

VI.

SCOTTISH MICRO-BURINS. BY A. D. LACAILLE, F.S.A.Scot.

Read February 28, 1942.

I. INTRODUCTION.

The so-called micro-burin, first glimpsed in 1871¹ and clearly described by Chierici² in 1875, has been made the subject of many papers, notably in the decades immediately preceding and following the last war and from the pens of Breuil, Siret, and Lequeux. In Scotland the artifact was first recognized twenty years ago.³ In 1935 I⁴ added new specimens to the list and can now establish its distribution still more fully. In my paper to this Society on "Scottish Gravers," in 1938,⁵ I reserved micro-burins for separate discussion, being convinced that they could not be considered in the same category as true gravers. Actually their use and cultural connexions have been the subject of much controversy. In space they are diffused from North Africa, Egypt, and Palestine to Central Europe, the Baltic lands, and Scotland. In time, an Upper Palæolithic Age has been claimed⁶ for some examples, though this is not proved. The type was certainly current over a long period on the Continent; and in Scotland, though known mostly from surface-finds, they come down to the Bronze Age. Still, outside Scotland, it is in purely Mesolithic industries that micro-burins are to be expected.

It has been noted that micro-burins are common in microlithic industries that do not comprise the most advanced geometric forms, such as trapezes. Hitherto this seemed to hold good of Scotland too, for the only site here, Shewalton Moor, Ayrshire, from which trapezes have been recovered, has yielded no micro-burins. On the contrary, on Deeside, at Ballantrae, and in the Tweed valley, trapezes are unknown, but micro-burins common. So, too, Deeside and Ballantrae show a higher proportion of micro-burins than does the valley of the Tweed, while in the latter area good geometric shapes are commoner than in the first two regions. Still, in the Tweedside industries many artifacts testify to the vogue of the micro-burin technique, applied even in materials less tractable than flint, and two micro-burins are known from the Culbin Sands.

I now find it difficult to believe that the micro-burin can really be absent

¹ C. Rosa, *Ricerche d'archeologia preistorica*. . . .

² *Bull. Paleol. Ital.*, i., ia. pp. 2, 17, 141.

³ H. Breuil, *Proc. Soc. Ant. Scot.*, lvi. p. 265.

⁴ *Proc. Soc. Ant. Scot.*, lxi. pp. 443-5.

⁵ *Ibid.*, lxxii. p. 184.

⁶ *E.g.*, J.-F. Pérol, *De l'industrie microlithique de Lacam*. . . ., Brive, 1935, pp. 1-16; cf. p. 117 below.

from Shewalton and incline to attribute the absence of specimens from available collections to chance.

As the collections from the Scottish sites mentioned consist mainly of surface-finds in the strictest sense, it is thought that there can be little disparity in age between them. In general, their chronological position is not strictly definable, but those from the so-called 25-foot beach at Campbeltown, described in *Proceedings*, 1940-41 (pp. 70-3), can be referred on geological grounds to the Atlantic climatic phase. The industry from shore sites there, occupied during the early post-glacial marine transgression, provides, not only the oldest examples of Scottish microliths and micro-burins, but also the earliest incontrovertible evidence for the presence of man in that part of Scotland. Moreover, Breuil identified a micro-burin among flints from a shell-mound at Oronsay,¹ resting upon the equivalent raised beach. Finally, a micro-burin is said to have been picked up on the surface of the 25-foot beach near Stranraer.²

Typology.—Before considering the production of the micro-burin we may mention here that a typical specimen consists of the butt or bulbar end of a small flake notched in the upper part, usually on the right side of the obverse or flake-scarred face. The bulbar face, or reverse, exhibits a small triangular facet or scar—actually an undercut fracture—extending from the plane of this face to the side of the flake opposite the notch, *e.g.* fig. 3, No. 2, from Campbeltown, No. 4 from Ballantrae, Nos. 3, 5-8 from Banchory, notched on the right; fig. 3, Nos. 9-10 from Ballantrae and Dryburgh respectively, notched on the left.

Some micro-burins are made on the upper ends of flakes, and their significance is explained on p. 108. Only a few can be recorded from Scottish sites, mainly specimens noticed in the late Rev. Dr Wm. Edgar's Ballantrae collection, *e.g.* fig. 3, Nos. 11 and 12.

Many inquirers have interpreted the characteristic small scar as a graver-facet because its intersection with the extremity of the notch on the opposite face resembles a narrow chisel-edge often appearing as if at the end of an offset beak. Some of those who see a tool type in the micro-burin insist that the small facet varies in respect of the angle it makes with the long axis of the flake. Hence, micro-burins have been classed with graters of the category known to French prehistorians as *burins-sur-lames-appointées*, or as transverse graters. Other archaeologists consider micro-burins to be awls, but, while holding different opinions as to the destination of the artifacts, the two schools agree that micro-burins are peculiar to Tardenoisian culture (*cf.* p. 116). Yet, even if we admit that some micro-

¹ Sir George Macdonald, *Prehistoric Scotland* (typescript, p. 49), suggests the possibility that this specimen really belongs to the Campbeltown group recovered by Gray (*Proc. Soc. Ant. Scot.*, xxviii, pp. 270 ff.). This is not very important since I have now identified micro-burins from Risga and other kitchen-middens referable to the same culture.

² V. G. Childe, *The Prehistory of Scotland*, p. 20.

burins were used, whether provided with a handle or not, then we must also confess that the very delicate extremities necessarily restricted their use. In any case, it seems unlikely that micro-burins could have served as gravers (*burins*). Their slightness is at once obvious when they are placed alongside small graver forms from our microlithic industries. The comparison stands out well in fig. 3, showing typical micro-burins and a small laterally hollowed angle-graver of green chert from Dryburgh (fig. 3, No. 1).

