it is the only suggestion of Solutrean in Italy to date.
(b) Solutrean habitat, economy and society:

As far as the Solutrean occupation of Périgord is concerned, de Sonneville-Bordes (1960:277) has pointed out an interesting situation. In the great shelters which had been occupied before the Solutreans came, the Solutrean usually marks the end of the occupation. (The exceptions are Laugerie-Haute and Le Ruth, but at the latter site the Magdalenian occupation was very slight.) Henceforth the great shelters of Southwestern France such as Laussel, Le Roc de Combe-Capelle, Abri Pataud, La Rochette and perhaps La Salutie, which had all been so important in Perigordian and Aurignacian times, saw no more Palaeolithic occupants after the Solutreans disappeared. On the other hand, in the major sites where the Solutreans had been the first occupants (Laugoule, Pech de la Boissière, the lower terrace of Fourneau du Diable, Roc de Cave, Jean-Blancs, the Grotte d'Excideuil and a number of other lesser sites) the Upper or Final Solutrean is inevitably followed by a Magdalenian of one kind or another. Why this should be so is intriguing. Could the climatic changes after the Middle Solutrean have rendered such shelters as Laussel, Le Roc de Combe-Capelle or Abri Pataud unusable? And could the very close identity in habitation sites between the late Solutreans and the Magdalenians be a factor of their preferring much the same territory and following much the same subsistence patterns
in a region where an ecological shift of balance had made some locations more attractive than formerly, or was it simply due to the fact that many of the large shelters were now uninhabitable?

Certainly there were far more Solutrean occupation levels in this region after the Middle Solutrean, and one has the impression that they occupied smaller sites and that the occupation layers are thinner, more restricted in the number of square feet occupied and represent smaller or more mobile groups. There are somewhere between fifty and sixty Upper and Final Solutrean sites in the Southwest, for example, and the majority are represented by rather thin levels in small caves or shelters which had not been frequented by the Solutreans previously. Even at the site of Laugerie-Haute, which remained a stronghold of Solutrean culture to the end, the Upper and Final levels are thin and numerous as compared with the much thicker and denser levels of the Middle and Lower Solutrean. At Le Ruth, too, judging from Breuil's sketch of 1909, the Upper Solutrean appears to have been thinner than the Middle and to have covered a smaller area of the site than the Lower Solutrean. It is tempting to suppose a movement after Middle Solutrean times away from large groups in the direction of fragmentation and splitting up into smaller groups. It may be worthwhile to consider this as part of the picture of the late Solutrean which had
become split up into groupings with a good deal of industrial variation and specialization. It would probably be wiser to refrain from conjecturing about their exact political and social structure, but a reconstruction of small, autonomous and free-wheeling bands or even family groups would probably not strain the evidence from most sites. Would this apparent fragmentation and lack of cohesiveness of later Solutrean explain the rapidity with which they seem to have disappeared and the slight effect they seem to have had on the material culture of their successors?

There is not much in the archaeological remains to indicate that the Solutrean economy or subsistence patterns were significantly different from those of the other Upper Palaeolithic groups; nor, in point of fact, would we expect much divergence at this basic subsistence level within a given region. The majority of sites are in shelters or caves in the valleys close to large streams, though there are a few instances, such as La Ferrassie (Dordogne) and Reilhac (Lot) where interfluvial sites were chosen. There seem also to be some open sites where perhaps some kind of huts or tents were used. At Saussaye-Tercis (Landes), Lacam (Correze) and at Solutré the habitations seem to have been entirely in the open, while at Gour de l’Arche and La Rochette (Dordogne), Roc de Sers (Charente) and the Grotte des Harpons at Lespugue (Haute-Garonne) at least part of the Solutrean
occupations were outside the cave or shelter. At several sites (Fourneau du Diable, Pech de la Boissiere), but or lean-to foundations have been reported under the rock shelters. Stone pavements of river pebbles have been reported from Laugerie-Haute, Badegoule and Abri Lachaud (Dordogne).

We know pathetically little of the seasonal nature or duration of the Solutrean occupations even at the major sites. At Fourneau du Diable, in both the Upper and Lower Terraces, and at Badegoule in Cheynier’s Solutrean III and IV, there seem to have been occupations during all twelve months of the year, judging from analysis of the faunal remains (Bouchud, 1954).

While there are insufficient analyzed data to provide a firm basis for comparison, it does not seem that the Solutrean hunting or eating habits were significantly different from those of the other Upper Palaeolithic groups in France. Contrary to a rather widespread opinion, the Solutreans were not predominantly horse hunters. Horse bones are often found in Solutrean deposits but always in smaller numbers than are reindeer remains. (It has to be remembered, of course, that one horse yields far more meat than a reindeer.) This is the case at Laugerie-Haute, Jean-Blancs, Badegoule, Fourneau du Diable, Pech de la Boissiere, Izturitz, Le Ruth and Solutre. At Fourneau du Diable, for example, there were six times as many reindeer individuals
as horse, while at Badegoule reindeer are reported as
constituting the overwhelming majority of the fauna, possibly
as high as 80%; at Laugerie-Haute, as already described,
the proportion was usually even higher. For most of the
other Solutrean sites, however, no comparative figures are
available. Indeed, at Solutré the situation during the
Solutrean contrasts sharply with the apparent immense
popularity of horseflesh in Perigordian times. At Laugerie-
Haute the presence of all the bones of the body suggests that
entire carcasses were brought in. At Istaritz, however,
bovids were the principal game though horse and reindeer
were present in small numbers. Mammoths were occasionally
killed, as in the Proto-Solutrean at Badegoule. Most of
the other large mammals - wild cattle, musk oxen, red deer,
Saiga antelope, bison, ibex, chamois, wild boar, bear and
wooly rhinoceros - as well as such small animals as fox,
wolf, hare, ermine, weasel, wild cat and cave hyaena, are
also found. In the Upper Solutrean at Badegoule there were
bones of such birds as eagle, crow, falcon; at Montaud
(Indre) duck and goose bones are reported. Fish remains are
occasionally found in Solutrean sites (salmon and carp
vertebrae at Badegoule, salmon bones at Livye, unidentified
fish bones at Fourmeau du Diable and Pech de la Boissière).
At Istaritz, Le Placard and Badegoule some short bone pins
may have been fish-hooks or fish-gorges. The absence of
such instruments as leisters and true fish-hooks may indicate that fishing methods were less well developed than, say, during the Maglemosian. At Istaritz there were several engravings of fish in the Solutrean.

Thus, in Southwestern France at least, the fauna was a mixture of "arctic" and "alpine" types, and the Solutreans exploited both, though the exact proportion of each is not clear. It is not possible to make any worthwhile generalizations about possible shifts in emphasis through time or in different regions of Solutrean hunting patterns. Usually site reports do not even indicate the subspecific level of such animals as reindeer, though tundra reindeer is most commonly mentioned. Forest reindeer were also present, however, especially at the beginning of the Solutrean according to Bouchud (1954). In the absence of more detailed studies and of Bouchud's syntheses of the Upper Palaeolithic faunal data, there is little gain in going beyond the statement that the Solutreans seem to have had no prejudices against any edible game.

(c) Solutrean skeletal remains:

No complete skeleton of certain Solutrean provenience has ever been found, and we know less about the physical type of Solutrean Man than of any other Upper Palaeolithic culture-bearer in France. In fact, we are little more advanced in this respect than when Gabriel de Mortillet
remarked in 1867 that "ces o做个 les seront decouverts osteologiques sur l'homme solutren" (p. 300). No remains at all are known from the proto-solutren or lower solutren in France, and the evidence from the later phases is very sketchy.

Dr. Mortillet had refused to recognize the Upper Palaeolithic status of the burials found at Solutren, as early as 1867 (at the Congres International d'Anthropologie et d'Archeologie Prehistoriques, in Paris) Frere-Rey had described these skeletons as mongoloid and identified some of them, at least, with the solutren; indeed, the notion of the Solutrens as mongoloids from the east was encouraged by the later Hungarian finds and has never quite died out. It would be tedious to go into a discussion of the Solutren skeletal material here. One would think that a thorough analysis might settle the question promptly, but apparently this has not been attempted. However, the most recent study of the remains now in Lyon (Aiguet, 1955) suggests that they are entirely modern morphologically and fit best in the local series which runs from the Neolithic to the Middle Ages, rather than into an Upper Palaeolithic series. This applies to the old finds as well as to those discovered at Fayet, Arcelin and Beperet in the present century. If Aiguet is right, the "Solutren burials" at Solutren can be written off.

