Chapter VI

THE CLASSIFICATION OF Solutrean ARTIFACTS

A tool is expressive in that it shows the purpose of the user and perhaps something of the skill of the maker. In so far as it is a work of fine art it shows something still more significant: something of the standards of technical performance and perhaps of esthetic satisfaction.


The typological system which has been used in this study is essentially that devised for the Upper Palaeolithic by de Sonneville-Bordes and Perrot (1953, 1954, 1955, 1956a, b) and slightly amended by the former in her 1960 work. As these authors were the first to point out, this classification is by no means final or perfect, and indeed its defects are those of any such classification where an attempt is made to discern discontinuities between classes of artifacts and to isolate units among objects which often possess a number of disparate ingredients such as retouch, decoration and technique of manufacture. Perhaps the greatest defect is inconsistency: for certain of the "types" (or sub-types) created, the criterion is form, for others manufacturing technique, for others it is secondary retouch. But, as the authors remind us (1956b:559), the greatest merit of such a type-list is just that it exists, and it must be admitted
that, in spite of its imperfections and taking into consideration the fact that it is essentially an intuitive, rule-of-thumb classification, it works rather well in actual practice. Since this writer feels that any attempt to work out a better system should be done on an entirely different level, as suggested in Chapter III, but which will require a greater familiarity with the entire Upper Palaeolithic range of artifacts than he possesses, there need be no hesitation in adopting the typology of de Sonneville-Bordes and Perrot here.

But it must be remembered that this list was made up on the basis of predominantly Aurignacian, Perigordian and Magdalenian materials, and the selections made reflect this bias. Only four specifically Solutrean types (Nos. 69 to 72) were isolated, in contrast to the great detail paid to variations in the other industries. The result is that the list is not wholly satisfactory from a Solutrean viewpoint, and I have made a number of additions or subdivisions to correspond to types which, on the basis of the present study, have been considered significant.

Now this creates a problem. As it is presently set up, the type-list contains 92 types and has no reserved spaces to allow for expansion. As a consequence, the addition of new numbers entails an enlargement of the format on which the cumulative graph is projected, and so graphs
made by the new method and the old are no longer comparable. In point of fact, however, the additions that must be made for the Solutrean are rather unimportant quantitatively, and experience has shown that their presence or absence on the graph makes little difference. The decision in the present case, then, has been to continue using the format of 92 types as far as the graphs are concerned, and to insert the new types (or rather, sub-types) in the list for descriptive purposes. It is not a wholly satisfactory solution, but it is more acceptable than creating several sets of graphs which are not mutually comparable.

Most of the additions which must be made involve the typically Solutrean implements -- the laurel leaves, pointes à face plane and shouldered points. However, several amendments should be made in the "ordinary" category also. The presence in the Solutrean of end-scrappers with the upper face (and very occasionally, as at Solutré and at Masnaigre, the lower face) covered with flat retouch, has often been noted. Certainly it is as distinctive a phenomenon as, say, the end-scrapper on an Aurignacian blade (No. 6 of the list) and should be marked out rather than, as in most cases, being lumped as an end-scrapper on a retouched blade. (This does not, however, include the frequent scrapers made on fragments of laurel-leaves; this is a completely different thing.) Combier (1955a) has resolved this difficulty by creating a
no. 6 bis, "grattoir sur lame à retouche solutréenne" (No. 6 being the scraper on an Aurignacian blade) and I have left it in this category, though calling it familiarly a "Solutrean end-scraper" (see fig. 20, no. 14). When they are double, as occasionally happens, one has no choice but to ignore all other characteristics and list them under No. 3. Another end-scraper variant which has been by-passed in the typological list is what will here be called, for lack of a better name, the "Grimaldian" microscraper. It is a small, delicately made end-scraper, usually with steep retouch on the sides and often made of yellow jasper or other fine stone. Peyrony noted them in the Solutrean of Laugerie-Haute and, since rather similar ones had been found in the "Grimaldian" industry from the Grotte des Enfants and other sites, suggested that there had been a Grimaldian invasion of Périgord (D. Peyrony, 1939-40). Whatever one thinks of