Though never overlooking the possibility that some micro-burins may have been employed, the writer would say that such injury as he has detected in the sharp ends of Scottish specimens always bear the indications of a blow and not of wear.

II. TECHNOLOGY.

A.—Parts of the sketches figured in Dr J. G. D. Clark's¹ summary of Siret's and Lequeux's theory of the micro-burin are reproduced in fig. 2. They have been cited because of their clarity, but, for reasons stated below, certain indications in Clark's group have been omitted in this work. It is hoped that the included illustrations, and those of different artifacts, as well as the brief descriptions which follow, are intelligible enough to make long comments unnecessary. M. Ed. Vignard's² painstaking and detailed treatise on the typology and technical features of micro-burins from Sebil, Upper Egypt, provides matter for additional figures which may also be helpful. Fortunately, the present author is able to figure actual specimens in support of the theoretical aspects dealt with by English, French, and Belgian workers.

A microlith (obliquely truncated flake) and a micro-burin from Professor Dorothy Garrod's excavations at Mount Carmel, which came into the possession of my friend the late Mr J. G. Marsden, of Acton, are illuminating (fig. 1, No. 1, 1 and 2). When these are brought together it is at once seen from the coincidence of the ridges and flake-scars on their outer faces that the two objects are the complementary parts of the same flake (fig. 1, No. 1, 3). The inverse working, however, impairs the fit on the bulbar surface, but this imperfection helps further to elucidate the manner of production of some microliths.

The representation of the Mount Carmel specimens shows how they agree with hypothetical examples included in the diagrams which refer to the manufacture of microlithic forms (fig. 2, No. 1, 1-6). Having all these before us, we think we can recapture the method by which the parent flakes were divided.

¹ *The Mesolithic Age in Britain*, pp. 97-103.

² *C. R. Congrès Préhistorique de France*, x., Nîmes-Avignon, 1931, pp. 66-106.

B.—Holding a suitable flake (fig. 2, No. 1, 1) bulbar face downward, the artisan made a notch in the side of the flake some distance above the butt (fig. 2, No. 1, 2).

The flake under treatment was then placed upon a ridged anvil (a flake, core, stone, or piece of wood), with its bulbar face upward and the bulb toward the operator. The flake was inclined downward (*i.e.* the bulb

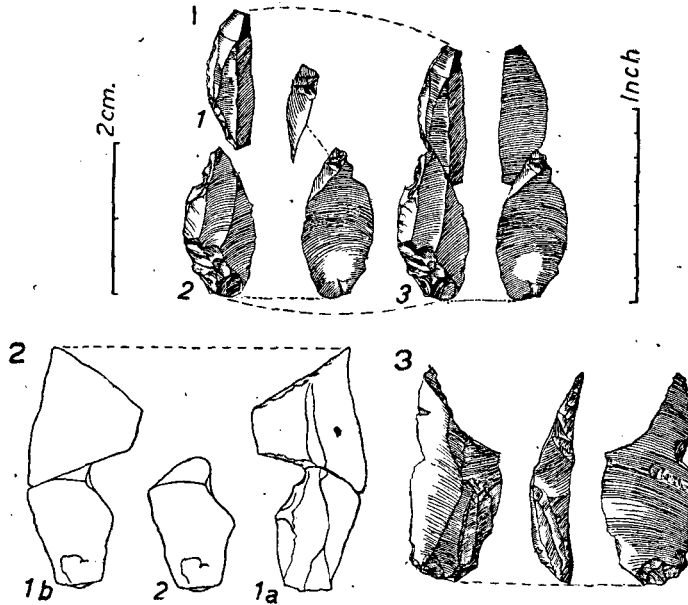


Fig. 1. The theory of micro-burin technique: No. 1, Mount Carmel, *cf.* fig. 2, No. 1; No. 2, El Gárcel (after Siret), *cf.* fig. 2, No. 2; No. 3, Dryburgh, *cf.* fig. 2, No. 3.

lower) with its long axis across the ridge and deflected to left or right according to the side in which the notch was made (fig. 2, No. 1, 3a, 3b).

With a pointed and light hammer (perhaps another flake), the knapper dealt a blow at the base of the notch. The desired place of impact is shown by a dot on the theoretical pieces sketched (fig. 2, No. 1, 3a, 3b). This operation resulted in the undercut fracture of the flake. The breaking of the flake was accompanied by an oblique positive faceting of the lower part, extending from the notch to the opposite side, with a knot or stigma (actually part of a cone of percussion) at the point of impact. Fig. 2, No. 1, 4a shows enlarged views of these features. On the detached upper end of the flake the point of impact is marked by a small pit (actually a hollow of percussion) accompanied by a negative facet. Fig. 2, No. 1, 4b shows an enlarged view of these features. A side-view (fig. 2, No. 1, 4c), enlarged also, is shown.

The lower part or bulbar end of the flake, now the micro-burin (fig. 2,

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P. 106, *line 1*, for "downward" read "upward."