At Laugerie-Haute, C. Hauser (the son of Otto Hauser, in excavations shortly after World War II) is supposed to have
found a child's skeleton, badly deteriorated, and the radius of an adult. There is no certainty that they came from the Solutrean levels, however (Vallois, 1953:165). The skeleton found in Laugerie-Haute by Lalanne in 1907, at first considered Solutrean, was later shown to be Medieval when a lead plummet was discovered in the thorax (Breuil, in Lalanne and Bouyssonie, 1941-46:1).

At Badegoule, Otto Hauser may have found a fragment of a child's cranium in the Solutrean, but it is now lost. Some other human fragments, including several mandibles, may have come from either the Solutrean or the Magdalenian (Vallois, 1953:124). Tabanou, the schoolmaster who was killed at Badegoule, seems to have found the mandibles and sold them to Champagne, claiming they were Solutrean (Champagne, 1905), though the justification for this provenience is not given. Massenat apparently found a fragment of a temporal bone which possibly was Solutrean in the breccia at this site (Massenat, 1869a:356), but it has since disappeared. All in all, very little trust can be placed in any of the human remains from Badegoule; as de Sonneville-Bordes states (1959a:16), there is a good possibility that all of these finds were Neolithic or later intrusive burials rather than Palaeolithic.

Breuil and Lantier (1951:295) mention that fragments of the skull and body of a child were found in a compact
Solutrean breccia with laurel leaves at the Abri Labattut, near Sergeac (Dordogne). It was accompanied by large *cypraea* shells and perforated deer teeth, and is now in the Musée de St.-Germain. Presumably it results from Didon's unpublished excavations; no other details have ever been published, apparently.

Several human molars were found by D. Peyrony in the *Solutréen supérieur* of Fourneau du Diable, but the originals seem to have disappeared (Vallois, 1953:126). De Vibraye had also found a molar in the breccia at Bourdeilles (i.e., at Fourneau du Diable) and this probably relates to the Solutrean I here (de Vibraye, 1864).

At Le Placard, de Maret found between 1882 and 1883 nine skull caps or fragments, two of them in the Upper Solutrean and the rest in the Magdalenian. Breuil and Obermaier (1909) interpret them as drinking cups. If they are, it is curious to find such a persistent continuity of custom between entirely different industries at a single site. One is male, asymmetrical and very large, with some long incisions on the parietal and some signs of burning (it rested directly on the Solutrean hearth), while the other has no trace of incisions. All nine skulls were dolichocephalic. De Maret also found in the Upper Solutrean here several maxillae, some teeth and some miscellaneous skull fragments (Breuil and Obermaier, op. cit.), while
Hamy (1869:434, note 1) mentioned that pieces of a dental arch were found in the Middle and Upper Solutrean.

The "Mongoloid" skeletons from Roc de Sers (Charente) have already been discussed here in their stratigraphic context. Martin had tentatively put them in the Upper Solutrean, but did not insist on this. Boule and Vallois (1957:282) now place them in the Magdalenian, though Lantier (1952a,b) still regards them as Solutrean. The arguments against this latter opinion have already been presented here, in Chapter VIII.

According to Patte (1958), Pradel found a human left lower maxillary fragment containing the second premolar and the first molar in the Solutrean with shouldered points at La Tannerie (Vienne). The remains showed scratches as if produced by flints during defleshing operations, according to Patte.

The skeleton from Roc de Cave (or Saint-Cirq-Madelon) (Lot) which Leye claimed to be Solutrean has already been mentioned. D. Peyrony (1949a) believed it was Azilian. It is now in the Les Eyzies museum, classified as of unknown age.

At Lacave (Lot), Viré (1905b:428) reported finding in his foyer 1 part of the frontal of a very young individual. It is probably Solutrean, but its present location is unknown.

At the Grotte de Roset (Tarn), Caraven-Cachin found
a human canine which he attributed to the Solutrean. According to Obermaier (1928), a skull fragment was also found in the Solutrean here. However, as already observed here, it is not entirely certain that there really was any Solutrean at this site.

Vallois (1953:149) is incorrect in attributing the human remains at Pair-non-Pair (Gironde) to the Solutrean; it is unlikely that the Solutreans ever occupied this site.

At the Grotte du Figueur (Ardeche), Veyrier, Buchard and Obenich (1954) reported finding a child's skeleton which they considered was probably from what they called the "Proto-Solutrean" (i.e., the Lower Solutrean of the present paper). However, the exact provenience does not seem to be certain, and R. Bonifay (in a personal communication) suggests that is more likely of Magdalenian age.

Vallois (1953:141) notes that at Isturitz an excavator named Bertillon had found a mandible "type Solutrean" which is now lost. Passemand (1944:39) says that a child's lower jaw, with teeth but lacking the chin, came from couche F.II (the first Solutrean level) and belonged to a robust individual about five years old.

This seems to complete the roster of Solutrean finds in France. Actually, the best physical evidence may come from Spain, where at Parpalló Pericot found a complete skull in the "Proto-Solutrean" which he described as of Cro-Magnon
type (Pericot, 1942). If the interpretations of the present paper are correct, this would be chronologically a late Solutrean in terms of the French sequence. A human frontal was recently found at Barranco Blanco (Valencia), similar to the Mechta-el Arbi type of North Africa and to Guanche skulls from the Canaries, and Pericot suggests that this strengthens his hypothesis for connections between North Africa and the European Solutrean (Pericot and Ripoll-Perallo, 1960:141).

Recently a male skull has been described as coming from the "Proto-Solutrean" of Whaley Rock Shelter No. 2 in Derbyshire, England (Brothwell, 1961). It was found in 1947 by the late A. L. Armstrong, who stated (1953:167) that it was associated with a "leaf-shaped blade of Solutrean pressure-flaking technique". The industry has not yet been published and I have seen no illustrations of the artifact described as Solutrean.

The conclusions which can be drawn from these few data are sketchy. We can only say that the scanty remains known from the Solutrean indicate that the people were of the same general stock as the better known Upper Palaeolithic populations of Western Europe; at least there is nothing to suggest a more primitive type. A rather large number of children's remains seem to occur. Finally, cannibalism and/or ritual defleshing is hinted at in a few cases. The absence of an authenticated deliberate burial suggests that the
Solutreans may have had somewhat different mortuary customs than the Aurignacians, Perigordians (though there are no burials known in the Upper Perigordian either), Proto-Magdalenians and Magdalenians. Perhaps they exposed their dead or took other measures which have effectively eliminated most of the skeletal material.

(d) Solutrean Art:

The question of the extent to which Solutrean art has been neglected or overlooked in the various classifications of Palaeolithic art is a troublesome one. So far this question has been raised mainly by the Spanish prehistorians; for various reasons, few dissenting voices are heard in France, though Combier's unpublished treatment of the wall art of Ardeche and Gard deals with some of the contradictions between current dogma and the field evidence. In spite of the fact that one of the first examples of art mobilier was found in the Middle Solutrean of Solutré in 1867 by de Ferry, it was generally supposed, for doctrinaire reasons, in the days of G. de Mortillet and Piette that the Solutreans placed no emphasis on art except, perhaps, at the very end when decorated bone and antler appeared. It is true that Daleau (1896, 1903) attributed the engravings at Pair-non-Pair to the Solutrean, as well as those at Chabot (Card); but he later changed his mind, probably under Creuil's influence.
Breuil's first classification of wall art, given at the first Congrès Préhistorique de France in Périgueux in 1905 (Breuil, 1906a), did not associate the art with particular industries, although this was attempted the following year at the International Congress in Monaco (Breuil, 1907c). Over the years Breuil's classification progressed along the lines originally set out, with modifications when new data came to light, but this development need not be gone into here. In general, the Solutrean came to be recognized as having a certain amount of engraved bone, antler and stone in its later part (e.g., at Le Placard, Solutré, Badegoule), some very impressive friezes and relief sculptures (Fourneau du Diable, Roc de Sers, Istaritz, Solutré), but no recognizable wall paintings anywhere. In more recent years Breuil has admitted the existence of paintings on slabs or plaques in the Solutrean at Parpalló in Eastern Spain, and in the most recent exposition of his scheme is willing to concede that there may be Solutrean wall paintings at Buxu (Asturias), Oulen (Gard), and possibly even at Altamira and at Peña del Candamo (Asturias) (Breuil, 1952:405). However, he maintains cautiously that "so far we know of no paintings in our caves which can be attributed with certainty to the Solutrean" (p. 39), and that the role of the Solutreans in Upper Palaeolithic wall and portable art is "certaine, mais assez indéterminée" (Breuil, 1960:98).
In the foregoing description of the Solutrean sites in France, some examples of art have been described and discussed briefly, mainly in terms of their stratigraphic positions in the sites or of their authenticity. A full treatment of Solutrean art is outside the competence of the present writer. Insufficient familiarity with the phenomena themselves and with the criteria used in judging them preclude a detailed discussion of the Solutrean in the context of Upper Palaeolithic art in general. All that will be attempted here is a very general description of that part of Solutrean art which seems well established or dated, and mention of some cases where certain writers claim the Solutrean art has gone unrecognized.

