

Type Classes of the Blade-Bladelet Element in India

Received 5 January 1981

RANJANA RAY AND ASOK K. GHOSH

THE INDUSTRIAL COMPLEX of the early Holocene, situated between Palaeolithic and Neolithic, is commonly known as Mesolithic. Problems related to the early Holocene industrial complex in India are numerous. On the one hand, there are still many problems in the proper identification of this industrial complex, and on the other, too many names have been used to label it. The basic terminologies used for this stage are still in chaos; each has its own connotation, and as a result general communication is lost.

TERMINOLOGY FOR THE STAGE

Overall, various terms have been used for the total industry, such as Mesolithic, Microlithic, Late Stone Age, Blade-Bladelet, and so on. Each of these terms has a different nomenclature, meaning, connotation, and reference. The term Mesolithic, originally coined by Westropp in 1866 (Wilkins 1959:130-131), is used by Clark (1932, 1936) with specificity, substantiated with relevant data and evidence. Unlike Europe, in the Indian situation Mesolithic is seldom found in proper sequential order. It has yet to be decided whether the term, which is indicative of cultural chronology, fits in, at least approximately, to the Indian context.

In India, the term Microlithic often replaces Mesolithic, and may be considered slightly better. Although it has no direct chronological bearing, it uses size diminution as a criterion for defining early Holocene industries, tentatively comparable to the Mesolithic assemblages. Size can hardly be considered a factor in defining a cultural stage. Similar microliths occur in both the upper Palaeolithic or Flake-Blade element (Ghosh 1966:156)

and the succeeding Neolithic stage. Microliths even continue into the metal age and into the early historic period.

The subdivision of microliths into geometric and nongeometric is quite arbitrary. As Gordon (1958:25) pointed out, a trapeze, trapezoid, or trapezoidal could have been an unfinished lunate. So-called geometric tools like the trapeze and triangle are not common in all the industries, and here the evolutionary nature of geometric over nongeometric tools has yet to be confirmed. Moreover, the terms geometric and nongeometric are not appropriate.

Burkitt and Cammiade (1930), in their classification of the Stone Age tools found around Kurnool, placed microliths into Series IV, the last of the fourfold division of Stone Age industries in India. The influence of African classifications is found in the use of terminology like Late Stone Age (Subbarao 1958). African terminology has its own meaning and usage in Africa, where several distinctive units (Clark 1957) were preceded by and closely related to the Second Intermediate stage. In India, the terminology went through further modifications and changes. Ghosh (1972) proposed the term Blade-Bladelet for the early Holocene industrial complex in India, and placed major emphasis on stratigraphy, both geological and archaeological. In the industrial complex of the late Pleistocene, the Flake-Blade element is really complex in nature. Although chronologically the industrial period was of shorter duration, the diversity of technotypological manifestations was immense. Size diminution of tool type is conspicuous in the end phase of Pleistocene lithic industry; the overall typology was not appreciably changed but the dimensions of tools became smaller. The required technological skills had already been achieved by the toolmaker during the end phase of the Flake-Blade element, when mastery over the blade technique was achieved. The resultant production of blades heralded a new element in toolmaking material and production technology. It is probable that during this period such smaller tools became necessary for proper adjustment to the prevailing ecological conditions. After the end of the Pleistocene and at the very beginning of the Holocene, these delicate tools, mostly blades or smaller blades, became dominant. Intensive examination of these phases reveals that there was a change from one element to the other, but both are genetically linked in typology and technology, and the main continuum is established through the blades. In this context the technologies of producing both blade and bladelet as blanks on which the tool type was made have been considered simultaneously. Production technology and produced materials are intimately connected. Therefore, it is logical to coin the term Blade-Bladelet industries, proposed by Ghosh (1972), which is more appropriate than all the terms proposed earlier. The post-Pleistocene environment was considerably different from the Pleistocene environment and the emergence of microlithism may be considered a cumulative result of changes in the main sphere of life.