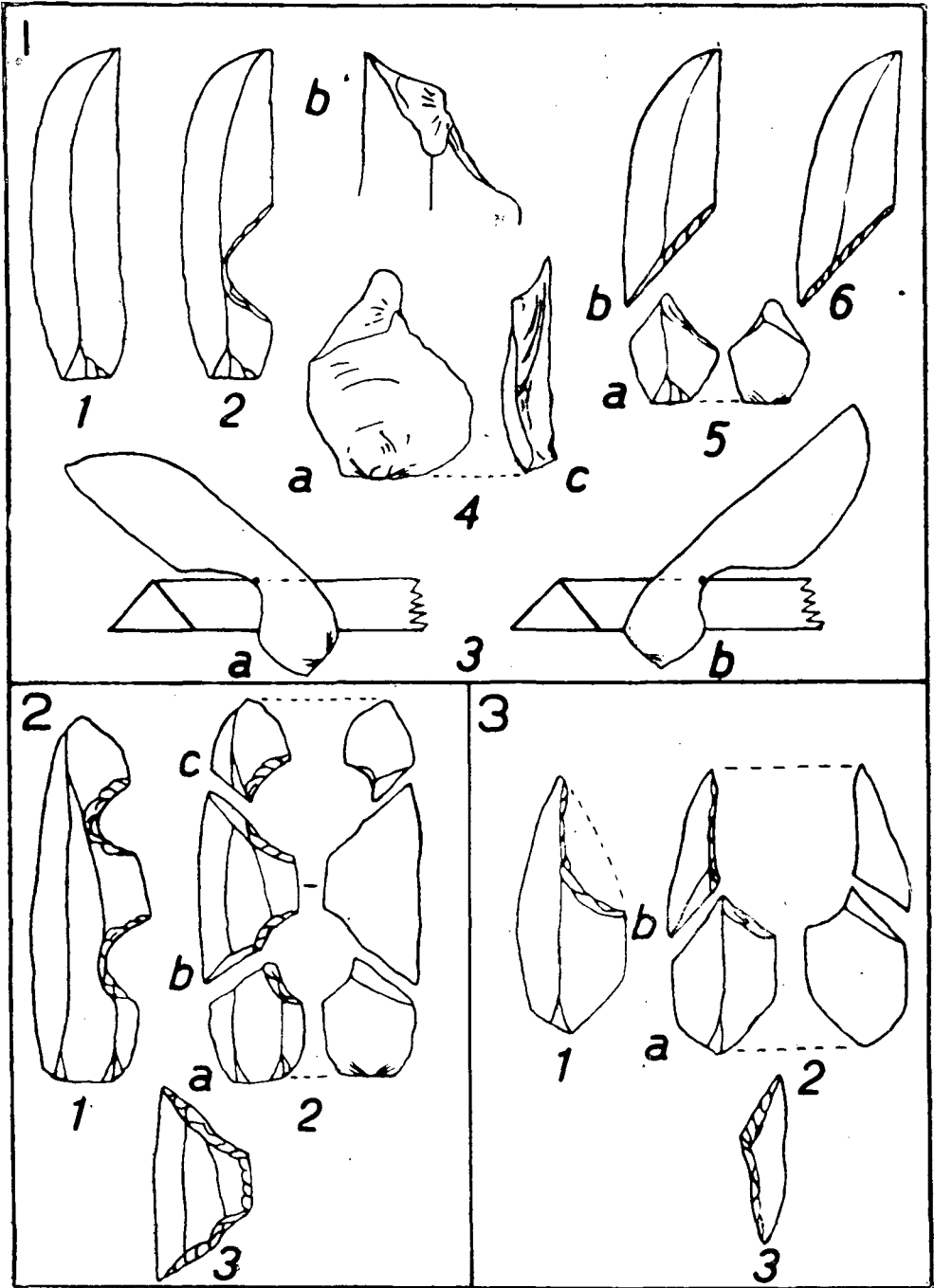


Fig. 2. The theory of micro-burin technique. (After Lequeux, Siret, Clark, and Vignard.)

No. 1, 5a), received no treatment and was discarded. The edge of the detached upper part of the flake (fig. 2, No. 1, 5b), which was involved in the first process of notching, was blunted by abrupt retouch for the length required to complete the microlith (fig. 2, No. 1, 6).

Many microlithic forms (which forms are so often fashioned in the upper ends of flakes) must have been produced by the method outlined. The prehistoric craftsman's aim in adopting the process was to remove the unwanted thick part of the flake. That micro-burin technique was not applied in the manufacture of all diminutive steep-edged artifacts appears from the occurrence of small flake-implements retaining the bulb of percussion, or from which the bulb was removed by slicing the flake at the base, or in which the bulb has been dressed down.¹

Trapezes, as one group of theoretical figures shows (fig. 2, No. 2, 1-3), and other advanced geometric shapes could be produced in the manner described by first forming suitably spaced lateral notches in a flake (fig. 2, No. 2, 1), and applying the necessary retouch to the middle portion removed. In the manufacture of some of these, particularly trapezes, two micro-burins would result from the division of the flake. Fig. 2, No. 2, 2 shows the whole group, comprising fig. 2, No. 2, 2a the lower micro-burin, fig. 2, No. 2, 2b the required piece of material, and fig. 2, No. 2, 2c the micro-burin on the flake-tip. The author, although unable as yet to figure three actual complementary parts of the one flake (*i.e.* trapeze or other geometric form with its two concomitant micro-burins), can yet illustrate a trapeze and its lower or bulbar micro-burin (fig. 1, No. 2, 1a, 1b, and 2) found by Siret² at El Gárcel, Almeria. The sketches show that, while the ridges and flake-scars on the outer face (fig. 1, No. 2, 1a) agree, a slight disparity, due to inverse marginal retouch, appears on the bulbar face (fig. 1, No. 2, 1b), as is the case in the pair from Mount Carmel, *supra* (fig. 1, No. 1). The bulbar face of the Spanish micro-burin, isolated from the trapeze, is represented by fig. 1, No. 2, 2.

So far, the Scottish sites which have yielded micro-burins on flake-tips have given no trapezes. The explanation of these rare micro-burins would therefore lie in such geometric shapes as triangles, whose manufacture called for portions of material determined by two notches formed in the parent flake before division.