As far as the Proto-Solutrean is concerned, it is very probable that no archaeologically recognizable forms of art existed; at least none has been identified at the three known sites in France. The limestone slab engraved with a bison from the Proto-Solutrean of Padégoule may well, as Cheynier admitted, have come from a later level.

The earliest manifestations of art in the Solutrean of the Southwest seems to be in the form of decorated bone, ivory and antler. The Peyronys found notched and incised sagaies in their Lower Solutrean at Laugerie-Haute, as well as what seem to be fragments of something like batons perforés decorated with deep, parallel incisions (D. and E.
Peyrony, 1938, fig. 26, no. 1). Probably the ivory disc ornamented with radiating incisions found in the Lower Solutrean (level 12-b) in 1959 is the earliest example of Solutrean art which can be definitely dated (see fig. 3, no. 7). The pattern of incisions is reminiscent of those on the perforated antler fragments found by the Peyronys.

The only other example on this horizon in Southwestern France seems to be a piece of notched bone found at Le Ruth. There is no evidence of wall art or stone work known, since the fragment of red-painted slab from the roof found in the Lower Solutrean at Laugerie-Haute by the Peyronys (ibid., p. 39) is not necessarily of Solutrean origin. In the Gard-Ardeche region, however, there does seem to be parietal art associated with the industries which I have here aligned with the Lower Solutrean of the Southwest. (Combier would date this Gard-Ardeche Solutrean with pointes a face plane even earlier, and extend its life over a longer period.) At Chabot and Le Fugier there are very deep engravings of mammoths, horses and other animals, and the similarity of style parallels the close resemblances between the Solutrean industries of the two sites. At the nearby site of Oulen there are linear paintings of a mammoth and a bear in red and black, some red tectiforms, a series of dots and some black lines in a recently-discovered inner chamber which only the Solutreans had occupied; in addition there are
engraved mammoths and other animals in both the inner and outer chambers. Some of the paintings and engravings at Oulen were in a part of the cave which had been sealed off before Magdalenian times, and both Breuil and Combier seem confident they can be attributed to the Solutrean. If so, it would imply that the Lower Solutrean in the lower valley of the Rhone was artistically precocious as compared with that of Southwestern France -- unless, of course, the Lower Solutrean in Gard and Ardeche is really contemporary with the Middle and later Solutrean elsewhere, or unless Lower Solutrean wall art in the Southwest has hitherto not been recognized as such. The problem cannot be resolved at the present time.

Whichever is the answer, the Solutrean sites in the Gard-Ardeche region did form a distinctive "school" of art, quite different from the art at the neighbouring sites of Ebbeu (Ardeche), Baume-Latrone (Gard) and the Grotte Bayol (Gard). It emphasized very deep engravings which at times approached crude bas-reliefs, with occasionally the edges of the incisions scraped down to give a raised effect to the figure (Combier, Druot and Huchard, 1959:95). The figurations are rather crude or elementary, with few details, but there are several motives which reoccur consistently: the trick of drawing the legs and bellies of the mammoths in a single curving line like a horseshoe, and the "duck-bill" muzzles of
the horses. This last feature, which occurs also at Parpalló, La Pileta and Ardales in Mediterranean Spain, is one of the arguments the authors use in postulating cultural connections between the two regions in the Solutrean. This conclusion, as already pointed out in this paper, is not supported by the purely archaeological evidence as far as the Solutrean in the two zones is concerned. If we were dealing with a single culture area through which elements filtered freely, we would expect to find the same Solutrean levels with pointes à face plane but without laurel leaves or shouldered points in Mediterranean Spain as we do in the Gard-Ardèche region. The fact is that this does not seem to happen, as has been described in more detail elsewhere in this paper. It suggests that the linkage or correlation between art styles and industrial styles may be very loose.

In the Middle Solutrean of Southwestern France, notched and incised organic material is fairly abundant at Laugerie-Haute, Le Ruth, Badegoule and in the Mayenne sites. Usually it takes the form of what is customarily known as "marques de chasse", which are short, parallel, equidistant lines which in many cases may have been made to facilitate hand grips; but at Monthau (Indre) there are two ivory pendants with small incisions which are probably purely decorative. At Badegoule, in his Solutrean II, Cheynier found what seem to be ibex horns and a horse's muzzle incised
on a fragment of limestone (Cheyney, 1949, fig. 20). In his Solutréen III he claimed to have found some 67 slabs of stone with engravings of birds and animals, and perhaps even a roughly incised nude female figure or "Venus" (Ibid., fig. 36, no. 3-3). There are also a large number of indecipherable scrawls. These engravings have to be taken cautiously, however, for he remarks (p. 212) that some of them might really be from the Solutréen supérieur! There was also a quartz pebble (unpublished) with a drawing in black paint of what he interprets as a fantastic beast (Ibid., p. 94).

At Solutré in 1867 H. de Ferry discovered a nodule of siliceous limestone on which was carved a headless reindeer, and in 1925 a plaque was found surcharged with incisions which, like some at Padegoule, are indecipherable (Combier, 1955:177).

Even these prehistorians unwilling to admit a lengthy artistic tradition during the Solutréen acknowledge that the Upper (and Final) Solutréen witnesses a respectable showing in some ways. The sculptured friezes are the best known. At Fourneau du Diable (Dordogne) in the Solutréen supérieur II or III of the Upper Terrace, occurred the famous frieze of animals carved in relief on a heavy limestone block. The principal subjects are two large individuals of Bos primigenius in high relief, apparently a cow and a bull, shown in profile and with one hiding part of the body of
the other (Plate IIa of the present paper). However, the block also contains six other engraved and sculptured animals and three **ebanches**, which Peyrony (1932a:59) thought were done by a different hand. These include two other cattle, in lower relief, and a number of horses and deer done in a perfunctory fashion.

It is also important to remember that the second Solutrean level of the Upper Terrace at Fourneau du Diable contained a block with black painted spots, possibly representing two animals, which would seem to indicate some knowledge of painting by the Solutreans. Large amounts of colouring materials were apparently found in the same level as the block (*ibid.*, p. 64). There were also three small stones engraved or incised with carvings representing deer, reindeer, bison and various **canrides**, and, in level III, several objects resembling circumcised phalli such as occur also in the Solutrean at Badegoule and Le Placard. A smaller sculptured stone fragment showing two animal heads was done in a purely Aurignacian style, as at La Ferrassie, according to Peyrony (*ibid.*, fig. 4h and p. 58), though found in the Solutrean level I or II.