CONVENTIONAL TYPOLOGY

A typology of the Blade-Bladelet element includes a variety of types, which are not always new. Typologically this industry is a combination of earlier (that is, the preceding Flake-Blade element) and new forms. Major terms used for the types are not always appropriate, because some of them lack logic and are irregular. Sometimes unreasonable simplicity is encountered. The problem becomes more intense when the same term is used for two or more different groups, or two or more terms are applied to a single unit. The existing typology is based on speculative functional use. With a view to finding out

the major difficulties encountered in existing typological nomenclature, an intensive study has been made.

The Blade-Bladelet element has a Pan-Indian distribution. Major emphasis is given to those sites that have been excavated and fairly intensively worked out—the sites on which a maximum amount of information is available. Typological data have been collected from the published reports of different workers and control samples are provided from our own collection from parts of eastern India. The limitations of the total collection are thus relatively random. In all regions there are always many workers and the total information from each region eliminates industrial bias in collection and reporting. Objectivity of work is greatly enhanced by the use of scaling.

An exhaustive study of published materials on the Blade-Bladelet typology has revealed that the existing typology is varied in its use (Ray, Flood, and Ghosh 1976). The main types include different varieties of scraper, knife, point, arrowhead, borer, lunate, triangle, trapeze, burin, and so on. Most of the types are made on flake, flake-blade, and blade. Types made on core are also present but are very rare, and these forms of materials have seldom been mentioned as separate entities; rather they have been included with types. Under such treatment the functional implications are mostly lost. Typological nomenclature appears to be highly controversial and contradictory in conventional terms. No proper standardization is maintained in the method of classification, and no fixed parameter for classification is maintained, with the result that different types are grouped under a single nomen and varied nomens are used for a single unit. One example of such diversities in nomenclature is given here with a view to pointing out the chaos.

Blunted back blades are the chief element of the Blade-Bladelet industry. A variety of types are included within this class, although some authors (Krishnaswami and Soundara Rajan 1951) did not make any further classification. Blunted back blades have two basic subclasses:

1. Those naturally blunted by retaining part of the natural cortex (Lal 1958);
2. Those blunted by working or retouching.

The second subclass has been given varied typological nomenclatures, including blunted back with one straight edge blunted (Gordon 1950; Sankalia 1956; Joshi 1968); blade with flat retouch (Misra 1971*a*); retouched blade (Misra 1971*a*, 1971*b*; Sharma 1973); rectangular knife blade, long knife blade, rectangular blade (Subbarao 1948); inversely blunted back blade (Misra 1971*a*); larger backed blade, thick blunted back blade, and thin blunted back blade (Malik 1959). All these arbitrary so-called types basically belong to the same class.

Within the category of blunted back blades, further subdivisions are made on the basis of the nature or extent of blunting, and the degree of sharpness or bluntness. The above is a single example of such contradiction, which illustrates the anomalies and improper usage to be found in the available typological terminology. In order to improve this situation, similar classes having different names have been grouped together and different classes defined by a single term have been separated. This analysis reveals major inadequacies in the conventional terminology and as a result proper methodology may be set forth for determining the appropriate nomenclature. There should be some classification for distinguishing between finished and blank types. Use of a set pattern for specific orientation of the tools will rule out many unnecessary problems. There is hardly any dis-

inction between retouch and blunting. The term retouch has been used to indicate both blunting and sharpening. It is possible that proper attention was not paid to the problem of terminology by a number of scholars who undertook the work. Although attempts have been made to revise the age-old, traditional terminology, so far they have not brought about any standardization. The whole situation has become more chaotic with the simultaneous use of different terms. It is hoped that this transition phase will soon be over and that objective terminologies will be established.

EMERGENT TYPOLOGY

Ray (1975) made an attempt to propose a meaningful typological classification. With the help of attribute analysis a standard inventory of classificatory types was made. Preliminary investigation was carried out with a total of 543 tools from Ray's own collection. This examination permitted careful selection of relevant attributes and variables. The attribute system includes 42 attributes, of which 37 are discrete attributes and the other 5 are variables. The attributes include detailed morphological, technological, and assumed functional characters. Each attribute is further subdivided into 12 variations within a possible range of deviation. In the methodology, main emphasis was given to the working area, its shape, location, and profile. The idea behind this was the implied purpose of the working area, although exact functions are seldom known. Working area, along with all other characteristics, signifies probable function and more specific functional differences among types. On the basis of multivariate analysis, certain significant attributes, mostly concerned with the working area, are deduced. Detailed observations are made on raw material, form of material (blank), and shape.

