Tool Typology and Technology

Stone Tool Typology

Typology is the method the archaeologist uses to arrange the artifacts in a scheme to show gradual development or degeneration through time. Artifact is the object deliberately made by man exhibiting certain characters for a purpose, and the most convincing character of the man made tool is the presence of alternate flaking to produce a regular set pattern. Based on these specific characters an artifact may be classified as a type.

Prehistoric archaeology is a study mainly of stone and bone tools, though it has occasionally to deal with other artifacts as well. These tools are the remains of the non-living culture, archaeologists have had to coin some names mostly on the form and technique as well as the likely function of the tools, say handaxe, chopper, scraper, blade, etc. Here the tools are understood as the artifacts made by man deliberately for certain purposes and will have a regular set pattern in both technique and form.

The content of the present programme is confined to the Stone tools only of the Stone Age. Regularly patterned tools are considered as the archaeological sign of culture. These early stone tools were apparently made by striking a stone with another stone, a technique known as percussion flaking. The piece of stone thus removed and the bigger lump is respectively known as flake and core, and both these sharp-edged flakes and cores could be used as tools. If the stone has facets removed from only one surface of the cutting edge, we call it a unifacial tool, and when facets are present on both the surfaces of the cutting edge, it is called bifacial tool.

Stone Tool Types

Handaxe:

Handaxe is considered as all-purpose tool used in the naked hand without handle, and hence the name. It is a bifacial tool, and is one of the earliest tools found at Abbeville in France by Boucher de Perthes in 1836. It is the diagnostic
tool of the Lower Palaeolithic industries, such as Abbevillian and Acheulian, and of one variety of the Mousterian. The pear-shaped type that has the shape of the fruit pear, with thick flaked or unflaked pebble butt for suitable handgrip and bifacially flaked narrow cutting edge, characterizes the hand axe of the Abbevillian industry. The flake scars are generally large with deep facets resulted probably by striking with a stone hammer.

In the Acheulian industry handaxes are represented by ovates, lanceolates and cordiforms, later followed by the micoquian types. A feature of certain axes of the Acheulian tradition is reverse S-twisted profile. The flake scars present on these types of handaxes are generally small and slender with flattish facets resulting from the cylinder hammer technique.

**Chopper:** It is a unifacial tool, made generally of a suitable pebble by flaking on one side only. It is the characteristic tool type of the culture of Soan in Punjab and the like in the Mainland Southeast Asia.

**Chopping Tool:** It is made on a core or split pebble by flaking alternately from both the surfaces resulting to a jagged wavy cutting edge.

**Cleaver:** It is an axe, made on a lump or massive flake, with a broad edge produced by the intersection of a primary flake surface with one or more flake scars on the other side. It is also characteristic tool type of the Acheulian industry of the Lower Palaeolithic culture.

**Pick:** This is a heavy pointed tool distinguished from the handaxe by its massive cross-section and elongated pointed edge.

**Scraper:** An artifact made mostly either on a flake or blade for scrapping the skin of animals, thin wooden or bamboo shafts, etc. According to the position and nature of the edge for scrapping, it is named as side scraper, end scraper, round scraper, convex scraper and concave or hollow scraper.

**Borer or graver:** It has a thick projected boring edge, which has been produced by retouching carefully. It is made on either a flake or nodule by making deep notches on the sides. This type of tool is used in boring holes for providing fastening attachments of the skin cloth.

**Point:** It is generally made on a flake having a pointed edge produced by careful retouches. In form it is triangular, semi-triangular and roughly leaf-shaped; some have incipient tang and barb. Small, thin leaf-shaped points could have been served as arrowheads, whereas the larger ones could have been used as spearheads. These are found during the Middle Palaeolithic and later periods.

**Blade:** It is a long and thin parallel-sided flake having one or more mid-ridges on the dorsal. This type of tool is very common since the Upper Palaeolithic times. It is used as knife when one of the sides is with blunting retouch down all or part to provide a comfortable surface for the finger during use.
Burin or Graver: It is the tool with a narrow chiseled edge made on either a flake or blade. Such a tool is regarded as the hallmark of the Upper Palaeolithic culture. These were primarily used for engraving on soft stone or bone and on the walls of the caves or rock-shelters. It is also a tool for making slots in wood or bone.

Microlith: It is a very small tool made on a blade or flake, often less than an inch long. Microliths are known as composite tool, because these could be used effectively by hafting one or more microliths to a shaft. Microliths have various forms, of which triangle, trapeze and lunate are very common; and it is the characteristic tool type of the Mesolithic culture in the Old World; however, it continued to be used as sickle blade in the Neolithic period too.

Neolithic Celt: It is a tool with smooth surfaces, some polished, and used as axe or adze after hafting to a handle during the Neolithic culture.