The merits of the method of cutting flakes by micro-burin technique are apparent, because, in addition to getting rid of unsuitable material, the notching, by reducing the width of the flake, facilitated fracture at a pre-

¹ The micro-burin technique has not yet been observed in Orkney where we find small flints, trimmed in microlithic style on complete flakes (*Proc. Soc. Ant. Scot.*, lxi. pp. 251-62). In this respect they resemble some stone industries from Ireland whence the micro-burin has not been reported up to date (*cf.*, *e.g.*, *Ulster Journal of Archaeology*, 1938, i. pp. 90-4). Such pieces are made in the tradition of the Upper Palæolithic abruptly retouched, narrow flake-tools.

² *Revue Anthropologique*, 1924, pp. 121-2, fig. 4.

determined point of least resistance. In the preparation of certain forms it allowed the operator to fix in advance the principal dimensions of the desired artifact.

From the foregoing it seems clear that in the micro-burin and concomitant microlith from Mount Carmel the characteristic transverse facets result from a blow delivered whilst the parent flake was held upon an anvil. One may even go further and assert that scrutiny of all true micro-burins, and experiments in flint-working according to the procedure described in the foregoing confirm the claim that the typical features could not have been produced otherwise.

Readers may have perceived that the mode of production outlined above diverges from that suggested by Lequeux's sketches reproduced by Clark. In these an arrow indicates the supposed direction of the blow intended to divide the notched flake; but, having given every consideration to the matter, the author ventures to point out that if the process (Lequeux's) were followed it would be necessary for the operator to hold the flake under treatment in the hand by the end (butt or tip according to the position of the notch), and the large portion would have to be struck off as a flake. Further, the method suggested by the directional arrow would not account for the fact that the knot or stigma of percussion occurs so often some little distance from the edge of the notch. Siret and Vignard are much nearer the truth in their deductions, as indeed we have been able to confirm from others' and our own experiments.

C.—An examination of the features evident on the two specimens from Palestine suggests certain further considerations. For example, had the blow, intended to divide the parent flake, not fallen accurately, the resulting facet would diverge somewhat from the standard present in the perfect type. In this connexion it may be observed that many small artifacts, although suggestive, are yet so scarred that at first sight it seems difficult to assign them to their proper place. Closer examination of their dominant traits, however, may show that the objects are the unsuccessful results of applying the specialized technique outlined above and that they belong to the same category of prehistoric products as micro-burins, namely, the by-products of microlith manufacture. Such specimens in flint are probably not more numerous in Scotland than elsewhere, but in the Tweed valley, where green chert served extensively in the production of microliths, the proportion of micro-burins and waste bearing aberrant features is decidedly high. Chert in this region varies greatly in point of tractability, and, to judge from artifacts worked in it, this rock seems not always to have been obedient to micro-burin technique.

The characteristic micro-burin facets may be noticed to differ slightly even in typical specimens bearing the signs of accurate division of the flake. This peculiarity can only be put down to the accident of fracture, due

perhaps to the properties of the rock or to unconscious variation in striking. Thus, the force of the blow upon the base of the notch could not always be uniform, and considering the hammers probably used and the small size of the piece under treatment, it could hardly be expected that the blow should inevitably fall with absolute precision. Besides, so delicate are the flakes operated upon that even slight variations seem exaggerated. Indeed, it is more surprising to find that there exists such uniformity in the principal traits of micro-burins, a fact which testifies to consistently accurate division of flakes. Hence, so closely do most of our micro-burins resemble each other that the reproduction here of but a few specimens from any one rich locality would suffice for a technical review. However, to support this assertion, examples, representative of our principal microlithic industries from more than one district, are illustrated in fig. 3.

The Deeside, Tweed valley, and Ballantrae microlithic series, which do not include trapezes, comprise such numbers of micro-burins as to show that the technique described above was much in vogue. The actual variety of micro-burins, however, is seen to be limited, as already stated. But, for the purpose of demonstration, a few variants, which now call for brief mention, may be shown as well as representatives of the standard. All examples referred to, and, no doubt, those to be discussed, may be taken as characteristic of the known Scottish microlithic industries, and they are probably equally typical of what new sites will yield.

D.—Sometimes it is not easy to determine by the eye alone whether the blow fell within or close to the notch even in apparently typical specimens of micro-burins, but inspection under the lens will reveal the mark of impact with the accompanying signs of shattering and rippling. Other micro-burins, seemingly quite normal, visibly betray slight variations taking the form of evidence of blows dealt slightly to one side or the other of, or even inside, the notch. Many specimens suggest indifferent workmanship, or accidents in manufacture, but it does not follow, where there is evidence of irregular division of the flake, that the concomitant part detached was necessarily rejected as unsuitable for dressing into the microlithic form required.

A fairly common case is the small preparatively notched flake in which the undercut fracture did not resolve into a clean oblique facet, but developed into one running down the whole length of the side of the flake. Such instances suggest use of faulty rock, in which the vibration set up in the piece under treatment by a blow, perhaps too vigorous, would cause the flake to fracture across its long axis with accompanying lateral downward splitting. Examples, found near Birkwood, Banchory, show this accidental fracture-feature (fig. 3, Nos. 13, 14),

It may be that the anvil played a part in fracturing flakes under treatment by micro-burin technique. Thus, if a flake were held down too lightly and a rather heavy hammer were used, the flake upon being struck would