An intensive splitter's classification (Buettner-Janusch 1966:173) is made first to form the basis for clustering. Tools are classified by shape, location, and profile of the working edge. Variations within these three attributes serve particular purposes, pointing to different uses.

Shape of working area has eleven possible variations (see Fig. 1). The contour of the working area has special relevance to function and technology. The variations are:

0. Straight
1. Convex
2. Concave
3. Concavo-Convex
4. Rounded
5. Notched
6. Oblique
7. Projected—when the edge is projected from the main body of the tool, a feature characteristic of point, borer, and awl
8. Transverse—characteristic of borers, with the edge usually at a right angle to the vertical plane
9. Assorted—when more than one variation is found on a single tool. Such assortments may be present on composite tools.

The next attribute to be considered is the location of the working area, which is considered in relation to the bulb of percussion. When the bulb of percussion is not found, the

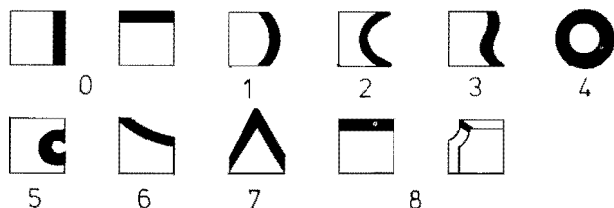


Fig. 1 Possible variations of shape at the working area: (0) straight; (1) convex; (2) concave; (3) concavo-convex; (4) rounded; (5) notched; (6) oblique; (7) projected; (8) transverse.

orientation in illustrations given by the respective authors is followed. It is sometimes hard to decide exactly where the working edge intersects the side of the tool, in which case an approximate estimation is made. For the variations listed below the flake-blade is placed with the bulb at the bottom. The opposite end of the bulb is considered to be the top. Identifications are made in relation to working area; the side with the working area is the front and the side opposite is the back, which is mostly unworked. Possible variations are (Fig. 2):

0. Anterior end
1. Right lateral side
2. Left lateral side
3. Both lateral sides
4. Two adjoining sides—anterior and right lateral
5. Two adjoining sides—anterior and left lateral
6. Three adjoining sides—two lateral and anterior or posterior
7. Three adjoining sides—one lateral, anterior, and posterior
8. Anterior and posterior ends
9. All round
- X. Unidentified

The third criterion is the profile of the working area, which reflects the specific character of the working area. This carries specific technological implications. The form of retouch along the working edge is a determinant of its nature, which also suggests its purpose. The major variations are (Fig. 3):

1. Straight—usually tools without marginal retouch have this kind of profile. The straight profile is formed by the intersection of the main flake surface and a flake scar on the dorsal surface.
2. Wavy—usually the result of alternate flaking.
3. Sinuous or serrated—profile formed by the removal of minute flake scars by pressure flaking.
4. Denticulated—this profile can only be formed by a controlled pressure technique.
5. Projected—found usually in the case of pointed awls and borers where the working area itself is a projection from the main body of the tool.
- 6-8. For additional types if and when defined.
9. Assorted
- X. Unidentified

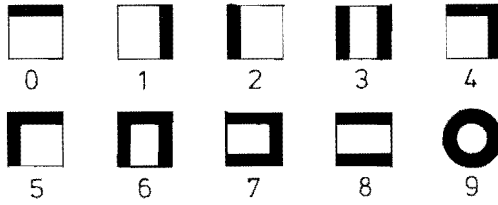


Fig. 2 Possible variations of the location of the working area: (0) anterior end; (1) right lateral side; (2) left lateral side; (3) both lateral sides; (4) two adjoining sides—anterior and right lateral; (5) two adjoining sides—anterior and left lateral; (6) three adjoining sides—two lateral and anterior or posterior; (7) three adjoining sides—one lateral, one anterior, one posterior; (8) anterior and posterior ends; (9) all round.