At Jean-Blancs (East side) Peyrony found a broken stone slab on which half of an engraved ibex was preserved; the same thing occurs in the Upper Solutrean of Fourneau du Diable. At Laugerie-Haute, in the middle of **couche H''''**
(Solutrean supérieur) the Peyronys found a limestone block (1938, Pl. IV, fig. 2) engraved with two animals, -- an squid of some kind with a very large head, partly in high relief, and a partly incised head of what may be an ibex with long curving horns; the authors relate the latter representation to those at Jean-Blanc and Fourneau du Viable.¹

The resemblances of the Solutrean friezes at Roc de Sers and Fourneau du Viable to the Magdalenian ones at Cap-Blanc, Angles-sur-l'Anglin and the ambiguous one at La Chaîne à Calvin have often been pointed out. The frieze at Roc de Sers (in the "ateliers solutréen") was thought by Henri Martin to be a semi-circular arrangement of two tiers of eight very heavy blocks of which five are sculptures. One block shows a pregnant horse following a mythical animal, a "pseudo-bovide" or bovine with the head of a carnivore or pig (see Plate IIb of this paper). Three others show horses in full body; the fifth is a scene showing, at one end of the block, a masked human and a number of low-relief horses and

¹Lantier (1930) has described a fragment of bas-relief on limestone which was in the Berlin Museum and came from Hauser's excavations in the Laugerie region. It closely resembled the Solutrean frieze at Roc de Sers, showing part of a horse in the same flat modelling. In the Museum it was described as Solutrean, but its uncertain provenance leaves this open to question. If it came from Laugerie-Basse, of course, it must be Magdalenian; but presumably even Hauser would have known that Laugerie-Basse contained no Solutrean, and so would hardly have called the sculpture Solutrean. So it may well have come from Laugerie-Haute.
a badger, at the other end a man bearing a stick over his shoulder and apparently fleeing in front of a brancing musk-ox. This is one of the few action scenes involving humans in Upper Palaeolithic art, and is reminiscent of the Magdalenian engraving found by Lartet and Christy at La Madeleine, showing a man with a stick or rod over his shoulder in the same position fleeing from a monstrous serpent (see Lartet and Christy, 1865-75, Pl. II B, fig. 8a,b). The frieze was supposed by Martin to have been deliberately overthrown on the platform before the end of the Solutrean occupation by later Solutrean iconoclasts, and this has given rise to some speculation regarding religious strife among the various Solutrean tribes. Lantier, however, has rejected this interpretation and maintains that they fell by natural action. In 1951 two new sculptures were found at Roc de Sers, and these had not been "overthrown" like the others. One of them (Block R) represents a male ibex, deeply carved in relief, with traces of another animal on the block. The other (Block S) is a composite arrangement showing the head of a young capridae of some kind (perhaps an antelope), a bison head and perhaps an ibex (see Graziosi, 1960, Pl. 156a). Lantier (1952a,b) though believing there is a unity of style among all these sculptures, insists that they are not all contemporary but represent the changing religious emphasis of different groups;
he thinks the blocks showing horses, cattle, reindeer, the
bird, and the musk-ox charging the man were done first, and
that the ibexes and the composite block are later in date.
Horse and cattle predominate in the sculptures, with fewer
reindeer and ibex; here, again, the evidence of art and
palaeontology show a discrepancy in relative popularity.

Apparently many of the animals portrayed in this
frieze were later transformed; for example, many of the
earlier bison have been elaborated to become horses, and the
"mythical animal" is a bison whose head was altered into a
wild boar's, according to Graziosi (op. cit., p. 143). The
carving is in both high and low relief, with a plastic
effect which often approaches sculpture in the round. The
areas surrounding the figure are left in the naturally rough
form, probably deliberately, as if to emphasize the
sculptures. The horses are not in the same style as those
at Cap-Blanc where they are more slender and better balanced
with, according to Graziosi (ibid., p. 146), more "maturity"
and greater technical experience due to a later dating. It
is curious that one of the blocks has a hole drilled through
it, like one of the Magdalenian sculptures at l'Angles-sur-
l'Anglin (Vienne).

In the French Pyrenees, Isturitz is apparently the
only site where Solutrean art is known. There, in his level
F.II, Passemard found some incised and notched bone, and a
pebble with an engraved horse. In the same horizon (which they called "Solutréen moyen et typique") the de Saint-Périers apparently found a number of bas-reliefs, engravings and crude sculptures of horses, bison, fish and many undecipherable scrawls.

At Solutré, in the upper horizon (Foyer A), a schist plaque was found incised with rough lines on both sides, part of which seem to represent a horse (Gombier 1955, fig. 21).

It has already been pointed out that the frieze at La Chaire à Calvin (Charente) might as easily be Magdalenian as Solutrean. Graziosi (op. cit., Pl. 164c) thinks it is "probably Solutrean", but says it resembles both the Solutrean frieze at Roc de Sers and the Magdalenian one at l'Angles-sur-l'Anglin. It has four animals in low relief on the back of the shelter; three are horses and the fourth is probably an ox. Two of the horses are in the act of copulating, a motif which is known from no other example of Solutrean art as far as I know.

Probably at Badegoule many of the engravings on stone slabs attributed by Cheyrier to the Middle Solutrean are really from the Upper or Final, as already stated. This may be buttressed by the finding at the nearby Abri Lachaud, in the Final Solutrean, of some undecipherable sketches and a good engraving of a reindeer and fawn in the same style as
at Badegoule (fig. 15, no. 14). Pre-Aubert (Correze) also yielded an engraved horse (?) on a slab, in the same style.

Mention has already been made of the bird-headed human figure discovered by Lemozi at Cabreres (Lot) resembling the dart-pierced figures painted at Pech-Merle and Cougnac. At Cavart (Lot) a crude bird-headed human face was engraved on one side of a pebble in the Solutrean, and an incomplete horse head on the other.

At Pech de la Boissière, in addition to the "ritual shovel" decorated with dots and linear striations, there were two crude animals (the species is not clear) engraved on stone.

The ambiguous nature of the bison engraved on the wall at La Grèze (Dordogne) has already been discussed; it may very well be Magdalenian.

In addition to these more or less realistic or naturalistic engravings, the simple incisions and notches ("marques de chasse") continue in popularity. They are frequent at Fourneau du Diable, Le Placard (where, curiously enough, no Solutrean engravings or sculptures are known), La Tannerie, Lauergie-Haute, Lespugue, Istoritz, Le Ruth, Badegoule, Pech de la Boissière and Lacave.

Now, the above brief catalogue of finds whose provenience is fairly certain might almost be termed the minimum definition of Solutrean art. It excludes wall
paintings and engravings from the Solutrean repertory (except in the Gard-Ardeche region) and limits the Solutrean to portable engravings and sculptures and to friezes. No sculpture in the round is known. On the face of it this is not an impossible situation, of course, although the discovery already mentioned at Cabrerets (Lot) by Lemozi shakes the foundations somewhat. The position outlined by Breuil has not yet suffered much overt criticism in France, but I should like to discuss the positions taken by the Spanish prehistorians whose disagreements with Breuil are of course not limited to Solutrean art.

Pericot's discovery of a large number of painted slabs in unquestionable Solutrean context at Farpallo caused him to question seriously the assumed hiatus in painting during this part of the Upper Palaeolithic (Pericot, 1942). Since then he has reiterated his belief that much of Solutrean art has not been recognized by the specialists and classifiers. Painted rectangles were found at Farpallo, so he believes that this motif first appeared in the Solutrean and developed later in the "Epigravettian". Thus he suggests that the black rectangle under the black stag at Lascaux is Solutrean, and that Solutrean influence is also to be seen at a number of other sites: La Pileta (where he thinks the majority of silhouetted figures are Solutrean), La Pasiega (at least the horse inside the rectangle) and
Altamira (the crude black horse and other similar figures of the last corridor) (Pericot, 1956). The schematic and geometric motifs of the Magdalenian were already common in the Solutrean, he thinks, while painting saw a real *floruit*. As for the origins of this Solutrean art, he inclines to see it as due to influences from Italy or North Africa (Pericot, 1950:117; 1957:277).

Pericot's liking for North African imports had already been discussed in the case of the supposed Aterian influences on the Spanish Solutrean. Probably the artistic connections across the Mediterranean are as ephemeral as the industrial ones, but this part of his thesis is not important. What is important are the avenues for a new approach which his criticisms open up. Jordá Gerdà also points out (1955; 1957) the possible common motifs at Parpalló and Pech-Marle, especially in the dappled or spotted mares, maintains that some of the Altamira paintings are Solutrean and insists that there was no hiatus in painting during the Solutrean.

In conversations with the Writer, Ripoll-Perelló has also expressed his belief that there is much more Solutrean art than Breuil has recognized. He believes, for example, that much (and possibly all) of Altamira is Solutrean; he is convinced that the stags are, and cites the bone engraving of a stag with lines representing musculature which models the wall paintings, claiming that the original excavator,
Alcalde del Rio, was correct in stating that he had found it in the Solutrean and that Breuil wrongly attributed it (and thus the wall paintings) to the Magdalenian. Similarly, in conversation, J. Gombier has suggested that much of the cave art in the Perigord region is probably Solutrean.

