

## THE BURIN SPALL ARTIFACT

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THE burin has been acknowledged as an American artifact for too short a time to have hatched a nest of progeny. Yet the thin slivers<sup>1</sup> that were struck or pressed from burins by the distinctive *coup de burin* appear to have been often used as tools in their own right. What shall we call them? "Burin-spall knives" or "burin-spall graters" are unwieldy names for these delicate objects, but at the moment nothing better comes to mind.

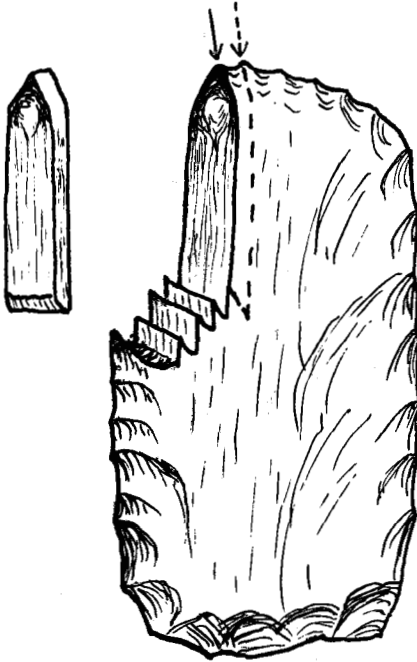
The presence of Old World burins in America became known after our excavations in the northern Bering Sea region in 1948.<sup>2</sup> Since that time burins have been found to be widely distributed in the earlier sites of interior and eastern arctic America. The burins of the Denbigh Flint Complex are so far those most varied in form and they perhaps come closest in their range of forms to European burins; but in each of the several New World localities where they are found burins are the product of delicate and sophisticated flint techniques. American burins are not made of "blades" in the Old World sense, although isolated ones are made of microblades. Usually they have rather resulted from removing first a part of the edge of a broad flake that has been trimmed to a quadrangular or ovate outline. The "burin blow", unlike the strike or press that dislodges a microblade from its core, does not usually allow the spall to split in a curve from the full length of the parent piece. Instead, it causes the spall to break loose in a hinge fracture while it is still straight, leaving a ragged scar at the distal end of the burin. A burin that has had several spalls removed by burin blows displays saw-like teeth approximately parallel to the last scar, as in Fig. 1.

The one feature of a burin that identifies the object beyond doubt is, of course, the presence of a "negative bulb" at the point where the burin blow has been delivered (Fig. 1 and Plate I). This is an essential effect of the technique and provides a scoop-shaped cutting edge that shaves razor-like at the bottom and edges of a groove when the burin is drawn edgewise toward the user. Most of the burins from Cape Denbigh and other American sites that I have examined closely are "angle oblique" burins (Burkitt, 1920, p. 308)<sup>3</sup> such as would lend themselves best to this use (as would also the forms of

<sup>1</sup>*Lamelles de coup de burin* (Bourlon, 1911, p. 272), or burin spalls (Noone, 1934, p. 82).

<sup>2</sup>Giddings, 1949 and 1951; Hopkins and Giddings, 1953. The last reference concerns the dating of the three cultural horizons at the Iyatayet site, where the burins are believed to date from a period 5,000 to 8,500 years ago.

<sup>3</sup>or "bevel-scaled" (Noone, 1934, p. 84).



**Fig. 1.** Diagrammatic angle burin of one Cape Denbigh type and detached spall. Arrows designate points of burin blow.

Note negative bulb (below arrow and on spall).

beaked burin<sup>4</sup>). These instruments, the broad faces of which are usually nearly parallel, could serve as gauged groovers for the longitudinal sectioning of antler, ivory, and other organic material, for which process Eskimo have recently used metal blades.<sup>5</sup> The American burins are usually provided with a substantial stem by which they could have been end-hafted in the manner of Eskimo men's knives. Although none has thus far been found in a handle, this means little, since organic materials are absent, or nearly so, in the burin sites.