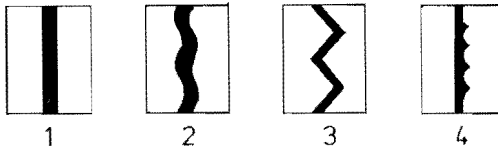


Fig. 3 Variations of profile of working area: (1) straight; (2) wavy; (3) sinuous or serrated; (4) denticulated.

It is indeed very difficult to differentiate between a nibbling and a minute retouching.

Together with these three attributes, shape is also considered. Shape cannot be omitted from the classificatory system because it has functional implications, although it is not the major determinant of function. Since shape depends on the type of raw material and the technology used, there could hardly be any uniformity in shape. In order to be more objective, each tool is treated as a quadrangle, the four sides of which are individually considered. There are eleven variations for anterior and posterior (lefthand column, below), and twelve for lateral (righthand column, below). They are (Fig. 4):

- | | |
|--------------------|----------------------|
| 0. Straight—full | 0. Straight—full |
| 1. Straight—short | 1. Straight—short |
| 2. Oblique—left | 2. Oblique |
| 3. Oblique—right | 3. Pointed |
| 4. Pointed—oblique | 4. Convex—more |
| 5. Pointed—convex | 5. Convex—less |
| 6. Convex | 6. Concave |
| 7. Concave | 7. Concavo—convex |
| 8. Notched—right | 8. Convexo—concave |
| 9. Notched—left | 9. Notched—posterior |
| X. Notched—medial | X. Notched—central |
| | Y. Notched—anterior |

For each artifact the attributes for the four sides are clustered and the total shape is expressed as the resultant of all four sides (Fig. 4). A total of 673 shapes is found as a result of clustering. These emergent shape forms may be further lumped together into three major classes (Fig. 5):