1 Those implements, though never very frequent at any site, have a fairly wide distribution at about 19 French sites in Mayenne, Indre, Dordogne, Corrèze, Charente and Lot. They are also found in both horizons at Solutré, and in what seems to be the late Solutrean at Isturitz. They are also known from some Cantabrian sites in Spain. Most are retouched on only the upper face, or part of it, but at Lacam (Corrèze), Pech de la Boissière, Badegoule, Jean-Blanca and LaugerieHaute: West (Dordogne) and Solutré (S.-et-L.) the lower faces are also retouched in some instances. In most cases they occur associated with shouldered points, but at such sites as Bonneval (Indre), the Grotte de la Chèvre (Mayenne) and Solutré they are in what is, typologically at least, the "Middle Solutrean". In the Southwest, however, they are probably a good indicator of the Upper and Final Solutrean as these terms are used in the present paper. But it might be pointed out that a double end-scraper with a good deal of flat retouch on the upper face does occur in the Lower Solutrean (level 30, or F.6) at Laugerie-HauteEast (see fig. 6 no. 3).
this hypothesis — and I think there is something to it —
the implements do seem to be a significant type or subtype
in the Solutrean of the Southwest where they occur in a
number of sites besides Laugerie-Haute. They are here list-
ed as No. 5, a (see fig. 4, no. 5).

Similarly, there occasionally occur in the Solutrean
backed bladelets which have been covered on one or both sides
with fine, flat retouch. Though never very numerous, they
are distinctive enough to be singled out; at least they are
as distinctive as Nos. 86 or 87 (truncated and denticulated
backed bladelets). Here they have been listed as No. 85,a.
(see fig. 20, no. 4)

A good case could be put up for listing a number of
other implements individually rather than lumping them to-
gether in No. 92, "divers". De Sonneville-Bordes has sug-
gested to the writer that pointed blades, and probably the
implement usually called bec burinat alterne, should have
been singled out as distinct types. These are not peculiari-
ly Solutrean types, of course, and they occur frequently in
the other Upper Palaeolithic industries. I have decided not
to create new types of them here, but probably this should be
done sometime. Possibly the Moustarian-type point which
occurs sometimes in the Solutrean should also be listed
individually.

It is in the typically Solutrean category of imple-
ments, however, that the important subdivisions have been made in this paper. Certainly the idea of refining some of these artifact typologies is not new, but I think the subtypes recognized here are based on somewhat different criteria than have usually been used in the past.

First, the pointes à face plane. The original French label has been retained for this category because I am unable to find an English equivalent which is meaningful and adequately descriptive. A literal translation, "point with a plain face" means little, for this also applies to Mousterian or almost any other point. "Unifacial foliates" is not good either, since this could create confusion between it and willow leaves and even some kinds of laurel leaves; and in any case, the pointes à face plane are by no means always completely unifacial.

The amount of variation among pointes à face plane is so great that one is tempted to split them up into wholly different types, rather than merely sub-types. Indeed, although a little effort can find specimens of intermediate forms which might be considered as filling in the discontinuities between the clusterings, it is probable that the expression pointes à face plane is too wide and inclusive, and embraces too much discrepancy and contradiction to fit easily in a single category. Some, for instance are close to being a special kind of backed blade; others are really unifacial foliates, while still others are merely pointed blades or
even, perhaps, Solutrean versions of Mousterian points. And there are chronological and geographical significances to certain of the sub-types, i.e., some disappeared early in the Solutrean while others persisted, and some are very narrowly restricted in space.

Nevertheless, the framework of the present typology does not allow for the creation of new type-numbers, and the various forms have so long been recognized implicitly if not explicitly, under one heading that confusion would develop if it were too violently broken up now. I have compromised here by recognizing a number of sub-types (Nos. 69, A, B, C, D, E) which, it must be emphasized, are not based simply on superficial form: they represent variations of a very loose central theme (i.e., a flake or short blade, generally pointed, with the usually flat retouch concentrated on part of the upper face and commonly with the bulb removed by chipping) which have reality not only in form but also in time and space. In the early part of this study a larger number of sub-types were isolated, due to the looseness of this category; but later comparisons showed that this list could be boiled down since some were isolated cases, possibly even flukes, which although distinctive morphologically have no significant temporal or spatial distribution. It is necessary, after all, to avoid thinking of each variation as a type or sub-type, since in no case can there be absolute identity between two stone implements and, in theory at least,
the number of sub-types is infinite.