The Denbigh Flint Complex at Iyatayet has consistently yielded about twice as many burin spalls as burins. Some displaced burin spalls may have been lost in the mud and midden of the younger part of the site. The Flint Complex layer is normally only the thickness of a chalk mark on top of a

<sup>4</sup>see Bourlon, 1911, especially Fig. 1, p. 268.

<sup>5</sup>No doubt the "burin-like" instruments of ground stone that are reported from many early arctic sites were used in the same manner, as was first elucidated by de Laguna (1947, p. 193), and enlarged upon by Collins (1953, pp. 36-38). I have observed in several archaeological sites of western Alaska that sections of antler and ivory have been first split into a number of slivers with wedge-shaped cross-sections and then whittled or smoothed into arrowheads or other objects. Some of the original sections were only partly finished and show that this splitting was done primarily by grooving. In 1939, while excavating the house of Okvik Culture at Gambell, St. Lawrence Island (Rainey, 1941, p. 471), I found numbers of burin-like instruments of polished stone in association with walrus tusks in various stages of sectioning and was impressed with the likelihood that in one or two cases I had fitted the grooving instrument into the groove that it had been in process of making when the house was abandoned.

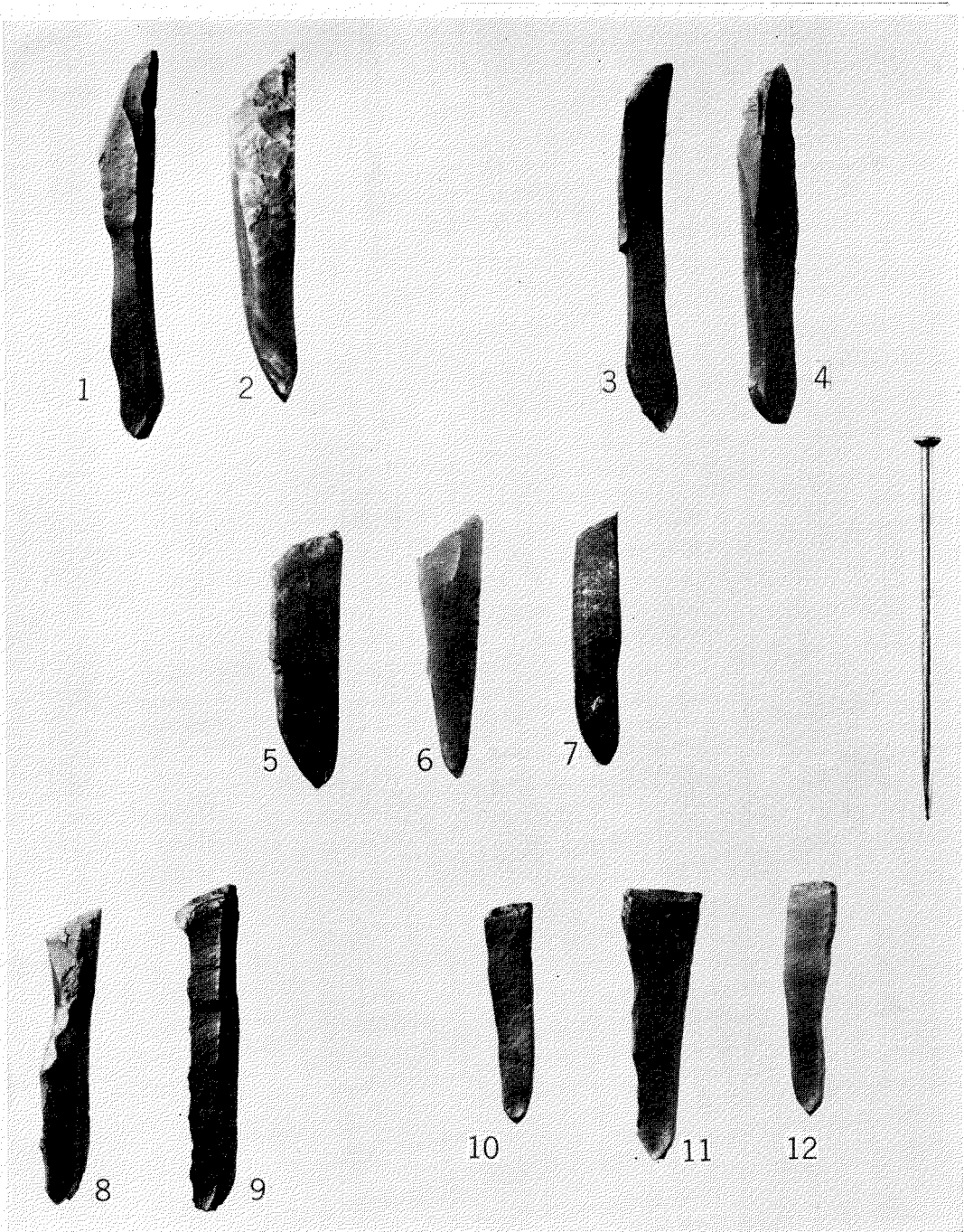


Plate I. Burin spalls of Cape Denbigh type, magnified. Note one-inch pin at right to give scale.

dense clay and since we have been able to proceed with great caution in that range, we have presumably lost no appreciable number of burin spalls in situ. The spalls are most often about the size of a spruce needle and, like it, usually of rectangular cross-section. A few reach three centimetres in length, but the majority are much shorter. The first spall struck from a prepared burin "core" is likely to be triangular in cross section, the original trimmed edge forming one or two of its three faces. This kind of burin spall shows only the "positive" bulb of percussion (Plate I, 2). All the spalls removed from the burin core after the initial one will be, if they are correctly struck (or pressed?), four-sided and will show both the negative bulb of the previous burin blow and the positive bulb of the latest blow. Thus in Plate I the negative bulb appears at the lower end of all specimens, except 2 and 6. If any of these spalls were turned over, the positive bulb would be visible.