Chisel: It is a small, narrow, cylindrical or rectangular tool with two of its sides tapering half way down the cutting edge. The butt end is generally thick for hammering.

Ring-Stone: It is generally circular or spherical stone tool with a hole at the middle to hold the shaft of the digging stick or mace.

Stone Tool Technology

We can broadly group the Palaeolithic stone tools as core tool, flake tool and blade tool. The tool made out of the core of a lump of stone by struking flakes to form the desired shape, butt and cutting edge is called core tool. The choppers, chopping tool, handaxe, pick and cleaver best represent core tools. However, a few hand axes and cleavers are also made on massive flakes. Tools made from the flakes detached from the core are called flake tools. Scrapers and points are categorized as flake tools, while tools made on parallel-sided long flakes detached from fluted core are better known as blade tools. Let us know discuss on the technology used in making these stone tools by our prehistoric ancestors.

Lower Palaeolithic Stone Tool Technology

Before the tool is made the maker first conceptualized the would be shape, size and utility. Then he will start searching for the raw material. To make a core tool, say chopper or handaxe, it requires picking up a big lump of stone and another stone to use as hammer. The lump of stone could be held in the hand, or against the knee, or laid on another support and the hammer strikes at the edge of a flattened area on the core at an oblique angle. Each blow with the hammer, if the force delivered correctly, will detach a flake from the undersurface of the core. The type of flake detached depends upon the exact position of the blow and its angle to the striking platform. Generally, a thick flake with more protuberant cone or bulb of percussion, on the main flake surface near the striking point, is resulted from such flaking method. If a series of similar blows are delivered at the margin or periphery of the core in alternate directions, a number of flake scars converging towards the centre of the core are resulted. All these flakings to produce a desired shape of the tool are called primary flakings. The blow of the hammer for the primary flaking is freely delivered without control onto the edge of the lump (core), and is also known as free flaking. The next step is to sharpen the cutting edge and prepare a suitable handholding place by striking off smaller flakes. This
process of sharpening the edge and blunting of the butt or back is called secondary flaking.

Another method of primary flaking, probably one of the most primitive methods of producing flakes is to dash or swing the lump or core against the edge of a larger stone or anvil. The block-on-block or anvil technique produces thick flakes as in the case of the course direct stone hammer technique.

A method less commonly used was the bipolar technique. In this, the core was placed upon the edge of another rock and struck with the hammer on the other end and that resulted to the removal of flakes from both the ends. On the core, there are flake scars with negative bulb of percussion at the opposite ends.

The advanced tool technology developed in the early Palaeolithic times is the soft hammer technique or cylinder hammer technique. In this case, the hammer is of a cylindrical bone or antler or hard wood; soft stone might also be used. When the force is delivered along the rounded surface of the hammer, it spreads from a larger area of contact resulting to the removal of thin flat flakes with diffused bulb. The intersection of a series of these flat flakes produces a nearly straight cutting edge. It is most likely that initial shaping was done with the stone hammer technique and the cylinder hammer technique was used for the finishing process. This technique was first noticed in making the handaxes at the type-site of St.Acheul, France and is the characteristic Acheulian industry.

Step flaking or resolved flaking is a further advanced secondary flaking technology developed during the early Palaeolithic culture. In this case, the blow of the hammer is controlled and delivered directing towards the center of the core to snap off a flake abruptly leaving an angular junction with the core.

**Middle Palaeolithic Stone Tool Technology**

Palaeolithic man also made flake tools, and was the characteristic feature particularly of the Middle Palaeolithic culture. Flakes detached during the process of making core tools and those could not be used further are called waste flakes, while some of these primary flakes detached by using anvil or direct stone hammer might be used for making flake tools. However, a Clactonian technique coined after the type-site at Clacton-on-sea, England was a technique used by the Lower Palaeolithic people for obtaining a flake. In the clactonian technique a nodule with fairly regular surfaces to serve as striking platform is selected. Having selected such a nodule, a blow is given with another stone near the edge of the naturally flatten surface (striking platform). If the blow is well directed and of suitable strength, a good flake will be detached. Such flakes will have a prominent bulb of percussion on the main flake surface, the surface of the flake that is originally in contact with the core, near the striking platform. And the angle between the main flake surface and the striking platform is always greater than 90 degree, or roughly 120 degree.
Further advanced flake obtaining technique is the Levallois technique, an artistic and skillful method of preparing flakes and cores that was first noticed from Levallois Perret, Paris. In this method the core is carefully prepared initially by roughly trimming the sides and then from the upper surface the cortex is removed in such a manner that the flake scars usually meet in the centre. The next step is to prepare a flattish place called striking platform by removing very small flakes on the core preferably at the end point perpendicular to the axis. Such prepared striking platform is called faceted platform. After that, a sharp blow is given on the striking platform. A thin flake roughly oval or triangular with a clean undersurface and a part of the striking platform is detached. The angle between the striking platform and the main flake surface is almost equal to 90 degree. The Levalloisian flake could be used as a tool without further retouching, as the margins and the end are already sharp due to the truncating of the flake scars on the upper surface with the clean undersurface. The core after the removal of an oval flake is called a ‘tortoise core’, implying that the rounded undersurface resembles the upper shell of a tortoise, while the fine conchoidal flake scar would look like belly or ventral surface.