Unfortunately, although such arguments may be logical, they are not conclusive. It would be curious if the Solutrean really did represent a dead halt in the Upper Palaeolithic wall art tradition apart from the friezes (especially in view of the Lower Solutrean parieta1 art in the Gard-Ardèche region), but proof for a contrary position must come from further excavations and more intensive stylistic analyses. I have not made any intensive study of Solutrean art, and the present paper can contribute little that is original to the solution of the problem. For whatever it might be worth, it should be noted that colouring materials and pigments are by no means absent in the Solutrean, though of course they may have had other uses than for wall paintings.1

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1 For example, "mineraux colorants" in the Proto-Solutrean of Le Trilobite (Yonne); yellow ochre in the earliest Solutrean level at Solutre; some pigments (not described further) at Le Ruth; red, yellow and black ochre at Pré-Aubert; red and black colours, some in the form of pointed and utilized crayons, at Pech de la Boissière; red and graphite crayons at Le Placard; huge amounts of colouring matters at Fourneau du Piette, especially in the Solutrean supérieur II; crayons at Badejoule; red ochre and black manganese of iron at Jean-Blancs; and occasional finds in the Solutrean of Laugerie-Haute.
The two principal zones for mural art in France are the Perigord region and the Central Pyrenees, and the current developmental schemes for Palaeolithic art (especially Breuil's) have been built up by comparisons and cross-checking of elements in the sites of these centres. Now, it is significant that the Solutrean is very abundant (relatively speaking) in the former region, while it is nearly absent in the Central Pyrenees where it occurs only at Lespugue (Haute-Garonne) and Roquacourbère (Ariège). That is, it seems reasonably certain that whatever cave art may or may not be attributable to the Solutreans in the Perigord district, they cannot very well be held responsible for much, if any, of the flourishing art of the Central Pyrenees. But the Aurignacian-Perigordian and the Magdalenian are well represented in both regions. What I am suggesting is that a careful comparative study might reveal the absence of elements or motifs or styles in the Pyrenees which are, however, present in Perigord; and that these discrepancies or differences might be accounted for by attributing them to the Solutrean.

As presently known, however, the principal characteristics of Solutrean art are something as follows: there is little emphasis on female sexuality, and the nude female torso engraved on a slab at Badegoule seems to be the closest approach to a Venus in the Solutrean (the so-
called Venus with a perforation like a baton perce found at
El Pendo in Spain and now in the Santander Museum bears
only a slight resemblance to a female body, and in any case
its Solutrean provenience is doubtful); no vulvae have yet
been recognized although some phalli are found; 1 no human
figurines at all are known. Engravings on bone, ivory or
antler are rare and are mainly in the form of simple notches;
elaborate decorations on implements such as sagales are
unknown. While some of the engravings on stone slabs are
respectable if not outstanding, there seems to have been a
pencil or for very rough squawks and undecipherable patterns
of lines. (These may have been caused by engraving on slabs
covered with ochre, and such palettes were found in the
Solutrean III at Badegoule, and in the late Solutrean at
Fourneau du Diable) (Payrony, 1932a:52). Relief sculptures

1 In this connection a Freudian psychoanalyticist,
Heilbronn, has tried to glean some data from the Upper
Falaeolithic representations of sex. He points out (1938)
that whereas the vulva is often shown in Aurignacian art and
the phallus is absent, in the Magdalenian vulvae are rare but
phalli are very common. In addition the female figures of
the "Aurignacian" become stylized and formalized in the
Magdalenian (this was before the discoveries of the figures
at Angles-sur-l'Anglin). Jones (1938) remarks that this may
indicate that the Magdalenian artists were more interested
in their own sex and that the frequent combinations of male
and female organs in the Magdalenian might suggest that "the
more purely libidinal motive has been displaced by others of
a more conflicting order" due perhaps to a more difficult
cultural life or climate (p. 450). This kind of psycho-
analytic reasoning is interesting though of course highly
speculative; but it would tend to align Solutrean art more
closely with the Magdalenian in this respect than with the
preceding motives.
are known from a number of sites, and in at least two they
take the form of wall friezes which stylistically are very
like Magdalenian ones. Finally (and very provisionally)
there may have been an actual decline in interest in paint-
ings.

While the stylistic and technical aspects of Solutrean
art can be easily summed up, it is more difficult to give a
good picture of the predominant motives. Human beings are,
of course, rare in all Franco-Cantabrian art and the bird-
headed individuals found in the Solutrean are not unknown
from the other periods. A few other human figurations are
known from the Solutrean: at Roc de Sers (Charente) two men
are shown in the frieze, and Martin found a tiny human face
engraved on the end of a small limestone cylinder which had
been carved with deep rings (Martin, 1928, fig. 17, A, B).
At Oulen (Gard) one of the engravings may indicate an
anthropomorphic figure (see Combier, Druot and Huchard,
1959, fig. 10, and fig. 12, no. 2).

At Badegoula the fauna represented by engravings
include horse, fish, mammoth, ibex, chamois, cattle and
felines; there is even a possible hare sculptured in sand-
stone. On the other hand, although reindeer bones are the
most common fauna remains found here, this animal is least
common in the art and less than 10% of the engravings
represent deer of various kinds. Conversely, capridae are
far more common in the art than their occurrence among the animal remains would seem to warrant, and Cheynier speculates as to whether this is a factor of scarcity or difficulty in hunting these species (Cheynier, 1949:110). In the Gard-Ardèche region, too, there is no close correspondence between the fauna shown on the walls and the remains in the Solutrean deposits. In order of their importance, the engraved animals in this region are mammoth, cattle and bison, then horse and red deer. No reindeer or ibex are depicted although these are the most frequent palaeontological remains, while mammoth remains are nearly absent. Combier, Druot and Huchard (1959) suggest that in the Gard-Ardèche region the mammoth had some totemic or religious significance. On the other hand, it may be simply a case of familiarity breeding contempt in the case of the reindeer and ibex.

As already mentioned here on several occasions, the marked resemblances between certain forms of Solutrean and Magdalenian art has often prompted suggestions of cultural links between the two. Payrony, for instance, suggested in 1950 that the last Solutrean at Pourneau du Diable and Roc de Sers had been contemporaries of the first Magdalenians of that region and had been inspired by Magdalenian artists. His archaeological basis for this belief has been refuted by de Sonneville-Bordes (1960:495-96), and certainly the presence of quite competent sculpture in the Middle Solutrean of
Solntré would seem to provide an even earlier source of inspiration within the Solutrean itself. But at the present time we have no clear idea of the direction of influence, if there was contact, between Solutrean and Magdalenian artists.

I have given here merely a summarization of what is known of Solutrean art. The whole question is still too unresolved to treat more concretely, and must await further research. As a final thought, however, and without prejudicing the case for a more extensive range of art in the Solutrean than has hitherto been recognized, one must wonder about the extent to which the fine Solutrean stone working served as a creative outlet which may have surrogated other forms of artistic expression. This possibility has already been mentioned in an earlier chapter of this paper. To hazard a guess, one would suppose that this kind of work would be more likely to replace worked bone, antler, ivory, etc., than wall painting and engraving, which lie in a different expressive dimension. There is probably a direct relationship here, and the curious Solutrean emphasis on elaborate surface flaking rather than on edge retouching does mark it off from the other Upper Palaeolithic industries in Western Europe. Certainly the more elaborate or delicate examples of Solutrean flint working, especially in the Upper-Final phases, are not practical or functional in the ordinary sense of the term and can hardly be attributed to any other
motivation than art, or, as already suggested, the urge to excel or compete.

(e) The Solutrean Phenomenon in the Upper Palaeolithic Context:

In an earlier part of this paper (Chapter III) there was some discussion of the ideas of Childe and Hawkes regarding the alignment of archaeological stages and cultures. In order to illustrate the principle for the Solutrean, Fig. 27 offers a scheme in which the French Solutrean is laid out in eight geographical regions. Instead of using terms such as Lower Solutrean or Upper Solutrean, the letters A, B, C, D and E have been substituted for the five phases of the Solutrean recognized in Périgord. The table illustrates fairly clearly, I think, the idea that the same kind of assemblage can occur on different time levels in different regions, and indicates how a regional treatment allows for more flexibility and a greater sensitivity in calibrating lags and differential tempos of diffusion.

This table can be contrasted with the more rigid scheme in Fig. 28, where all assemblages which are similar are considered synchronic. Obviously this treatment does not allow for lags or time for diffusion, nor does it allow for the changes in what are, after all, dynamic and continually changing traditions to show up as time differences in the vertical columns. That is, all "Middle Solutrean" industries
are always on exactly the same time-level, while the Solutrean
was extinguished everywhere simultaneously. The deficiencies
of this tyrannical method are obvious, and would be shown up
even more if means of absolute dating were available to
substantiate the postulated time-differences and directions
of diffusion which in this paper have been arrived at on the
basis of comparative typologies.