We speculated from the first on the possibility that these delicate objects had served some special purpose in their own right. They might have been inset barbs for fish hooks, preceding the ivory pegs or metal barbs of more recent arctic fish hooks. Most of our thoughts on the nature of the burin spall had to do, however, with the end at which the burin blow had been applied.

Then, one day in January of 1954, I received a telephone call from Prof. Carleton Coon, in another wing of the University Museum at Philadelphia. He wanted to know whether or not the burins in my collection had been actually dulled by use, as by grooving hard organic materials. I recalled that only a few burins appeared obviously worn, though under magnification the working end sometimes bore signs of scouring or the removal of microscopic flakes along the edges of the negative bulb. Coon then asked if I could spare a burin for experimenting to find if it would actually groove bony material. I chose a representative burin and took it to Coon's laboratory, where he produced a fresh beef bone. We found that by drawing it back and forth the flint tool did in fact groove the bone very effectively and rapidly. Moreover, the burin was not lost, as it showed no appreciable wear after the test.

Back at my desk, it occurred to me that burins must have become dulled by use if they needed sharpening as often as the scars on the Denbigh specimens indicated. Consequently, burin spalls ought to be in most cases dulled or otherwise ineffective at the working end. A quick examination under magnification failed to show that this was the case, however. Why were they not dulled? The only obvious explanation would be that they were not merely the by-products of burin use, but were meant to function as tools in their own right.

I began to examine the burin spalls in earnest under magnification. Almost immediately I found that not the bulbous, but the opposite end showed obvious signs of wear. A fine retouch, usually not visible to the naked eye, was to be seen at the distal end of the spall in the great majority of cases. Another regularity appeared. When the burin spall was placed on a flat surface with the retouched end upward, the negative bulb also lay upward at the opposite