A. Nearly or fully symmetrical, usually pointed at both ends (though occasionally one end is rounded) and with the upper face covered with flat retouch over most or all of its surface. The lower face may be wholly plain, or retouched over part of its surface. This variety is usually made on slender blades. In some cases, especially in the Proto-Solutrean, the blades may be rather thick and give a limace-like effect. (Fig. 8, nos. 8, 9)

B. These are the "typical" pointes à face plane, the kind most usually encountered. They tend to be teardrop shaped, or déjeté, usually to the right, and ordinarily have much of the upper face retouched along the left side of the median ridge. In a few cases the entire upper face may be retouched. As a rule, the retouch on the lower face is limited to "lifting" the bulb by chipping, but occasionally it is broken off entirely.1 This type B may be made on broad flakes or on shortened blades. (Fig. 15 No. 8)

C. This type is occasionally not easy to distin-

1 Probably this basal thinning was a device in hafting the "point", though we know absolutely nothing about the functions of pointes à face plane. None has ever been found hafted or mounted, to my knowledge. Most pointes à face plane do have their bulbs lifted or removed, but some -- of
guish from the last one, but as a rule it is quite distinctive. Commonly it is shaped like a backed knife or point, rather like an elongated Châtelperron point. In almost every case it is made on a long blade, pointed at one end and is sometimes slightly curved. The retouch is concentrated on one side of the median spine of the upper face (in almost every case on the left side, but one or two cases of right-side retouch are known). The bulb may be lifted as in Type B. In section it is usually triangular. (Fig. 10 No. 7).

D. This less common type is broad and rather heavy, often made on a rather irregular flake with flat retouch on most or all of the upper face and on part of the lower. It is sometimes compared to Mousterian points, but is found throughout the Solutrean and not only in the earlier phases. Those found in the Proto-Solutrean at Badegoule are representative. (Fig. 15 No. 11).

E. These are the ones which cluster around the borders of the points à face plane category, and are essentially only pointed blades. They may be single- or double-tipped, and the bulbs are more usually broken off

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The text contains some typographical errors and is difficult to read. After correcting these, it seems to discuss different types of flint tools, possibly associated with specific archaeological cultures. The specificity and technical nature of the content suggest it is from an academic or archaeological document. Further clarification or context would be necessary to fully understand its implications.
or left intact than removed by "lifting". Commonly the flat retouch is concentrated around the tip or tips, with some irregularly scattered along the edges. It is difficult to draw a hard and fast line about these; while in the strict sense they are pointes à face plane, many could as easily be dismissed as pointed blades or blades with some retouch such as are found in any Upper Palaeolithic industry. In the collections I have studies I have excluded as many as possible from the pointe à face plane category, but many other people have included them and even more dubious specimens in this category and thereby artificially increased the percentage for No. 69. (Fig.8 No. 11).

Laurel leaves.