Again, Fig. 28,b offers a contrast with fig. 28,a.
It is a synthetic reconstruction of the Solutrean in time and
space, based on Tables 1-4, and the differences are obvious.
It should be remembered, of course, that the exact slopes of
many of the slanting horizons are speculative, and their
precise positions in the vertical columns are also not firmly
pinned down. But they illustrate the principle even if they
are not precise, and I believe give a truer picture of
Solutrean development in France (and Spain) than is possible
by the usual methods. At any rate, it illustrates
sufficiently well in a two-dimensional way the hypotheses
developed in this paper and the realities of a part of the
Upper Palaeolithic occupations in the regions involved. The
arrows in the table are intended to show the directions of
evolution and diffusion; the horizontal or sloping arrows
indicate diffusion or movement through space, while the
vertical arrows are intended to show continuities through
time in the given region, i.e., where internal evolution is
demonstrated -- though of course internal evolution is rarely sealed off and protected from "contamination" by diffusion from outside, even perhaps in the case of Solutré.

It is rather curious that no attempts have been made to organize the data of the European Upper Palaeolithic in terms of the area co-tradition concept which has proved so popular among New World archaeologists and has been tried on for size, with varying degrees of success, in most regions of the New World. Probably the general absence of communication between New and Old World prehistorians is to blame for the failure of the idea to diffuse more widely (though Braidwood has used the scheme to buttress his hypotheses for the growth of village and urban life in the Middle East, and it has been severely criticized by the excavator of Jericho, Miss Kenyon).

Perhaps the concept of "a culture area with time depth" cannot be applied to the Upper Palaeolithic of Western Europe accurately, though it would be interesting to try. Rouse (1954) has argued that the concept is not applicable to all areas (for example, that it does not work in the American Southwest) and it is possible that the same restrictions are operative in Europe. The traditions lasting through time must be linked with each other by the sharing of certain traits, and there must be some degree of cultural continuity between cultures which succeed each other; also, each culture must be found in all the regions of the culture
area dealt with. If this rigid model, drawn after the Peruvian scheme and insisted on by Rouse as being faithful to Bennett's original ideas, is adhered to, then there are certain disadvantages to using the area co-tradition idea for the Upper Palaeolithic of Western Europe. The Solutrean itself, with its limited spatial dimension, is an obstacle to such an attempt; another is the parallel Perigordian-Aurignacian phyla, which seem relatively independent of each other like the Anasazi and Hohokam cultures in the American Southwest which have their own histories and thus cannot be said to make an area co-tradition. In the same way, Rouse is unable to see a culture area in the prehistoric West Indies because the non-ceramic Ciboney and the ceramic Arawak traditions coexisted for a long time in the same territories.

In spite of these strictures, it may be worthwhile to attempt an application of the area co-tradition to the Upper Palaeolithic of Western Europe, especially considering the more flexible approach adopted by such authorities as Willey and Phillips (1958) who are again inclined to place the emphasis in such co-traditions on single technologies or other unified systems of forms, rather than on whole cultures (ibid., p. 37). If this position is adopted, then Western Europe does qualify, for there is certainly a strong and powerful stream of continuity in cultural behaviour.
running through all the stages. As far as the flint implements are concerned, in any given industry of the French Upper Palaeolithic there will be a large number of implements which cannot easily be distinguished from those of the other Upper Palaeolithic assemblages. For example, it is not usually possible to distinguish most Solutrean burins, scrapers, perforators, "microlitha", etc., from those of the same classes in the other industries, except in the minority of cases where the retouch betrays them. The same is true of most bone and antler artifacts. In other words, there is a central core of similarity or identity in all these assemblages (the "substratum" of some writers), and in a certain sense each of the "cultures" distinguished in the Western European continuum from about Würm II onward represents an elaboration and recombination of this nucleus or substratum. This seems to be the case from the earliest Perigordian and Aurignacian to the end of the Magdalenian, and holds true, though not always to the same degree, for the stone industries on both coasts of the Mediterranean.

A number of characteristics are common to, and bind together, the various Upper Palaeolithic industries of Western Europe in spite of the unique character of each and the difference of emphasis at different times and places. Some of these are suggested by the following:

The use of bone, antler and other animal materials
for implements;

The emphasis on light stone tools, with a high proportion usually made on blades. Qualitatively we can observe an important emphasis placed on quick, impetuous working by direct percussion rather than on more laborious means of "sculpturing" the implements by step-flaking and reworking of old tools as in the Mousterian. There are few heavy-duty tools such as exist in the Lower-Middle Palaeolithic and in the Mesolithic and Neolithic. Tools tended to be specialized to a high order;

The economy was mainly oriented towards hunting of large land mammals which were often migratory;

Dwellings were usually in rock shelters or caves rather than in open sites with subterranean houses, huts or tents;

There was an emphasis on elaborate forms of painting, sculpture and engraving which were usually naturalistic, with much attention to representations of fauna and little to human figures or the landscape or flora. Personal decoration and ornamentation seems to have been common.

I am not certain that more cultural traditions than these should be added. There seems to have been an absence of such domesticated animals as dogs; there may have been some kind of ritual emphasis on sexuality or fertility; and tailored clothing might have been the rule towards the end,
though this is by no means clear. We do know that there was a fairly uniform physical type of Homo sapiens throughout, but this is not a valid criterion of a tradition. Certainly we can say less about the Solutrean physical type in France than for any other Upper Palaeolithic division.

The view has often been expressed that Western Europe represents a mere cul-de-sac during the Upper Palaeolithic, when it was a kind of refuse area or Land's End where the great Eurasian culture waves broke and petered out; a place where cultures are piled helter-skelter like the linguistic groups of aboriginal California. Now, this view was probably a justifiable reaction to the earlier attitudes whereby the French prehistoric sequences dominated the rest of Eurasia; but it is not much more realistic. On the contrary, there is good evidence that Western Europe was a "high pressure area" endowed with rich resources and culturally advanced and inventive populations. The tendency would then rather be for the direction of diffusion to have been outward as well as inward; that is, Western Europe was a creditor and not merely a debtor culture area. With its rich economic resources, especially in Southwestern France and Northern Spain, this ecological niche would encourage a maximum population of hunters and gatherers from outside, though not hindering the adoption of traits from the peripheral regions.
In the present paper, however, I am less concerned with presenting the notion of Western Europe as a co-tradition area in the Upper Palaeolithic than with using some of the concepts which have been employed in New World archaeology, such as the "horizon" or "horizon style". Now, even within the Solutrean itself there can be perceived a number of broad, sweeping styles of doing things which cut across most of the areas concerned. For example, during the Middle Solutrean phase a style of making unifacial foliates ("Badegoule Points") penetrated into all of the French Solutrean regions except the Pyrenees (where probably the failure of the fashion to diffuse is due to the lateness of the Solutrean entry there and its relative isolation).

In the later Solutrean a number of styles cut across all the regions where the Solutrean is surely present; the tendency for smaller points and foliates; the fashion of stemming implements (even in those regions, such as Solutré, where true shouldered points never caught on or reached); the proliferation of very small tools such as backed bladelets; and, probably, the presence of more retouch on the ordinary tools. In the Lower and Proto-Solutrean the great similarity in pointes à face plane everywhere might also be considered an horizon style in the broadest sense.

The question to be asked, of course, is: what do these "horizon styles" mean? Are they due to actual contacts
between Solutrean groups, or to secondary diffusion of ideas? Or is it simply the independent working out of trends which were already inherent in the Solutrean? This paper is unable to present a clear answer, but would be inclined to attribute most of the parallels to various forms of diffusion. In this paper there have been frequent suggestions that certain Solutrean sub-areas or even sites developed in isolation. These should be regarded as relative degrees of isolation since it is doubtful that, on any given horizon, any Solutrean group was entirely without contacts with others. The thing to establish is the amount and direction of interaction between sites, as reflected in industrial resemblances, and to reconstruct something of the network of linkages in order to understand the rate and direction of the flow of ideas, articles and even people. Ideally this might be shown on a map where the sites are connected by radiating lines which vary in thickness according to the intensity of interaction with other related sites. The heaviest concentration of criss-crossing lines would of course correspond to the culture sub-areas during each of the phases defined.