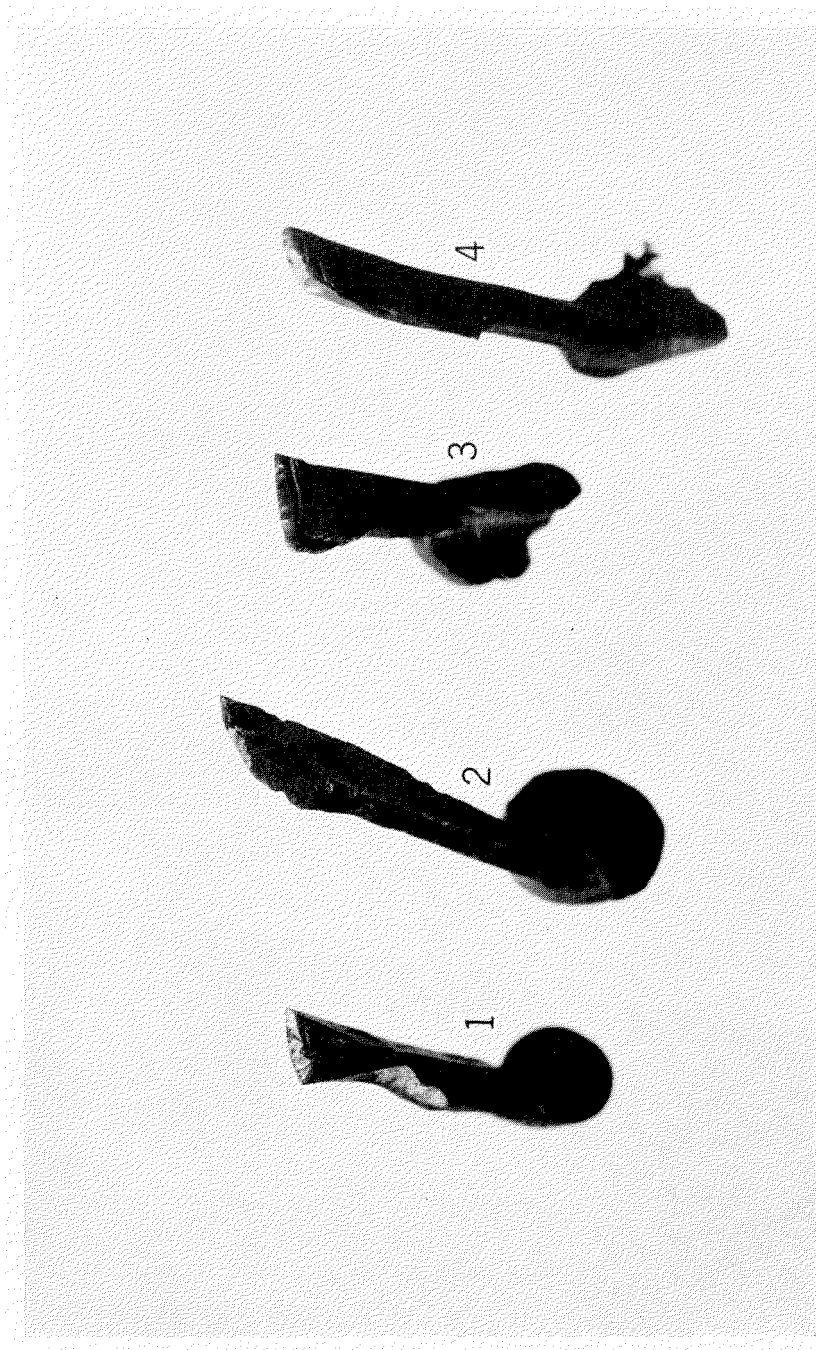


Plate II. Four burin spalls of Plate I more highly magnified to show working face.

end. This is shown in Plate I<sup>6</sup>, in which 12 burin spalls lie with the retouched end toward the top of the illustration. The negative bulb is visible in most specimens, but no positive bulb can be seen.

The retouched area is much too small in most spalls (the pin shown in Plate I is an ordinary one-inch pin) to allow it to have been prepared by the usual process of pressure retouch. There is no doubt that the retouched areas result from use or from some shearing process, as occurs in pressing the working edge against bone or antler. Shown in Plate II are four of the spalls of Plate I, tilted in order to bring out details of the tips. It will be seen that they resemble thumbnail scrapers. Plate III shows the greatly enlarged working edge of one of the burin spalls (Plate I, 8; Plate II, 1).

