Chapter V

THE PROBLEM OF SOLUTREAN "PRESSURE FLAKING"

À propos du Solutréen, W. MacBurney parle de la fabrication, par pression, des feuilles de laurier. Nous attendons toujours qu'on taille devant nous, par pression, une feuille de laurier (nous ne disons pas pointe à cran ou feuille de saule) en silex (nous ne disons pas en verre ou en obsidienne) (Bordes, 1954: 574).

I am not certain when the belief was introduced into the literature that the flat retouch so characteristic of the Solutrean was the result of pressure flaking; but it seems to have happened sometime before the end of the last century, probably as a result of explorers' accounts of the use of the method by primitives. Lartet and Christy in Auliquae Aquitanicae (pp. 17-18), for instance, give some detail to accounts of Eskimo pressure flaking methods as described by Captain Belcher.

But, in point of fact, it is often extremely difficult to know whether pressure flaking has been employed. The too-easy assumption that all the even, flat surface flaking on Solutrean implements is the result of pressure is certainly wrong, but it would be an equivalent exaggeration to deny its presence at all. The truth is that the Solutreans used a number of techniques, probably all that had been known in previous industries, including ordinary percussion retouch
and much more abrupt and semi-abrupt retouch than is generally thought. But they added a technique which, though present before,\(^1\) was rare: the skill in removing thin, flat flakes whose length and width could to some extent be controlled. However, the important point here is that these flakes cannot all have been removed by pressure.

The experiments by F. Bordes (see Bordes, 1947, especially pp. 14-16, 19-22) in reproducing Solutrean-type artifacts have clearly shown that a great deal of the Solutrean effect can be attained by skillful percussion when flint is used, and that not only the large flat flakes but also much of the more delicate finishing retouch are best done in this way. Indeed, in the quotation given at the head of this chapter Bordes has expressed his belief that any other method is impossible for removing the larger flat flakes from flint.

What Bordes' experiments have demonstrated is that surprisingly fine work can be done by simple percussion. However, he has suggested to the writer that this was probably responsible for the irregular, flat flaking but not for the finest parallel ribbon flaking ("en pelure") which possibly was done by two persons working together (or perhaps by one individual using some kind of vise) and utilizing indirect

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\(^1\) Flat, parallel flaking is sometimes found on the edges of Mousterian implements, especially the Mousterian of Acheulian tradition in France. See, for example, Bordes (1961), Fig. 2, c-d.
controlled percussion rather than simple direct percussion. For one thing, flint is probably too hard to permit the removal of long, regular flakes by pressure alone; one either gets short, regular flakes, or irregular ones of medium length. Certainly flakes up to an inch or more in length from flint would be impossible to remove by pressure. Oakley (1957:48) has pointed out that experiments have shown it is practically impossible in the case of flint, to detach spalls more than a half inch in length by simple pressure. Yet it is easy to find even delicate ribbon flaking an inch or more long on Solutrean implements. The experiments of Goodman (1944), though not wholly conclusive, have indicated that flint comes near the top of the list for hardness, while quartzites and obsidian are much more susceptible to pressure flaking. It is unfortunate that such rare observations of pressure flaking by modern primitives as Elkin's (1948) do not describe the kind or size of flake removed by pressure flaking on flint. Coutier's experiments with pressure flaking (1929) are also not very clear in this respect.

It should be clearly understood that no criteria, other than subjective or circumstantial ones, have been devised in this study to distinguish absolutely between pressure and certain forms of percussion flaking. When very short, delicate flaking is present, especially on very small implements such as on the faces of backed bladelets or shouldered
points, or even on miniature laurel leaves and on willow leaves, some pressure, at least, may be assumed without much danger. But for the larger flakes or scales I think this is impossible. What is most important in the Solutrean, it seems to me, is not the exact method used to remove the distinctive flakes (though this information would be useful) but the character of the flaking itself. Flat surface retouching occurs very infrequently on small artifacts in pre-Solutrean times, though probably the flaking on some Font-Robert points is a similar phenomenon. It is its frequency more than its character that is significant in the Solutrean; any previous occurrences were extremely sporadic, but in the Solutrean it attained an importance which has always been one of the most remarkable features of that industry. One of the efforts of this paper, based on the new data from Laugerie-Haute, will be to demonstrate that this technique shows a progressive increase in frequency from the early to the late Solutrean.