Opposed to this elaborate Levalloisian core preparation is the discoid core or Mousterian technique. For this a lump of stone or large flake with suitably flattened surfaces is taken, and is flaked around its edge to detach short and broad flakes. The resultant core assumed a circular or disc shape. These flake scars on the core could be used as striking platform for detaching a flake with 2 to 4 truncated flake scars on the dorsal surface. These flakes are generally of 3 inch long and several such flakes could be obtained from a single discoid core. However, only one flake about six or more inch long could be detached from the Levalloisian core. Hence, discoid core is considered more economical.

**Upper Palaeolithic Stone Tool Technology**

Tools made from the parallel-sided long flakes with at least a midridge on the dorsal are called blade tools. Blade tools are considered as the characteristic feature of the Upper Palaeolithic culture. For the production of blades, a core is prepared by breaking a large nodule in two with a hammer stone. Using either piece, the maker then knocks long, thin flakes from the outside rim leaving a tapering fluted core. From this core a series of finish blades could be obtained by striking off one by one in such a way that each includes a pair of the ridges left by the previous round of flaking. Blades obtained by using the direct percussion with a stone hammer are generally broad. But the narrow blades might have been obtained by using punch technique. In this, the point of a punch of wood or bone was placed on the striking platform of the core and a force applied by hammer stone or pressure to the other end of the punch. Micro blades could also be obtained with the punching technique and made different type of microliths.

Pressure flaking technique is another advanced flaking technique developed during the Upper Palaeolithic culture to prepare beautiful tools like leaf-shaped points. A pointed implement of wood, bone or stone is used for pressing against the edge in a downward or upward movement. This results to the removal of a flat flake from the lower or upper surface of the tool. The resultant flake scar because of smallness is also known as fish scale scar.

Burin or graver is generally made on blade and rarely on flake. It is also one of the characteristic tools of the Upper Palaeolithic industries. After obtaining a blade from the fluted core, the tool maker first snaps off the pointed end. Next, using a wood or antler hammer, he chips the broken end to make a striking
platform. The burin facet could be obtained by striking with a cylindrical batton after resting the blade on an anvil stone at an angle or the blade is pressed sharply against a stone to remove the tip. If a double bevel is desired, the blade is turned over and flaked again.

**Mesolithic Stone Tool Technology**

Mesolithic culture is generally characterized by making tools on microblades. As stated earlier microblades could be obtained by using punching technique. Small fluted cores are first prepared in the same process as done during the Upper Palaeolithic period, and then another series of tiny flake-blades across the core are detached with punching technique to truncate with the earlier longitudinal flake scars. Next, the core is fixed on the ground with one end, then the edge of the punch is placed on the flat striking platform near the truncated ridge and suitable force is applied resulting in the removal of a micro-blade.

**Neolithic Stone Tool Technology**

Neolithic culture is characterized by the making of smoothed surface stone tools generally known as celts. After the selection of a suitable piece of stone, it has been shaped by flaking with a stone hammer. Next, the flaking ridges are removed by striking lightly with a hammer, then ground on a coarse stone slab by adding sand and water often to smoothen the surfaces. To prepare the cutting edge it is further ground bifacially or unifacially to get the medial or lateral edge.

Pecking is also another technique adopted by the Neolithic man in making the celt out of very hard and tough rock that is difficult in flaking. In this the maker used a very narrow ended hammer (like the prism edge of the quartz) to peck all over the surfaces of the stone, probably a suitably shaped pebble. Then ground all over the surfaces.

Rectilinear shouldered celt is another Neolithic stone tool. The tenon of the celt is supposed to be made by sawing technique. The sawing was believed to have been done with a sharp edged sliver, might be of bamboo or shell, by adding sand and water to serve as abrasive action.

Ring stone is another tool type found during the Neolithic culture to use as weight of the digging stick. Drilling technique was used in making the hole. For that, a suitably sized flattish pebble was selected and a depression is made on both the surfaces at the centre by pecking with another stone hammer. Next, drilling on the depression was done first from the upper surface with a bamboo tube rotating between the palms, and often-adding sand and water for abrasive action; when it drills about halfway it upturns and repeat the same process of drilling.

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