As far as subdividing into "types" goes, the so-called laurel leaves of the Solutrean have not been neglected. It would be tedious to go into all the classifications which have been devised since Arcein's and de Ferry's initial attempt with the Solutré materials. Lartet and Christy, in Reliques Aquitanicae, do not seem to have attempted any systematic typology of the Laugerie-Haute foliates but, as already noted, the popular term "laurel leaf" was applied early in the game by Alphonse Tremeau de Rochebrune in 1866. Possibly the first classification attempted was that of de Ferry and Arcein at the Congress of Norwich-London in 1868 when
they recognized three types: symmetrical, round-based and lessangular. In later classifications, six types of "lance points" were distinguished, and nine "arrow points"; the botanical terminology had evidently caught on, since the new foliate forms included walnut leaves, chestnut leaves, briar leaves, willow leaves, almond leaves and plantain leaves, as well as some geometric forms (de Ferry, Arcelin and Prunen-Bay, 1870). These latter writers, incidentally, believing that they could distinguish between lance points and arrow points, claimed that the bow was used by the Solutreans. Their experiments in weighing the various types as well as measuring them, and finding that the weights clustered around clearly marked means, is surely one of the earliest attempts in prehistoric studies at scientific rather than a priori reasoning (ibid., p. 72). Arcelin's classification of 1890 brought the number of types down to five, mostly based on geometrical shapes of losanges, triangles and ovals. Girod (1906) split them up into four groups: oval, losangular, elongated and massive. Déchelette (1909) adopted Arcelin's classification of 1890. From time to time since then new types have been recognized as further research brought them to light, especially after the Pyrenean and Spanish Solutrean were discovered, but there was no energetic attempt at a classification until Chey-nier's 1949 publication on Badejoule. Here he isolates 18 laurel leaf types, and since then the list has been expanded
to 25 by adding new ones and deleting some of the 1949 "types" (Cheynier, 1958). Most of Cheynier's types are botanically derived, even to such exotic creations as mistletoe leaves, but a few are based on geometry or on parallels with the heads of serpents or the Eiffel Tower.

Now, Cheynier's classification, for all its ludi-
erous undertones, illustrates two fallacies in type-isolating. In almost every case the definition is based solely on the gross form or silhouette of the foliate, with very little attention paid to size and none at all to the quality or kind of retouch. The other defect is that excessive attention is paid to insignificant or "fluke" characteristics which were almost certainly due to accident or individual idiosyncrasy and were rarely repeated. Certainly the existence of a bizarre, irregularly notched foliate at Montaut (Landes) is interesting from the viewpoint of the extreme range of treatment a Solutrean artisan might attempt; but since it seems to be the only one known, it is an eccentric rather than part of a pattern and, like many of Cheynier's other creations, cannot rightfully be treated as a "type".

The following classification of Solutrean foliates is a highly empirical one; it is the result of the writer's inspection of most of the French collections, especially in Southwestern France and possibly is incomplete as far as the Spanish material is concerned. Certainly the present categor-
ies should not be regarded as final or perfect, but in the framework of the classification used here they do seem to be useful and to stand up pretty well.

Just as with the pointes à face plane, we know very little about the original functions of these artifacts and the morphological term "points" should not be accepted too readily. There is a general assumption that the Solutrean foliates were used as spear or dart points. I believe that while many could have been, many others were not made for this purpose. Obviously the huge specimens from Volgu were not, and a large number even of the medium-size ones would also have been too heavy probably. Many of course seem too delicately made for any heavy duty purpose. The asymmetrical ones, especially from the Pyrenees region, would most likely have made very unsatisfactory projectile points. I think it is probable that what has generally been lumped into a single category of implements really represents a number of different ones, and that certain may have served as knives or even scrapers. Some of the extravagantly asymmetrical foliates from Montaut (Landes) closely resemble the semi-lunar knives or ulus of the Arctic. Unfortunately, we have almost no direct archaeological knowledge about the purposes to which laurel leaves were put; Cheynier did find a specimen hafted in the horizontal section of a reindeer mandible at Badegoule, cemented in place by the breccia, but it was discovered in an
unstratified context near the ploughed surface of the site (Cheynier, 1956). It is likely that on the whole the laurel leaves had the same functions as the pointes à face plane which they gradually supplanted -- and some of these latter were almost certainly knives and other hand tools rather than arms. And, of course, many may not have been implements at all in the ordinary sense of the word. The ethnographic collections of the Peabody Museum of Harvard University from the Yurok and other Indian groups of California contain a number of large obsidian and flint blades, shaped like laurel leaves, the largest of which were used as sacred or cult objects or heirlooms, and the smaller as hafted knives or daggers. Very small ones were projectile points. Also, small unifacially flaked points rather like pointes à face plane were sewn or attached to Belts and other articles of clothing as ornaments.

First of all, of course, in classifying the laurel leaves the unfinished specimens or ébauches should be separated from the finished ones. It is sometimes possible to make guesses as to the ultimate form of the ébauches, but in most cases it is risky and tends to distort the ratios of the others. Essentially, an ébauche is a formless specimen and may even have been deliberately manufactured blanks which were kept on hand for later fashioning into finished specimens as required. As far as typological listing is concerned,
The sub-types of No. 70 which have been isolated and adopted in this paper are as follows.