Only in the Southwest has it been possible, in the present paper, to make any worthwhile guesses concerning the demographic situation during Solutrean times. The Proto-Solutrean and even the Lower Solutrean might, as
already noted, be accounted for, on the basis of present evidence, as the residue of a few bands or families localized generally around the lower and middle parts of the Vézère Valley. Judging from the degree of similarity of implements, especially of pointes à face plane, they were either not yet differentiated industrially or the relations between them were quite close. In the Middle Solutrean one has the impression that while the total population was larger, the number of groups was still small and that the population was concentrated in rather large groupings of, perhaps, a dozen or so families at a site like Laugerie-Haute. Perhaps it was this increasing population density which caused the various Solutrean "colonies" to branch off to the north and south at this time. In the Upper Solutrean a process of splintering or break-up seems to have taken place, with a reversion once again to small independent groupings with less than complete intercourse with each other. Even site occupations by no means distant in space and on the same time horizon (if the assumptions of this paper are correct), such as Jean-Blancs and Pech de la Boissière, seem to have had few direct contacts with each other. In the admittedly fairly homogeneous Southwest at least three culture sub-areas (or regions, in the spatial taxonomy used by Willey and Phillips) can be distinguished:

A. The Lot and Corrèze region;
B. The country along the Beune and Vézère between Limeuil and Le Moustier (Dordogne);

C. The broad zone sweeping across the top and western part of the département of Dordogne (including Fourneau du Diable and Jean-Blancs) into Garente and as far north as Vienne.

An attempt at delineating these sub-areas is made in Map III.

The situation in the Final Solutrean is less clear. This phase can only be identified at certain sites in southwestern France, although it may have had typologically distinct but temporally equivalent contemporaries at other sites. Logically, of course, one would expect to see a dwindling away in size and numbers of these occupations just before the total disappearance of the culture; but whether this was actually the case is unknown.

I have tried in this paper to trace out the micro-evolution of the French Solutrean, mainly in order to align the known deposits chronologically in their relative positions and to seek some hint of the directions in which diffusion and growth must have taken place in space. It is hard to say whether there is a wider pattern than this perceptible in the Solutrean development; that is to say, whether there was a significant cultural or technological advance from the beginning to the end of the Solutrean in
the region dealt with. I can see no evidence that (to use Leslie White's criteria) there was a culture advance reflected in any increase of the amount of energy harnessed or that the efficiency or economy of the means of controlling energy was increased. Possibly the variety and form of armaments, especially of projectile and thrusting points, became more efficient but this cannot be claimed with assurance until more is known of the functions of laurel leaves and pointes à face plane. (For shouldered points there is more obvious reason to suppose utilization as projectile points.) There is no evidence at all in the Solutrean for the use of bows, and no good direct evidence for the presence of the spear-thrower. Indeed, nothing at all in the Solutrean tool-kit indicates a magnification of efficiency or a greater control of energy than in the preceding Upper Palaeolithic assemblages.

The Magdalenian spear-throwers and the Mesolithic bows do, of course, suggest such an advance.

1 The earliest archaeologically dated spear-thrower is from the Magdalenian III of Le Placard (Charente); however, the supposedly pre-Magdalenian death scene from the pit at Lascaux also shows one, and it is possible that they were known before Solutrean times but were made entirely of perishable wood. Only the bone and antler ones have been preserved (Garrod, 1955:21). Cheynier (1949:12) has suggested that the Solutreans at Badegoule used spear-throwers, and cites a "hooked" bone object Peyrony had found in his couche A (D. Peyrony, 1908a, fig. 3, no. 1), but this is incorrect. Cheynier also illustrates some bone objects he found as possible spear-throwers (1949, fig. 108), but the projections on these seem to be natural protuberances and in any case they came from the disturbed soil in the niveau a chic.
Similarly, Sauer's speculation (1947) that the Solutrean (and Magdalenian) reflect specialized hunters from the East who owed their successful invasion of Europe to their mobility and their possession of dart throwers, finely-edged blades and projectile points of high penetration, is at the present time only speculation. It might be mentioned, however, that Vanfrey has also considered the bifacial symmetrical foliate as a superior projectile point with a more reliable trajectory (Vanfrey, 1931:161). If they were so efficient, one wonders why their popularity declined towards the end in favour of shouldered points — unless these latter were even more efficient; certainly they would be easier to haft than the laurel leaves.

Just what the Solutrean does represent, in fact, is difficult to define. I do not think it represents a violent break in the stream of Upper Palaeolithic development in Western Europe, although it does show signs of veering in a somewhat different direction than the other industries. Neither can it legitimately be considered a regression; technologically the stone industry is about as sophisticated as in other periods, and in some respects more refined, even if work in bone and antler was not particularly emphasized. In the field of art the Solutreans seem to have been more than competent in the main branch they chose (sculpture), and were probably responsible for more painting and engraving
than is generally admitted. And, although we know next to nothing of the functional value of one Upper Palaeolithic tool kit as compared with another, it is impossible to say that the Solutrean was less efficient in their subsistence efforts. In fact, it is probable that, all in all, one tool kit did the necessary job about as well as another. It is difficult in the Upper Palaeolithic to point to levels or stages of increasing complexity (except, possibly, in the field of art) such as can be distinguished in, say, the various "Neolithic" cultures of the Middle East.

Some minor traditions may have marked the Solutreans off somewhat. Judging by the rareness of human skeletal material their manner of disposing of their dead may have been different, and perhaps they exposed the corpses rather than interring them. There may also have been some differences in their attitudes towards sexuality or fertility, as reflected in their indifference towards representing vulvae, breasts or female bodies. The near, or complete, absence of perforated batons ("batons de commandement") in the Solutrean also marks it off somewhat from the other Upper Palaeolithic industries.¹

¹A doubtful fragment of a baton peseo was found by Martin at Roc de Sers (Charente) (Martin, 1927, Pl. II, fig. 2). At Badougoule Cheyder claimed to have found fragments in the "Solutréen supérieur" from the disturbed zone (1949, fig. 108, nos. 9, 10). But the best evidence, though still not conclusive, is from the excavations of D. Peyrony at Fourneau du Diable where a fragment of some perforated (cont'd)
As for the kind of micro-evolution which the Solutrean represents: I am inclined to agree in part with Bordes' recent (1960) description of it as a linear evolution in which there is a great deal of stability in the "ordinary" tool kit, and the characteristic implements relay each other in an overlapping fashion rather than replace each other suddenly as he suggests is the case in the Perigordian and Aurignacian. That is, pointes à face plane are gradually overtaken by laurel leaves and the latter by shouldered points, with no abrupt breaks apparent. But this model seems true only in part. Towards the end there was a good deal of regional specialization or ramification, much of it probably contemporary, so that a more exact picture of the Solutrean growth would show it as a fairly bare trunk from the Proto-Solutrean to the end of the Middle Solutrean.

(cont’d.) Implement made of reindeer antler was found in the top Solutrean level of the Upper Terrace, directly under the Magdalenian deposits (D. Peyrony, 1932a, fig. 37, no. 1); and at Laugerie-Haute, where three small fragments of antler which had been perforated in some way were found in the Lower Solutrean (couche H†). However, it is by no means certain that these last were really bâtons percés (D. and E. Peyrony, 1936, fig. 26). They also mention (p. 45) some fragments found in couche H ′′ (Solutrène supérieur) but these are not illustrated and I have not seen them in the Les Eyzies museum. In the other Upper Palaeolithic assemblages not all perforated objects are bâtons, and indeed there was probably a wide range of functions even in the class of objects loosely grouped together as bâtons de commandement; but the failure of the Solutrean thus far to produce a single unquestionable example suggests a certain break in a tradition which runs from Aurignacian and Perigordian through the Proto-Magdalenian to the classic Magdalenian.
and thereafter a series of limbs and branches sprouting forth to provide the complexity which I have tried to describe in this paper. This representation of the Solutrean is seen in figure 29.