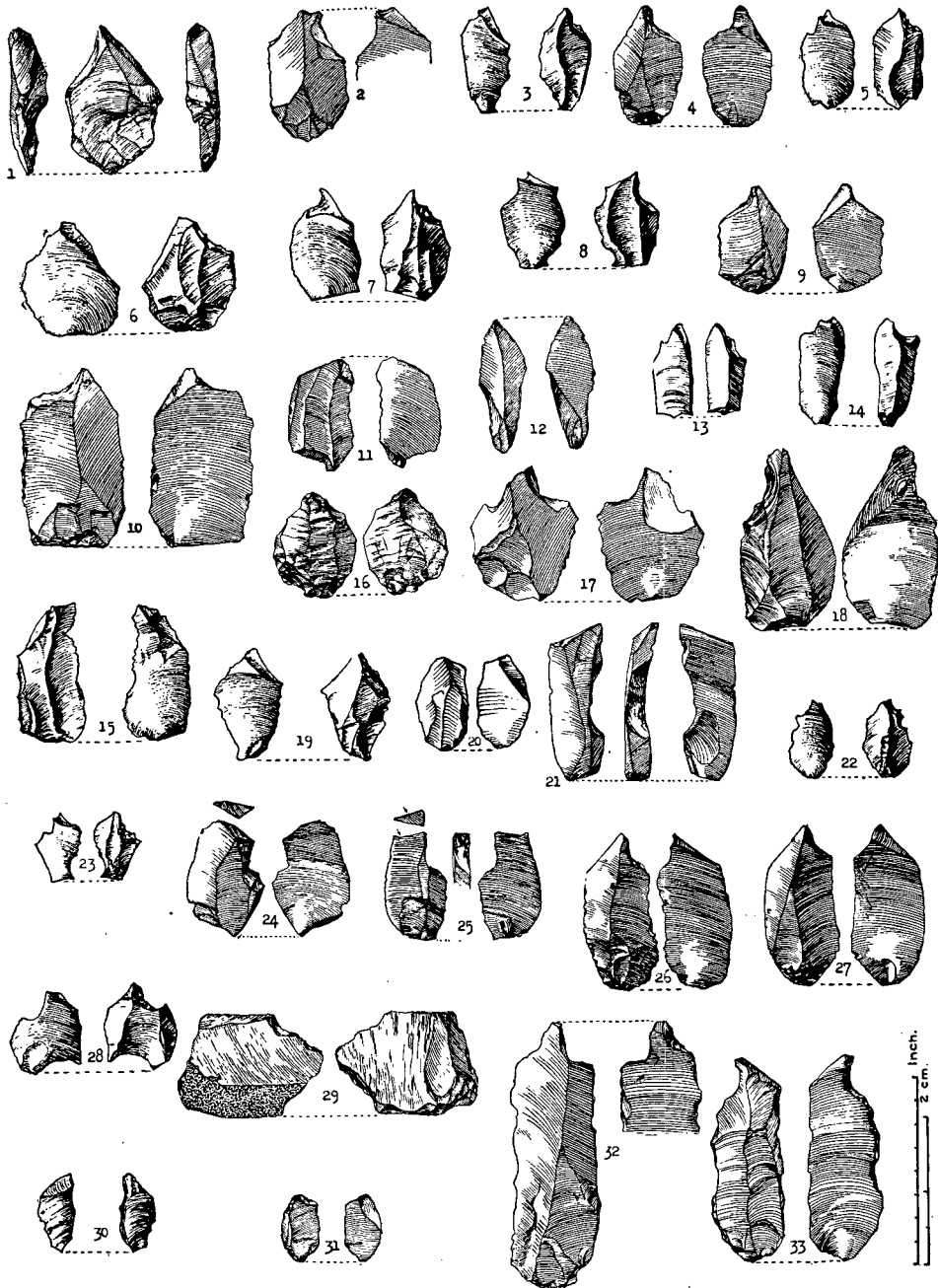


Fig. 3. From Scottish sites: No. 1, Angle-graver (for comparison); Nos. 2-20, 26-28 and 31, Micro-burins (13-18, faulty fractures); Nos. 21-25, Notched flakes (22-23, breaks; 24-25, miss-hits); No. 29, Flake, apparently divided by micro-burin technique; No. 30, Broken microlith (for comparison); Nos. 32-33, Awls (for comparison).

possibly respond to the reaction of the anvil. In such a case the knot of percussion might occur on the ridged and flake-scarred face held down upon the anvil, exactly as takes place in the English gun-flint, *postea*, p. 116. No Scottish specimen has yet been noted to bear incontrovertible indications of this treatment, unless a notchless micro-burin in the late Rev. Dr Wm. Edgar's collection provides an instance (fig. 3, No. 15). The deep hollow of percussion appearing near its tip and within the narrow facet may result from a direct blow upon the ridged face. The now vanished concomitant part of the flake would, of course, when detached bear the stigma or knot of percussion. Vignard, however, claims and figures specimens.

It may be inferred from the foregoing that the marks of impact are of significance in a study of the technical aspects of micro-burins. Therefore, it is regrettable that illustrations of these small artifacts so rarely indicate the true character of their fracture-features as evidenced by the modifications in the facets and other traits. Hoping that this paper may attract attention to a form hitherto little regarded in Scotland, we have attempted to give an idea of the nature of the different features.