A. Symmetrical, bipointed, medium width. This is the most common form, the feuille de laurier at its most typical. It seems to be the basic stock and is usually found everywhere in France where foliates occur. It seems rather rare in the Pyrenees and in Spain, however. The sides are commonly curved rather than straight, and the retouch may range from very rough percussion to extremely regular flaking. In a sense, this is the basic type of Solutrean and the others are merely elaborations on the theme (fig. 17 no. 9).

B. Broad, symmetrical, bipointed. The overlap of this sub-type with the previous one is often found, but it occurs consistently enough to be distinguished. On the whole, it is a peripheral type, geographically speaking, and is surprisingly rare in Périgord but frequent in the northern sites, at Solutré and in the sub-Pyrenean sites such as at Montaut (Landes). In many cases it is broad and heavy enough to suggest bifaces of the Mousterian of Acheulian tradition (fig. 20 no. 15).

C. Convex based foliates. These are nearly always found in Spain (Cantabria) and in the sub-Pyrenean sites in France; a few are found in the French Southwest and at
Solutré but it is not certain that there is any relationship. There are one or two of these foliates from the French Pyrenees region which seem to be unifacial, but it is not certain that this occurs in a sufficiently consistent way to constitute a new sub-type (fig. 23, no. 1).

D. Concave based foliates (symmetrical). Those, too, are almost entirely limited to Spain and the sub-Pyrenean sites in France. I do not believe that the curious laurel leaves with tiny basal notches which occur at Badegoule should be included here (fig. 24, no. 7)

E. Concave based foliates (asymmetrical). These are also found only in Spain and the French sites near the Pyrenees. It is probably a derivation from the previous sub-type, but has a somewhat different distribution in space, and, most likely, in time as well. They are sometimes, but erroneously, listed as shouldered points (pointes à cran)(fig. 24, no. 12)

F. Asymmetrical Montaut-type foliates. Most Solutrean sites will contain a couple of asymmetrical foliates, usually the result of accident, reworking or poor craftsmanship. However, at certain sub-Pyrenean sites, especially at Montaut (Landes) they are so frequent and so predominant a type that their uniqueness is obvious. They do not seem to occur to any important extent in
Spain and, since those asymmetrical or lop-sided laurel leaves in such sites as Laugerie-Haute-West, Solutré, Sous-Champ (Corrèze), Pré-Aubert and Le Ruth do not really belong in this category in spite of superficial likeness, this sub-type represents a genuine regional specialization (fig. 23 no. 11).

6. Badegoule points or unifacial foliates. The existence of this class is the principal reason that the expression "bifacial foliates" cannot be adopted for the class of implements generally called, in its widest sense, laurel leaves. Since in this particular sub-type one face is nearly plain (commonly slightly concave, with some retouch along the margins of the lower face), they are often called pointes à face plane. But this is a mistake, since (a) they are usually -- not always -- quite large, as large as regular laurel leaves, with the upper face fully retouched and bearing none of the retouch patterns of the typical pointes à face plane, (b) they occur only in association with full-grown laurel leaves which they closely resemble; at Solutré, where they are best known, (fig. 21 no. 7) no pointes à face plane are found, and the same is true at Roc de Sers (Charente) (fig. 19 no. 13). Combier (1955) listed them as pointes à face plane, but in conversation with the writer since then he has tended to agree that they are
really specialized forms of laurel leaves. Just why one face was left plain is not obvious. There is no bulb-lifting as with pointes à face plane. Occasionally there is a little difficulty in distinguishing them from Type A pointes à face plane when the latter are broad, long and with retouch on all the upper face; but generally they are quite distinct. Historically, the evidence seems in favor of a development out of existing laurel leaf types rather than from any pointes à face plane. Cheynier once suggested the term fléchette for this artifact (1949), but of course no connection with the quite different Perigordian fléchette such as found at La Gravette should be implied. For lack of a better name, and to avoid confusion with other Solutrean types, I propose calling them "Badegoule points" since they occur in large numbers at that site. They are also found at Pech de la Boissière, Fourneau du Diable and probably in Laugerie-Haute:West (level 10) and East (levels 30 and 29) possibly they are found at Excideuil (Dordogne) and Le Placard as well, and they are numerous at Roc de Sers (Charente) and Solutré. J. Combier has stated (1955: 161) that they occur at Montaud (Indre), though they are not mentioned in the site report by Breuil and Clement (1906). Unifacial foliates also seem to occur in the "Middle Solutrean" at La Salpêtrière (Gard), though
they do not seem to be miniatures; and in the collections from the Grotte du Figuier (Ardèche) exposed in the Musée de Nîmes I noted some in what may be a Lower Solutrean context.