In a recent paper (1960), Breuil has repeated his old belief that the Solutrean extended into Western Germany, Bavaria, Poland, possibly Roumania and as far into the Soviet Union as Eastern Siberia. Now, it is clear from the context and from his other writings that Breuil is using the term Solutrean in a general descriptive rather than a specific sense, i.e., as industries possessing Solutrean-like foliates, and that he does not mean that these foliate industries in the Old and New World were genetically related. The problem is something of a semantic one: Breuil sees a number of centres of "formes solutroides" in the world, in Africa, Spain, France, Eastern Europe and Asia, and chooses to lump these probably spontaneous inventions under the general rubric of Solutrean. In this paper I have preferred to recognize the great gaps in time and space and the distinct contexts in which the foliates occur, and so keep the term Solutrean for those Upper Palaeolithic industries of Western Europe which do have a demonstrable genetic relationship with each other. Possibly, if one takes the broadest possible view of world prehistory, there is (as Breuil intimates in the paper referred to above) a kind
of universal tendency towards the production of bifacial foliates; but I am quite convinced that this generalization has no direct application to the problem of the Western European Solutrean on the micro-evolutionary scale on which it has been discussed here.

It is difficult for the present writer to work up much enthusiasm for the suggestions which have been made from time to time regarding the Solutrean influences on New World cultures. These have mainly taken the form of drawing cautious or not-so-cautious parallels between Solutrean foliate shapes and New World ones, e.g., Sandia, or to the occurrence of "pressure-flaking" technique in Europe and America. Occasionally the link-up attempts have been bolder (e.g., see McCown's refutation of this general position in 1939). I do not want to overload the bibliography of the present paper with the many references in Americanist literature to "Solutrean" in the New World, but the most recent by Greenman (1960) leaves one with a gasp of admiration for the author's ingenious virtuosity. He attempts to demonstrate a migration by the Solutreans from the Bay of Biscay region, at a time when the North Atlantic was covered with ice, to Newfoundland (where he supposes many Solutrean and Magdalenian traits persisted into the extinct Beothuk Indian culture) and thence to the American continent.
The attempts to derive the American "Solutrean" elements from Europe via Asia can generally be blocked by the failure to find any real Solutrean in Europe east of the Rhine or Rhone, let alone in Asia. Laurel-leaf shaped foliates have been found in Siberia at such sites as Verkholenskii Gora near Irkutsk in Stage III of the Upper Palaeolithic, and at Tadusha on the Amur, together with "pressure flaking" (Chard, 1959), and also at Pereselentschekskii Punkt in the Yenesei Valley; but, as Chard states, although they are pre-Neolithic there is nothing to suggest an age of greater than 5,000 years. Nevertheless, Wormington has recently suggested that the large, bifacial laurel leaves at the Irkutsk Military Hospital site in Eastern Siberia may be regarded as older than the Mal'ta and Buret sites and attributed to the Siberian Palaeolithic I stage, with an age older than 20,000 B.C. (Wormington, 1962:233). Again, Rudenko (1961, fig. 15,h) shows a bifacially worked foliate from the Palaeolithic site of Ist'-Kanskaya Cave in the Altai Mountains of Siberia, and describes the deposits as older than Mal'ta or Buret, with the characteristic Siberian mélange of Mousterian and Upper Palaeolithic types of artifacts. Whether these foliates also have roots in a Middle Palaeolithic sub-stratum, and whether the New World phenomena owe anything to them, is not possible to say here.
(f) Some suggestions for the future:

It is obvious that there are still a good many problems concerning the Solutrean waiting to be cleared up. This paper has done little more than highlight some of them. Unfortunately, the supply of Solutrean sites still to be excavated is dangerously small, and this situation leaves no room for uninstructed digging or for excavations without a clear purpose in mind; any further destruction of the Solutrean evidence would be unforgivable. The Solutrean sites excavated in the future should be nursed along gently with every possible scrap of information extracted from the work, for there is great danger that otherwise some vital questions will never be answered.

The following is a list of the French sites where Solutrean deposits may still be investigated:

Abri du Mal Pas (or Le Malpas) (Dordogne) - Upper Solutrean.

Abri Maury à Soulâèves (Dordogne) - Upper Solutrean.

Le Ruth (Dordogne) - Lower, Middle and Upper-Final Solutrean.

Badougule (Dordogne) - possibly some Proto-Solutrean.

Fourneau du Diable (Dordogne) - possibly some Solutrean deposits in the slope leading down to the river.

Jean-Blancs (Dordogne) - slope deposits.

Laugerie-Haute (East and West sides) (Dordogne) -
all phases, except possibly the Proto-Solutrean, are still represented.

Abri Maury at Laugerie-Haute (Dordogne) - Lower, Middle and Upper-Final Solutrean.

Abri Pataud (Dordogne) - possibly in the former courtyard near the farmhouse.

Chez Vignaud (Dordogne) - possibly some slope deposits.

Abri Lachaud (Dordogne) - Final Solutrean.

Sous-les-Roches (or Rocheraille) (Dordogne) - uncertain.

Roc de Sers (Charente) - probably some Upper Solutrean.

Sous-Champ (Corrèze) - now under the roadway and probably inaccessible.

Grotte de Rochefort and Cave à Margot (Mayenne) - uncertain.

Abilly (Abri des Roches) (Indre) - extensive Middle Solutrean.

Solutré (Saône-et-Loire) - very important deposits.

Grotte d'Oulen (Gard) - Lower Solutrean.

La Salpêtrière (Gard) - limited Lower and Middle Solutrean.

Grotte d'Hareguy (Basses-Pyrénées) - present but kind uncertain.
Montaut (Landes) - possibly some Solutrean remains.

There are several kinds of data we badly need at the present time to sort out some of the Solutrean tangles. Obviously, a reliable series of absolute dates obtained by radiocarbon or other methods would, if precise enough, be invaluable in determining the duration of each Solutrean phase and the speed of internal evolution. This would also enable us to say whether, in truth, the Solutrean in such peripheral regions as Mayenne, Solutre or the Lower Rhône Valley really coexisted with the Upper Solutrean elsewhere, or if the latest Solutreans in certain districts overlapped in time with the earliest Magdalenians.

The analysis of more of the Solutrean faunal remains in museum collections would also be valuable in determining the nature of the Solutrean occupations of the sites concerned. The results of Pouchud’s work on the remains from sites as Bourneau du Diable (Dordogne) indicate the value of such investigations.

The whole question of Solutrean art has to be reexamined within the context of Upper Palaeolithic art in general. In the present paper I have briefly touched on the importance of this subject and suggested a few conclusions. A more detailed stylistic analysis oriented towards the geographical range of motives as well as to the coincidence of mural motives and finds in archaeological deposits would
be used.

we also really need statistical descriptions of some sites in the Solutrean and some to determine whether the internal geological structure of the Solutrean in these regions are in line with those studied in Southwestern France are at Solntré.

but, more than anything else, we need careful problem-oriented excavations in certain key areas. the necessity of rare resources in the perturbed solntrean birthplace in southeastern France, especially in the lower Rhone valley, needs no underlining. if the opportunity ever comes up to do further research in the remaining proto-solutrean deposits at bejargie-facts or raepoima, it should be seized immediately.

also needed are detailed investigations in such marginal areas as bejargie, or more, to establish the exact living conditions of the solntréans or the periphery of the densely-inhabited area. the verification of the uncertain "proto-solutrean" manifestations in belgium, belgium and the lower lands in northern france also requires future study. the region of raepoima is another such peripheral region where detailed examination of the living conditions would throw much light on these local variants. but, most of all, the site of solntré itself should be investigated with these problems in mind to determine the temporal range
of its industries and the degree of its isolation from the other Solutrean areas of France; the nature of the occupations here is probably the biggest single problem in the whole Solutrean.

The exact relationships of the Mediterranean-type cultures of the Upper Palaeolithic to the Solutrean ones also need further studies. In the present paper I have adopted v. Feulner's old hypothesis that there had been a movement or influence from the Mediterranean region into Périgord during the Middle Solutrean, and have used it to explain part, at least, of the growth of the Upper Solutrean. This explanation is not yet conclusively demonstrated to a satisfactory degree, however, and the discovery of other Middle Solutrean assemblages revealing such an introduction of Mediterranean elements would be a valuable confirmation.

In short, what the investigations of the Solutrean in the past century have revealed is only a small part of what we must have in order to understand this short phase of man's life in Europe in that vital division of the Old Stone Age, the Upper Palaeolithic. We must conclude on the standard note of hopeful pessimism with which so many archaeological accounts are finished — that we shall understand better when a good deal more, and better, field work has been carried out. Or, as the greatest archaeologist of them all put it:
"L'origine des types solutréens d'Europe est donc une affaire complexe qui demandera encore, pour en dénouer l'écheveau, de nouvelles découvertes et des recherches soigneuses..." (Breuil, 1940:266).

The End