E.—Siret has recorded a type of micro-burin from El Gárcel, the prepared lateral hollow of which comprises a double notch.¹ In this variant the scar is much wider and generally longer than in the usual form. Very similar objects may also result from an ill-directed blow, which enlarged an ordinary notch and simultaneously gave rise to a wide spreading scar instead of causing a normal narrow undercut fracture with short facet. A chert example (fig. 3, No. 16) from Dryburgh, and one of flint (fig. 3, No. 17) from the Albyn Distillery, Campbeltown, raised beach industry, compare with Siret's. In these Scottish micro-burins, both of which are made in rather poor materials, there is slight scaling with consequent wide spreading of the shallow scar. A Deeside example (fig. 3, No. 18), struck in a good buff flint, most closely resembles Siret's type-specimen. In respect of the nature of the fracture all these may be compared with the laterally faceted examples (fig. 3, Nos. 13, 14) from Banchory.²

F.—Of other variants, those Scottish instances apparently unprovided with artificial lateral notching (Fr. *langue d'aspic*) are remarkable, because, considering what has been said on the production of micro-burins, it may seem contradictory to suggest that the delicate oblique facet could have resulted unless a hollow had been made in the side of a flake before division. Inspection will usually show, however, that advantage was taken of a convenient lateral nick which adequately reduced the width of the flake, and it was near the base of this hollow that the craftsman struck. The Ballantrae and Banchory collections furnish us with examples, one from the latter locality being figured (fig. 3, No. 19).

¹ *Op. cit.*, p. 44; cf. also Ed. Vignard, *C.R.C.P.F.*, x, p. 84.

² Cf. Vignard's "éclatement vibratoire," *loc. cit.*, p. 82, and pl. viii, 6.

There also occur kindred small objects, which, though faceted obliquely across their upper ends, yet exhibit no signs of adventitious or intentional notching. These pieces are scarce everywhere, but a list can be made of Scottish specimens, Deeside and Ballantrae yielding a few. Technically this notchless variety, which was probably produced in making very narrow microlithic forms, belongs to the micro-burin class. Fig. 3, No. 20, from Banchory, immediately proclaims this identity. While interesting as a modification of the normal sort, it is a link with English gun-flints and ought to be studied in conjunction with them (p. 116).

III. NOTCHED FLAKES.

Writers, commenting on the microlithic element in our principal British collections, have mentioned notched flakes agreeing in size with the general run of diminutive primary flakes and treated artifacts with which they occur. So far as concerns our Scottish industries there is a call for further notice of these objects. Actually, the notched flakes belonging to our microlithic industries may be sorted into groups. Many notched flakes, intact or broken in different ways, must be considered on the score of the working along the edge of the hollow, not as tool-forms (*e.g.* side-hollow-scrapers or spokeshaves), but as pieces which were involved in the early stages of preparing microliths by micro-burin technique.

In the first category may be ranged small flakes which were provided with the essential notch prior to division, and which for some reason received no further treatment, *e.g.* No. 21 in fig. 3 from Deeside. It seems that the size of these is such that they cannot be regarded as tools, but as treated primary material considered in the foregoing section (fig. 2, No. 1, 2, 3*a*, 3*b*, *supra*, p. 106).

Next in this list are those flakes which fractured across under the process of notching. In these cases the surface of the fracture is not oblique but more or less at right angles to the flake surfaces. Also, no marks of percussion are discernible on such objects as merely snapped under treatment. Two specimens (fig. 3, Nos. 22, 23) of flint from Miss Paterson's Deeside collection are representative.

From conversations with M. Ed. Vignard, who has figured and discussed examples from Sebil, personal experiments and observation, I have come to the conclusion that numbers of small fractured notched flakes owe their condition to misdirection of the blow intended to cut them. Consequently, many specimens, picked up at our sites near Ballantrae and in the valleys of the Dee and Tweed, must be regarded as failures of the second stage of the preparation of microliths by micro-burin technique, and not tool-forms damaged in the course of usage. When complete these broken notched flakes

doubtless conformed to the ideal specimen (fig. 2, No. 1, 2), and fulfilled all the requirements necessary for the manufacture of artifacts by the process described. In typical examples of miss-hits the fracture generally takes the form of a truncation immediately above the notch, which is not oblique and is more or less at right angles to the long axis of the flake, *e.g.* fig. 3, Nos. 24, 25, from Dryburgh. Some specimens, however, also split downward from the truncation. This fault appears in objects from all our sites, for it seems to have been a common accident due probably to incorrect placing of the flake on the anvil or to movement thereon during the operation. If the edge of the truncation be closely scrutinized it will usually be found to bear some indication to show where the hammer fell.

IV. EMPLOYMENT OF MICRO-BURINS.

A.—Granting that some micro-burins may have been employed as tools, it is nevertheless difficult to imagine to what use such small and fragile objects could be put, unless a suggestion as to one possibility made by Messrs D. Peyrony and H. V. V. Noone be tenable. According to them, the artifacts, whose beak-like tips are not adapted to chiselling but conceivably to fine cutting, might have served as parts of composite implements, *e.g.* barbs of weapons.¹ Even so, such artifact evidence as the author has examined points to micro-burins as none other than by-products. Still, the complementary parts of some micro-burins must have been so small as to seem to many inquirers explicable only as waste. Vignard holds that in such cases the micro-burins (obviously more manageable than their concomitants) were really the products wanted and that they were made for employment. His conjecture, however, does not seem wholly convincing when one examines the artifact evidence. Our Scottish series, which include the tiniest dressed forms, certainly do not lack extremely small micro-burins, numbers measuring less than 1 cm. in length. The present author, therefore, prefers to think that many of the diminutive microlithic forms—not necessarily geometric—were almost entirely fashioned in the flake before division, *e.g.* fig. 1, No. 3, referred to in the next subsection. However, in fairness to Vignard, two specimens from the Culbin Sands, Moray (fig. 3, Nos. 26 and 27),² and formerly in the Lewis Abbott Collection, are figured as micro-burins of the type believed by Vignard to have been manufactured for its own sake. A micro-burin from Birkwood, Banchory, is also represented (fig. 3, No. 28) as one comparing closely with specimens similarly referred by Vignard to this order.³

¹ *Bull. Soc. Préhist. Franç.*, xxxv. (1928) pp. 108-10.

² These examples seem to be the only evidence that a microlithic industry once flourished in this area so prolific in finds of later periods.