H. Stemmed points (pointes à pédoncule). The existence of these in the Solutrean of France has given rise to a number of hypotheses regarding, in the last century, links with the Neolithic, and, in the present one, with Spain or North Africa. Several studies have been devoted to them (D. Peyrony, 1932c; Kelley, 1955). They occur, never in large numbers, in most Solutrean regions of France and the degree of stemming varies a good deal. I suspect that this should be regarded not so much as a separate sub-type, but rather as a style or fashion which influenced many of the other sub-types of foliates during part of the Middle and Late Solutrean, i.e., it represents a kind of fashion for stemming foliates and even other implements. The habit does not seem to be restricted to any particular shape or size range, and does not necessarily imply the use of the bow. Many, however, are small (fig. 16 no. 19).

I. Miniature laurel leaves. These are tiny, delicately made bifacial foliates (resembling small-scale versions of sub-type A) with extremely fine retouch. Possibly they might be merged with sub-type A; but there seems to
be a discontinuity of size between these and the range of sub-type A (i.e., no intermediate specimens) and the decision here has been to consider them in a separate grouping (fig. 5 no. 10).

J. In the same way, the very large foliastes (other than Ébauches) found at Volgu, La Crouzette (Dordogne) and a number of other sites seem to indicate a special category. They appear, in Southwestern France, most frequently in the Middle Solutrean and it will be recalled that at Laugerie-Haute the Peyrony (1938) had distinguished a "niveau des grandes feuilles de laurier".

K. The sublosangical, rhomboidal or triangular-based points have long been recognized, especially at Solutré. They probably differ functionally from the stemmed points, which tend to be small whereas the sublosangular ones are larger and in some cases very large (fig. 5 no. 18).

L. A curious sub-type, found nearly exclusively in Périgord, is very elongated and symmetrical with pointed or sometimes rounded ends and absolutely straight, parallel sides for most of the length. The retouch is usually very delicate. They might almost be called bifacial willow leaves. Here, again, one wonders whether this is rightfully called a sub-type, or if it should be regarded as a regular laurel leaf subjected to the fashion for elongation and delicate retouch which flourished at the
end of the Solutrean (fig. 14 no. 5)

N. At a limited number of sites in Southwestern France as well as at Solutré there occur asymmetrical bifacial foliates which are nevertheless distinct from the Mont- taut type found in the Pyrenees. They are found at Sous- Champs and Pré-Aubert (Corrèze) (see fig. 16 no. 7), at Le Ruth (Dordogne) (Peyrony 1909, fig. 44 no. 6) and Badé- poule (Dordogne) (Cheynier 1949, fig. 62 nos. 7-12), while Bordes (1955) illustrates one from old excavations at Laugerie-Haute (Dordogne) and compares it with an American Sandia points. One was also recovered in the recent excavations at Laugerie-Haute: West, level 10 or Middle Solutrean (fig. 4 no. 11). They are usually medium-sized and differ in no way except their outline from the usual bifacial symmetrical laurel leaves, of which they are probably variants. Although they seem to appear first in the Middle Solutrean at Laugerie-Haute, along with Grimaldian end-scrapers and large laurel leaves, they occur also in the Solutréen supérieur of Corrèze, where some twenty were found at Pré-Aubert.

Shouldered points (No. 72 - points à cran)

Three kinds of single-shouldered points have been recognized in this study as being significant sub-types. It seems more reasonable to classify them according to shapes and degree of retouch, instead of merely according to the
angle of the shoulder as Cheynier (1949) has done.