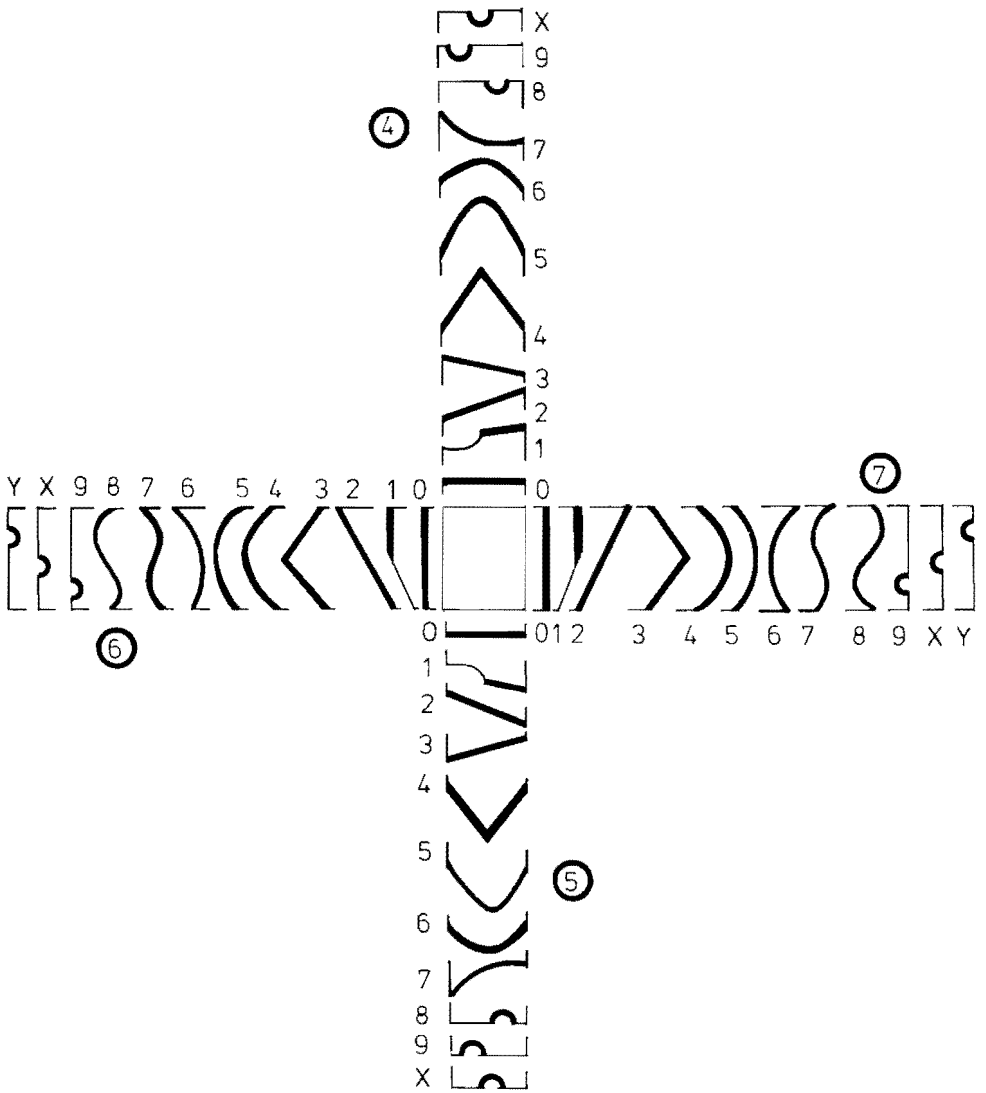


Fig. 4 Representative variations of general shape at the anterior (4), posterior (5), left (6), and right (7) lateral margins. Anterior/posterior variations: 0. straight full; 1. straight short; 2. oblique left; 3. oblique right; 4. pointed oblique; 5. pointed convex; 6. convex; 7. concave; 8. notched right; 9. notched left; X. notched medial.

- A. Rectangularoid
- B. Triangularoid
- C. Rounded, subclassified into
 - C₁ Rounded—the total dimension is more than a half circle
 - C₂ Semirounded—a half circle or a segment of a half circle

Rectangularoid and rounded forms each have conspicuous variations, which have been treated as separate forms. They are:

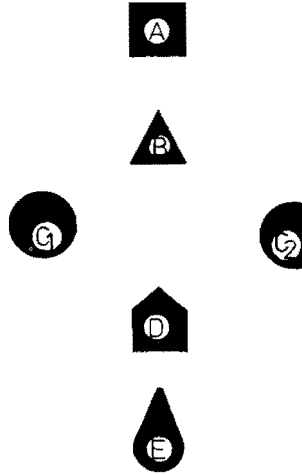


Fig. 5 Emergent shape variations. *A.* rectangularoid; *B.* triangularoid; *C₁.* rounded—more than a half circle; *C₂.* semirounded—half circle or segment of half circle; *D.* rectangularoid with ends projected; *E.* rounded with projection.

- D. Rectangularoid with any of the ends projected, proximally or distally
- E. Rounded with projection either proximally or distally.

An intensive examination of shapes revealed that microvariations occur in each class, as follows:

A	B	C ₁	C ₂	D	E
300	23	102	37	135	76

These attributes have been analyzed to discover their associations for a specific tool type, or class, in order to determine the main type classes. The total probability of emergent assemblages, from trials in which four attributes were treated concurrently, is 5082, but the actual number of emergent type classes is much smaller. Diagrammatically, the probable associations of the four major attributes with each variable are (Fig. 6):

- A. Shape of working area
- B. Location of working area
- C. Profile of working area
- D. Morphological form

Simultaneously, each class was compared in terms of existing typological nomenclature.

A total of 2104 tools are being considered for analysis in the present study, which is in no way complete. Further levels of perfection may be attained by sophisticated statistical techniques, which are in process. An aggregate of 253 type classes emerged from the treatment and computation through assemblage. The splitter's classification is intensive. Closely related types are then grouped to find the scheme of the lumpers' classification