Close examination of more than 200 burin spalls from the Denbigh Flint Complex showed that nearly all of the four-sided specimens that had been struck successfully are worked in the manner of those shown in Plate I. In most of the specimens the worked edge slants to the left (Plate I, 1-9). A smaller number have the working edge nearly at right angles to the length of the spall (Plate I, 10-12), and only four specimens have the worked edge sloping to the right. If the slope indicates right and left handedness, as I presume it does, the retouched burin spalls would seem to have been the tips of engraving tools not unlike those used by modern engravers. As such they would have been mounted at the end of a handle and drawn toward the worker, the sloping edge in front.

Something more can be said of these used burin spalls as regards their probable function as engraving tools. In the same way as the burin seems to have a "neolithic" successor in the burin-like instrument of polished stone, so may this burin spall artifact have its successor in the rodent-tooth and metal engraving tools at later times in the Bering Strait area. The Ipiutak site at Point Hope yielded a "penholder" form of engraving tool in many variations, often elaborately decorated, that had either the sharpened incisor of a ground squirrel or an iron point inserted in a rectangular groove at one end (Larsen and Rainey, 1948, pp. 82-84, Fig. 18, Pl. 8, 15-24). Engraving-tool holders of the same general form are known from the palae-Eskimo levels at Iyatayet, from later cultural phases on the Kobuk River (Giddings, 1952, pp. 72-73, Pl. 43, 24, Pl. 44, 21) and elsewhere in the earlier Alaskan sites.<sup>7</sup> Engraving tools of slightly different form, holding metal bits, are known from Punuk levels on St. Lawrence Island (Collins, 1937, pp. 303-5, Pl. 60, 10-11, Pl. 81, 17-20).

If we are not too far afield in considering the burin spall tools to have been hafted engravers, another reasonable guess is that the Denbigh Flint people gave free rein to their artistic talents, quite possibly in the field of the elaborate art styles that prevailed in the western Eskimo area some 2,000 years ago. Thus

<sup>6</sup>The photographs were made in the University Museum at Philadelphia by Mr. Reuben Goldberg.

<sup>7</sup>Possibly the oldest object of this kind that has been illustrated is from the Okvik Culture of the Punuk Islands (Rainey, 1941, Fig. 35, 10). It was identified by Dr. Rainey later, after he had found similar objects at Ipiutak.



**Plate III.** Working face of burin spall shown in Plate I, 8 and Plate II, 1, highly magnified.

far, however, we have no organic materials from the oldest layer at Cape Denbigh, and therefore no proof of engraving skill.

Even though the burin of the Denbigh Flint Complex was probably used primarily for grooving, it must have been regarded by its makers in many cases as a core for the production of excellent burin spalls. Was this a unique local conception? I could not recall a suggestion from elsewhere that the burin spall was a tool. On turning to the few burin spalls from a site that I had recently investigated on the North Knife River of the Churchill region of Manitoba, however, I found again the retouched implement like that from Cape Denbigh.

I wrote then to Dr. Helge Larsen in Denmark, explaining the case to him, enclosing photographs, and asking him about the burin material that he had recently excavated in an early site in Greenland. He replied with enthusiasm that he and his colleagues at the National Museum had examined the burin spalls collected the previous summer at the Sarqaq site in Disko Bay, and had found that "every one of the spalls made of flint, jasper and similar minerals had the same retouch [as in the photographs] . . . , and just as fine."

As to the burin spalls as artifacts of importance in Europe during Paleolithic and Mesolithic times, I have as yet no positive information. It appears that they have most often been regarded as reject material, so that we may have to wait for some time to learn whether or not the burin spall tool is primarily a phenomenon of the American Arctic. Bourlon (1911) made use of burin spalls in his study of the burin technique, and Noone (1953) writes that the "humble burin spall . . . , a by-product in the production and upkeep of burins, is not entirely without value . . . ." as a means of learning more of the object from which it has been separated. It is hoped that someone will re-examine the burin spalls that are preserved in the museums of Europe. In the meantime it looks as though the American Arctic has produced a new form of artifact, and one quite as minuscule and specialized as can be desired in a flint technique.

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