A. Typical simple shouldered points, with little or no flat retouch. This is the earliest and most common kind, and persists to the end of the Solutrean. The shoulder is on the right side. They are found in all regions where Solutrean shouldered points occur, and seem to be the basic type from which the more elaborate varieties diverged (fig. 15 no. 15)

B. Atypical shouldered points. These are almost always simple, with little retouch, but the shoulder is on the left side. These occur rather rarely in most sites, but in one region, around Fourneau du Diable and Le Placard in northern Dordogne and southern Charente, they are found in very large numbers and seem to be a significant local phenomenon. Sometimes they have been listed under No. 56 ("atypical shouldered points") but I prefer to leave this latter category for Perigordian and other pieces which differ somewhat from the Solutrean ones (fig. 18 no. 5)

C. Elaborate shouldered points. These range in size from small to very elongated, and differ from sub-type A in being covered on their upper faces (and occasionally, on part of the lower) with fine flat retouch which is often ribbon flaking (fig. 10 no. 18). Very often, too, they are much longer than the general run of sub-type A. The
shoulder is in practically every case on the right side. They appear in the Southwest later than the simple ones, and their geographical range is more restricted. The extremely elongated ones are even more restricted in space and are found only within the Southwest, sometimes rivalling willow leaves in size and finish. Indeed, the very long ones such as are found at Bradegoule and Jean-Blancs might be considered the result of the style or fashion for elongated sophistication prevalent in the last part of the Solutrean, interacting with a basic and otherwise stable form. They have been found at only one site (Brasempouy) in the sub-Pyrenean region of France, but are frequent in Cantabrian Spain.

The above sub-types refer to single-shouldered points. Probably, in dealing with the Spanish materials, a fourth sub-type should be recognized: the double-shouldered or barbed-and-tanged point ("tête de flèche") found in the eastern sites such as Parpalló (Jordá's Iberian zone). However, I do not believe this type is found with any significance in France and I have not considered it here. The few cases where it is allegedly found in France will be discussed later. These points should not, of course, be confused with stemmed foliates.
willow leaves

These vary somewhat in size and also in the amount of retouch which is applied to the lower face, but otherwise there do not appear to be sufficient distinctive variants to subdivide this category. The retouch is nearly always very regular and fine; the ends are usually rounded and as a rule the implement is concave-convex from a side view as a result of being made on a long, curving blade. In most cases the retouch on the lower face is quite limited.

Willow leaves seem restricted to the end of the late Solutrean and are almost entirely concentrated in the départements of Dordogne, Charente, Corrèze and Lot (fig. 16 no. 20). However, there is at least one known from Isturitz, and they occur again in Cantabria, e.g., at Altamira. Occasionally small, slender, finely worked laurel leaves such as sub-types I or L have been called willow leaves, but this seems to be erroneous.

The following, accordingly, is the typological list for stone artifacts used in the present paper in dealing with the French Solutrean:

1. End-of-blade scraper
2. Atypical end-scraper
3. Double end-scraper
4. Ogival end-scraper
5. End-scraper on retouched blade
5a. "Grimaldian" micro-scaper
6. End-scaper on Aurignacian blade
6a. Solutrean end-scaper
7. Fan-shaped end-scaper
8. End-scaper on flake
9. Circular scraper
10. Thumbnail scraper
11. Carinated scraper
12. Atypical carinated scraper
13. Thick-nosed end-scaper
14. Flat nosed end-scaper
15. Nucleiform scraper
16. Plane or rabot
17. End-scaper/burin
18. End-scaper/truncated blade
19. Burin/truncated blade
20. Perforator/truncated blade
21. Perforator/end-scaper
22. Perforator/burin
23. Perforator (Perçoir)
24. Bec or atypical perforator
25. Multiple perforator
26. Micro-perforator
27. Straight dihedral angle burin ("diedre droit")
28. Asymmetrical dihedral angle burin ("diedre déjeté")
29. Transverse or transverse-oblique angle/burin ("burin dièdre d'angle")