Now, the flakes removed by what will here be called "Solutrean flaking" (regardless of whether they were achieved by direct percussion, controlled percussion or even by pressure flaking) are very distinctive and can easily be recognized. Yet no effort has ever been made apparently to mark

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1 They are not universally restricted to the Solutrean, of course. I have noted identical flakes from American Indian sites. They are also known in the Mousterian of Acheulian tradition, according to information from F. Bordes.
tine, but from other types of waste flakes, although the frequency of fish scale-like flakes has sometimes been noted strictly in Solutrean sites. In the Laugerie-Haute excavations they were separated and studied, and although the simple mathematical methods used here did not disclose anything significant apart from the increase in frequency through time, from a technological point of view they are most interesting since they reveal a part of the methods used in making certain Solutrean implements. The size of the flakes detached varies greatly, from enormous ones several inches long or wide, to tiny scale-like pieces which, conceivably, were removed by pressure. The significant thing is that nearly all (some of the tiniest do not) have comparatively broad striking platforms and a very pronounced "lip". It shows clearly that in manufacturing laurel leaves, at least, the Solutreans had made use of the process known as "turning the edge", that is, creating a rather broad striking platform down both edges by grinding to give a base for striking or pushing off the flakes (see fig. 25, no. 5 for an example of this). One of these Solutrean flakes is illustrated in Figure 25, no. 3. According to Kelley (1955:52), Breuil has often pointed out that the Solutrean sometimes used another method of creating such a longitudinal striking platform: instead of grinding it, they struck off a long sliver, a kind of burin blow, which could be used for
the same purpose. This is quite possible, but I do not recall seeing any unequivocal examples.

When ordinary pressure flaking involving very small flakes is carried out by one person, the piece is held in a hand and the flakes are pushed off the lower face which is hidden from the worker or (as by Exdés) from the upper face. Hence it is a question, even if the material is tractable to pressure, whether long, regular, parallel flaking can be achieved in this way. None of the literature consulted makes this point clear, and my own experimenting was inconclusive. Obviously this is a field for more experimenting.

On the other hand, if it is held upright in a vise or notch, and a punch is used, the blow can be directed downward nearly vertically and the control over the flake shape is better. In some cases two individuals may have cooperated in the manufacture. It may be of value to note that this method was reported by Catlin from his own observations among the Apache in the last century:

The master-workman, seated on the ground, lays one of these flakes on the palm of his left hand, holding it firmly down with two or more fingers of the same hand, and with his right hand, between the thumb and two forefingers, places his chisel (or punch) on the point that is to be broken off; and a co-operator (a striker) sitting in front of him, with a mallet of very hard wood, strikes the chisel (or punch) on the upper end, flaking the flint off on the underside, below each projecting point that is struck. The flint is then turned and chipped in the same manner from the opposite side; and so turned and chipped until the required shape and di-
mensions are obtained, all the fractures being made on the palm of the hand (Catlin, 1868:184).

It is not suggested, of course, that all the Solutrean flat retouch was produced in this controlled-percussion manner. As Breuil has mentioned elsewhere (1950), Coutier had shown that by working with a wooden stick and applying rather violent percussion appuyée large, flat flakes can be removed; this Breuil considers to be the laurel-leaf technique, as opposed to what he considers pressure flaking, for small laurel leaves, shouldered points and willow leaves. This writer agrees, though pointing out that even much of the so-called pressure flaking on the latter classes of implements were probably done to a much greater extent by controlled percussion than by pressure, if the productions of F. Bordes are indicative. One of the preliminary steps in making a laurel leaf is shown here by an unfinished specimen from Laugerie-Haute:East (fig. 25 no.1).

In sum, three main methods of stone working seem to have been used by the Solutreans: ordinary percussion, to shape the âbauches and also to make the retouch found on most ordinary tools; a certain amount of abrupt retouch, which occurs in greater frequency than is usually believed, even before the backed bladelets and shouldered points appear; and flat or "Solutrean" flaking, which may have been performed by either (a) direct percussion with a wooden âbaton or -- as demonstrated by Bordes -- with bone or antler, the effects
of using a stone hammer being inferior, (b) controlled percussion, using an intermediate punch, or (c) pressure, when it is clear that the size and nature of the flaking allows this surmise. A very rough estimate of my own is that true pressure flaking probably never exceeds 10% of the total in the recent Solutrean, and is much less in earlier phases.

The origins of the peculiar Solutrean retouch is as hazy as the ultimate origins of the culture itself. This problem will be discussed in a later chapter, but it might be mentioned here that several guesses have attempted to find the roots in the retouch of the Aurignacian (Capitan, 1912:433; Cheyney, 195:213). Déchelette (1903:140) had derived the Solutrean point from the Aurignacian blades with fine marginal retouch, thus implying that the Solutrean retouch also had its origin here. It is clear from the results of the recent Laugerie-Haute excavations, however, that it appears in a rather restrained fashion (speaking quantitatively, not qualitatively, for it is already well-developed qualitatively in the Proto-Solutrean) in the lower levels and expands greatly with the beginning of the Middle Solutrean.