³ *C.R.C.P.F.*, x. pp. 88-90, and pl. xii, Nos. 20 and 21.

B.—Though we have no reason to think of any Scottish micro-burin as an artifact produced for itself, a specimen may, however, be mentioned as an exact counterpart of objects in which one school sees the deliberate intention of the craftsman to manufacture micro-burins. We understand that the microlithic industry from the rock-shelter of Lalla-Marnia, Algeria, although poor in trapezes, has proved rich in equally represented micro-burins and triangular flakes, the last-named with one battered edge and a triangular facet at the base. From these indications Lequeux infers that the micro-burin, and not the small flake, was the wanted object. Clark, deducing how micro-burins were made at the Algerian station, quotes Lequeux's statistics to show that relatively few of the triangular flakes are worn and that the majority of the micro-burins appear to have been used.¹ Consequently, when viewed from a technical angle, the drawing of a specimen from Dryburgh (fig. 1, No. 3), which cannot so far be matched from this or other Scottish locality, excites interest if compared with the example figured and considered with Clark's theoretical specimen based on Lequeux's findings (fig. 2, No. 3, 1-3). Failing other evidence, it is thought, the tapering upper part of our piece with its steeply worked edge suggests an unfinished microlithic form; if manufacture were completed (and the flake were divided by a blow dealt at the spot where the straight battered edge merges into the transverse one), the features of a micro-burin would certainly result. Moreover, the very careful treatment expended on the edge of the upper part of this flake cannot be regarded as a stage in the making of a micro-burin as a primary product. Instead, we appear to be faced with a small microlith in the making, and one of the sort hinted at in the preceding paragraph. In this connexion the example is a useful addition to our series, and if others like it are eventually discovered they will be further testimony to the adoption of different methods in the production of small forms by the application of the principles of micro-burin technique.

V. MATERIALS.

Flint and chert examples have up till now been noted in the foregoing paragraphs; but, where it was practised, micro-burin technique was probably exercised with other rocks if we take as an example a small flake of quartz (fig. 3, No. 29) recovered by excavation in the 25-foot raised beach near the Albyn Distillery, Campbeltown. This flake appears to have been notched preparatively to ensure accurate division, and, as it belongs to an Early Mesolithic industry which comprises microliths and micro-burins, it is suggestive enough to be included among specimens illustrated.

¹ *The Mesolithic Age in Britain*, pp. 99-100.

VI. ASPECTS OF THE ENGLISH GUN-FLINT INDUSTRY AS RELATED TO MICRO-BURIN TECHNIQUE.

The explanation of the micro-burin as the result of a method of making microliths advanced above is due not only to examination of prehistoric artifacts and theoretical deductions, but also to experiments conducted by M. Vignard and by the author himself. The fast-dying English gun-flint industry further provides valuable corroboration. As expounded by Knowles and Barnes¹ the procedure adopted by the surviving exponents of the old craft at Brandon in dividing flakes into sections might indeed possibly be regarded as a reminiscence of the highly specialized technique that yielded micro-burins. The undercut fracture forming the "sides" of an English gun-flint corresponds to the transverse facet of the micro-burin and exhibits a similar knot of percussion or its corresponding negative. This is, however, produced by the reaction of the anvil, the reverse of what happened in micro-burin technique. Moreover, the fracture lies at right angles to the long axis of the original flake, but an oblique fracture, reproducing more closely the facet of a micro-burin, can be produced by the same technique as Knowles and Barnes have explained.

VII. PSEUDO MICRO-BURINS.

Without study of a great number of specimens, experimentation with siliceous rocks and an examination of the comparative ethnographic evidence, the micro-burin facet may of course give rise to many theories. Only one need be mentioned here, and that because some Scottish artifacts seem to be involved. We refer to the suggestion that micro-burins are damaged implements. Dr L. S. B. Leakey² treats several small pointed artifacts—of obsidian—from his "Upper Kenya Aurignacian" in the same category as micro-burins.

Although the African objects, many of which are steeply trimmed along one edge, bear a small oblique facet and sometimes a notch, Leakey considers them to be awls, and he thinks the facet giving the artifacts the look of micro-burins nothing but a fracture-feature due to usage. Moreover, as these small pointed and faceted forms are so common in microlithic industries he believes they must be broken tools. While the present author agrees with those who consider that most of the Kenya examples are not acceptable as micro-burins,³ he recalls that at sites yielding microliths there occasionally occur small pointed implements with an oblique facet on

¹ *Antiquity*, 1937, pp. 201-7.

² *The Stone Age Cultures of Kenya Colony*, pp. 101-2, 242.

³ A. C. Blanc has identified some true micro-burins in Leakey's series. *Bull. Soc. Préhist. Franç.*, xxxvi. (1939), p. 120, fn.

the bulbar face due to breakage, probably through service. Inspection of this trait on such objects will show how sensibly it differs from the facet caused by a blow, which invariably leaves indications testifying to the application of micro-burin technique.

Our own collections provide some steeply dressed examples with a facet probably resulting from excessive stress brought to bear upon the implement. A flint specimen (fig. 3, No. 30) from Miss Paterson's Deeside series is unmistakably a broken microlith. The small scar at its upper end, though not unlike one due to a blow, yet shows no marks of percussion; nevertheless, the accidentally produced facet exhibits the characteristics of the conchoidal fracture of flint. In respect of this and other rocks having similar properties, it may be said that a fracture-feature, such as a facet whether accidentally or intentionally produced, occurring in very frail diminutive objects, must often at a first glance appear indistinguishable. The difference, however, may be detected between the facet of the Banchory specimen (fig. 3, No. 30) and that characterizing a small notchless micro-burin from Ballantrae (fig. 3, No. 31).