30. Burin on angle of broken blade or flake.

31. Multiple dihedral angle burin

32. Busked burin

33. Parrot-beaked (Épe-de-perroquet) burin

34. Burin on a straight retouched truncation

35. Burin on an oblique retouched truncation

36. Burin on a concave retouched truncation

37. Burin on a convex retouched truncation

38. Transversal burin on a lateral truncation

39. Transversal burin on a notch

40. Multiple burin on a retouched truncation

41. Mixed multiple burin

42. Noailles burin

43. Nucleiform burin

44. Flat-faced burin (burin plan)

45. Audii-type point or knife

46. Châtelperron point or knife

47. Atypical Châtelperron point or knife

48. Gravette point

49. Atypical Gravette point

50. Micro-Gravette

51. "Pointe des Vachons" (now suppressed)

52. Pont-Yves point

53. Backed piece with gibbosity
41. Flèchette
45. Tanged point
46. Atypical shouldered point
47. Shouldered piece
48. Blade, fully backed
49. Blade, partially backed
50. Blade with straight retouched truncation
51. Blade with oblique retouched truncation
52. Blade with concave retouched truncation
53. Blade with convex retouched truncation
54. Blade or flake with double truncation
55. Piece with continuous retouch on one edge
56. Piece with continuous retouch on two edges
57. Aurignacian blade
58. Strangulated blade

69. Pointes à face plane:
   A. Symmetrical with most or all of upper face retouched
   B. Tear-drop shaped with some retouch on both faces
   C. Elongated "backed knife" variety
   D. Broad and heavy, resembling Mousterian points
   E. Retouched and pointed blades

70. Laurel leaves;
   A. Symmetrical, bipointed, medium width and length
   B. Symmetrical, bipointed, broad
   C. Convex based
70. D. Symmetrical, concave based  
E. Asymmetrical, concave based  
F. Asymmetrical, Montaut-type  
G. Unifacial Badegoule point  
H. Stemmed  
I. Miniature  
J. Very large  
K. Sublosangical  
L. Elongated, parallel-sided  
M. Ordinary asymmetrical  

71. Willow leaf  

72. Solutrean shouldered points  
A. Typical, simple  
B. Atypical  
C. Elaborate  

73. Pick  
74. Notched piece  
75. Denticulated piece  

76. Splintered piece (Pièce esquillée)  
77. Side-scraper (racloir)  

78. Raclette  
79. Triangle  
80. Rectangle  
81. Trapeze  
82. Rhomboid
83. Lanate
84. Bladelet with retouched truncation
85. Ordinary backed bladelet
86. Solutrean backed bladelet
87. Truncated backed bladelet
88. Denticulated backed bladelet
89. Denticulated bladelet
90. Notched bladelet
91. Dufour-type bladelet
92. Azilian point
93. Miscellaneous

Implements of antler, bone and ivory

No special classification is needed here, since the Solutrean seems to share in the types of sagaies, points or awls, needles, lissoirs, etc., found in the other Upper Palaeolithic assemblages. There is nothing particularly distinctive about the Solutrean bone, antler and ivory types as far as this study has revealed, but they tend to be repetitive, and restricted both in absolute quantity and in the number of types used. Nor are there any implements which can fairly be said to be peculiar to the Solutrean. In Cantabria Jordá Cerdá (1955:93) has maintained, following Obermaier, that the curved sagaie with flattened midsection is a peculiarly Solutrean instrument. However, it is not certain that this holds true for France, for although it occurs in the Solutrean
here, it is also known in the Aurignacian V of Laugerie-Haute (see D. and E. Peyrony, 1938:39).

The Solutrean use of organic materials such as bone, antler and ivory is not as limited as has often been claimed, but it cannot be said to be well developed except, perhaps, in the final stages at some of the Charente and Dordogne sites. Most **jagales** are simple-bevelled or cylindrical with rounded bases. The so-called bone or ivory laurel leaves and shouldered points which are sometimes reported should not be taken seriously. They represent an idea which goes back to the time of the de Mortilleta. Breuil (1909:1231) has shown that the bone **pointe à cran** illustrated in the Musée Préhistorique (Pl. XIX, no. 149, 1902 ed.) is simply a naturally bent fragment.