For the Solutreans, in contrast to other Upper Palaeolithic artisans in Western Europe, stone-working seems to have had some special significance over and beyond the ordinary utilitarian purposes. It is not exaggerated enthusiasm to say that they worked stone lovingly, and devoted
to it a care, precision and finesse which, as has been so
often pointed out, carries their results into the realm of
art rather than of utility alone. Thus it is difficult to
perceive a utilitarian motivation in the delicate flat
(probably pressure) flaking found on the sides of some of
the backed bladelets or on the surfaces of some end-scrapers.
For some reason, the artistic impulses of the population
seem to have been exerted in this media rather than in some
other. It is revealed as much by the careful selection of
raw materials (both from the view of attractiveness, such as
veined or spotted jaspers, chalcedonys and rock crystal, and
for its fine grain for better flaking results) as in the fine,
even exquisite controlled percussion and pressure flaking.¹

Why did this trend come about? And what can we deduce from
the archaeological residue about the Solutrean attitudes to-
ward stone? These are questions about which it is permissible
to speculate. Certainly it reveals a certain shift in atti-
tude. This is not to say that the preceding and following
Upper Palaeolithic industries were devoid of skilful stone-
working, but it is true that in morphological artistry and
in secondary retouch the Solutrean reached a climax which was

¹Though it should be recalled that in the Spanish Can-
tabrian sites, where quartzite is predominant, the same regu-
lar, parallel or "ribbon" flaking is found on the coarser-
grained material which in other regions is found on flint and
fine-grained stones.
not again reached until much later times in the Old World.
Yet this applies to only part of the Solutrean tool-kit; the
elegant specimens are in strong contrast to the ordinary
tools, which are usually quite mediocre and poorly retouched.
Solutrean burins, for example, are not well developed --
there is no peculiarly Solutrean burin type -- and are often
very makeshift indeed; casual burins-on-breaks always form
a large and often predominant portion of the burin category
in every Solutrean industry inspected. End-scarpers are
fairly well made, though not especially so, and there are
only one or possibly two distinctive Solutrean scraper
types. The retouch on the heads of the scarpers is often
delicate, however, and in some cases it is possible to iden-
tify a Solutrean implement, in the absence of circumstantial
evidence, by the sharp, almost cutting edge of the head which
has been formed by flattish flaking. Perforators are usually
poor and makeshift too, but occasionally the Solutreans
were moved to produce an extremely elongated specimen.

While the whole Upper Palaeolithic tradition in Wes-
tern Europe can be said to be marked (in a general way: I am
aware of the exceptions such as the Aurignacian V or the
early Magdalenian) by such characteristics as: light, portable
tools, composite implements, quick abrupt workmanship rather
than laborious flaking -- yet the Solutreans seem to have
carried this tendency towards flamboyancy in retouch to bi-
zarre or spectacular forms (in their laurel and willow leaves
especially) and to functionally superfluous niceties, to a point which must certainly denote something about their psychological tradition as well as their technological ones. It can hardly be doubted that the most striking exhibitions of this were designed for something more than subsistence functions. It is not impossible that there were centers of fabrication from which the productions were traded within the Solutrean zone — the enormous number of 5,000-plus shouldered points found in the late Solutrean of Le Placard (Charente) suggests something more than mere local self-sufficiency. The fact that many laurel-leaves, willow-leaves and shouldered points, by reason of their extreme fragility, could never have been seriously used as weapons or tools has often been remarked. One feels that a number of Solutrean groups included connoisseurs or aesthetes who delighted in this kind of performance for its own sake and perhaps in competition with other groups or individuals.¹ Certainly

¹ There is an interesting reminder of something of this idea in Man's observations of the habits of the Andaman Islanders: "In the manufacture of their weapons, utensils, and other articles, they... spend... hour after hour in laboriously striking pieces of iron with a stone hammer for the purpose of forming spear or arrowheads, or in improving the shape of a bow, etc., even though there be no necessity, immediate or prospective, to stimulate them to such efforts. The incentive is evidently a spirit of emulation, each one priding himself on being able to produce work which will excel, or at least compare not unfavourably with that of his neighbours" (Man 1932:26). Again, certain Australian tribes make heavy, painted spears which are carried about as indicators of personal status or wealth but are never used — and indeed, are nearly useless — for more practical purposes.
it is harder to explain this kind of art by such dogma as hunting, sympathetic or reproductive magic than is the case with cave paintings or engravings on organic materials, though of course ritual or ceremonial purposes cannot be excluded. Solutrean stone-working may present the evidence that some Palaeolithic artistic impulses, at least, could be free of all these latter-day interpretations and owe their being in certain instances to purely aesthetic feelings. Perhaps Solutrean concentration on this branch of expression was partly responsible for their lesser emphasis on painting, engraving and work in bone, ivory and antler. Whether this represents aesthetic decadence, as is usually claimed for the Solutrean period, is another kind of problem, and must be decided subjectively.