Again, a pronounced facet borne by some small pieces, which may suggest a micro-burin scar, will prove upon inspection to form a sort of hinge in negative. Such a feature probably indicates a fracture due to the exerting of too much pressure upon a finely pointed tool used with a twisting movement.

Some narrow specimens terminate in a deceptive sort of beak. In many cases these are true micro-burins, but in others various reasons may account for the small oblique facet appearing on the bulbar face. The exact character of the scar ought, however, to be determinable by seeking for the mark of impact which rarely fails to leave unmistakable signs. Yet, an example now brought to notice might conceivably be classed as a micro-burin. Actually, however, the figured artifact from Dryburgh (fig. 3, No. 32) is an awl of green chert, the tiny flake-scar at its tip on the bulbar face being due to the removal of too large a squill in the course of the fashioning of the delicate narrow point. To make this explanation clear a perfect specimen of the same rock and from the same locality, but with staggered working-point, is figured with its damaged companion (fig. 3, No. 33).

VIII. ORIGIN AND SURVIVAL OF MICRO-BURIN TECHNIQUE.

It has already been mentioned that micro-burin technique is claimed to have a place at Lacam, Brive-la-Gaillarde (Corrèze), among the crafts of folk living in the third stage of Magdalenian culture.¹ Though this claim is not generally accepted, the micro-burin does appear early at some French

¹ Cf. p. 103, note. M. Pérol regards the micro-burins found stratified at Lacam as tools, not as waste.

sites. In the south-western *départements* and elsewhere it has been noticed among products (Sauveterrian) from a horizon intercalated between a late Magdalenian and an early Tardenoisian level.¹ Vignard² makes a good case for assigning the inception of this style of working to the improvement of striking-platforms of flake-implements of Levalloisian facies referable to his second level at Sebil, Upper Egypt. In point of chronology he would equate the culture represented with the initial phases of the Aurignacian. His third level at Sebil yields a rich industry in which ample evidence of the development of micro-burin technique is furnished by advanced geometric and other forms. The technique believed by this archæologist to have been cradled at Sebil thence became widespread. He would trace the wanderings and influence of its exponents by the constant appearance of the micro-burin in unchanging fundamental form, a fact proclaiming identity of method of production at all sites.

While Vignard's distribution from a site in Upper Egypt may be disputed, the common ancestry of microlithic industries can hardly be doubted. In this respect it will be recalled that many years ago Breuil³ expressed the opinion, since so often quoted, that the diffusion of the micro-burin, which provides the essential link, indicates a migratory movement from a common point situated in the Mediterranean basin.⁴

The significance of the micro-burin also lies in its being expressive of great ingenuity in working stone for the needs of peoples living under certain cultural conditions. On the strength of the evidence afforded by excavations we have reason to believe that by the Late Boreal climatic period micro-burin technique was well established in English Mesolithic industries.⁵ That it had penetrated as far as Scotland by relatively Early Atlantic times is proved by the occurrence of micro-burins, and microliths fashioned from the upper part of flakes, recovered from the Argyll 25-foot raised beach deposits. The presence of these artifacts among others indicates that the primordial settlers on our shores possessed a well-developed culture. That the method long persisted in prehistoric Scotland and England appears from the numbers of surface-found micro-burins and microliths. Micro-burin technique, preserved in the South by stone craftsmen of the early Metal Ages,⁶ must eventually have been acquired by the first English commercial flint-knappers, who, while retaining its

¹ *Archives de l'Institut de Paléontologie Humaine*, Mémoire 14, pp. 12-17.

² *C.R.C.P.F.*, x, pp. 102-3.

³ *L'Anthropologie*, xxxi, p. 351; *Les Subdivisions du Paléolithique Supérieur*, 2nd edit., p. 73.

⁴ Blanc reports (*op. cit.*, pp. 122-31) micro-burins in an industry associated with a glacial fauna at La Grotta Romanelli, Otranto.

⁵ *Antiquaries' Journal*, xv, (1935) pp. 284-319.

⁶ M. Siret was convinced that the sections of flint, from which triangular, hollow-based and even barbed arrow-heads were made in the Copper Age of Almeria and Granada, were obtained by dividing the blades by the micro-burin technique.—*Rev. Anthr.*, 1924, pp. 132-3. This would not really be surprising and evidence might be looked for in British forms resembling the Spanish.

strict principle, slightly modified actual practice. The last of the artisans at Brandon, who in effect now carry on so ancient a tradition, will probably witness its extinction.

IX. ACKNOWLEDGMENTS.

The author wishes to record that in the preparation of this paper he has had the valued help of several friends. His warm thanks go first to our Fellows Miss Hilda M. Leslie Paterson, Banchory, and Dr W. A. Munro, Edinburgh, both of whom with their customary generosity so freely placed their collections at the writer's disposal. To Miss J. H. M. Cullen, Glasgow, he is grateful for giving him access to the series which her late brother-in-law, Rev. Dr Wm. Edgar, assembled from Ballantrae. The advice and interest of Professor A. S. Barnes, London, and M. Ed. Vignard, Paris, are acknowledged with gratitude.

APPENDIX.

Since these notes were written, a grant awarded me by the Trustees of the Leverhulme Research Fellowships, whom I thank, permitted me last summer to extend my inquiries in our Mesolithic field. The results of these investigations will be duly reported, but I may say now that inspection of several collections of stone implements revealed a number of micro-burins. Of those which may be mentioned meantime are a flake-tip example from Risga, Argyll, preserved in the Hunterian Museum, Glasgow University, and a butt-end specimen from the Tentsmuir Sands, Fife, in the University Museum, St Andrews.