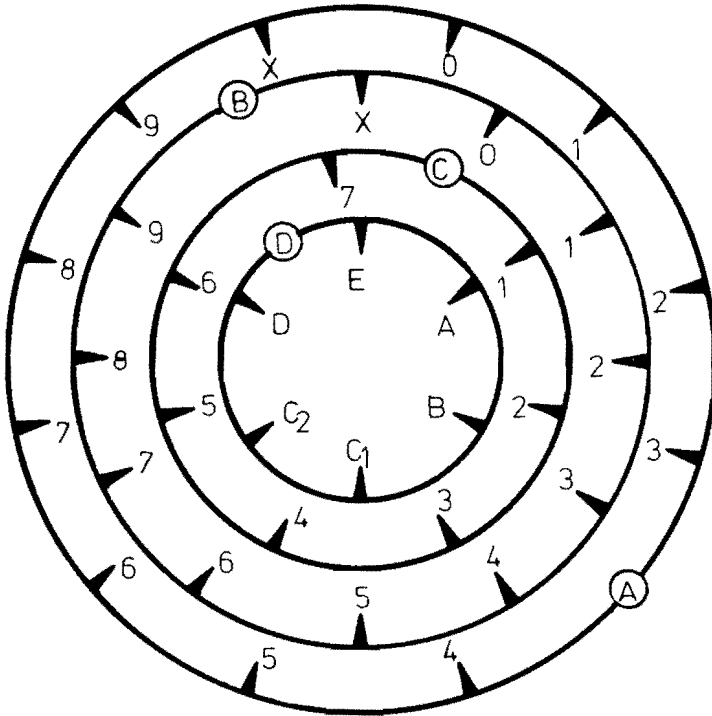


Fig. 6 Diagram showing the probable association of four considered attributes that bring out the expected total types. A. Shape of working area. B. Location of working area. C. Profile of working area. D. Morphological form.

(Buettner-Janusch 1966:173), which minimizes the number. For convenience, the present classification is compared with conventional terminology, which is adopted with strict standardization in terms of selection of attributes and their assemblages.

The following are the major type classes and subclasses that have emerged from the attribute analysis. The nomenclature of types and subtypes, along with representative variations as expressed through the attributes and their variables, have also been included.

A. Unretouched Pieces

1. Flake

- (i) Triangularoid
- (ii) Ovaloid
- (iii) Semicircular
- (iv) Rounded

2. Bladelike flake

- (i) Rectangularoid
- (ii) Rectangularoid with projected end

3. Blade

- (i) Rectangularoid
- (ii) Rectangularoid with one oblique side

B. Side Scrapers

I. Single edged

1. Convex
 - (i) Rectangularoid
 - (ii) Rectangularoid with one side projected
 - (iii) Semicircular
 - (iv) Rounded
2. Straight
 - (i) Ovaloid
3. Concave
 - (i) Rounded
 - (ii) Rectangularoid
 - (iii) Rectangularoid with projection
 - (iv) Ovaloid
4. Concavo-convex
 - (i) Rectangularoid
 - (ii) Triangularoid
 - (iii) Rectangularoid with projection
 - (iv) Ovaloid
 - (v) Rounded
 - (vi) Semicircular
5. Notched
 - (i) Rectangularoid
 - (ii) Triangularoid
 - (iii) Rounded
 - (iv) Ovaloid
 - (v) Rectangularoid with projection
6. Oblique
 - (i) Rounded
 - (ii) Rectangularoid
 - (iii) Ovaloid
 - (iv) Semicircular
 - (v) Triangularoid

II. Double edged

1. Biconcave
 - (i) Rectangularoid
2. Plano-convex
 - (i) Ovaloid
 - (ii) Semicircular
3. Biconvex
 - (i) Ovaloid
 - (ii) Rounded
 - (iii) Rectangularoid

C. End Scraper

Single edged

1. Straight
 - (i) Rectangularoid
 - (ii) Rounded
 - (iii) Ovaloid
2. Convex
 - (i) Rectangularoid
 - (ii) Semicircular
 - (iii) Rounded
 - (iv) Ovaloid
3. Concave
 - (i) Rectangularoid
 - (ii) Rounded
4. Notched
 - (i) Rounded
 - (ii) Ovaloid
5. Oblique
 - (i) Rectangularoid
 - (ii) Ovaloid
 - (iii) Rounded

D. End-cum-side Scraper

1. Straight
 - (i) Rectangularoid
 - (ii) Rounded
2. Convex (one side straight, one side convex is included within this group)
 - (i) Rectangularoid
 - (ii) Rounded
 - (iii) Ovaloid
 - (iv) Semicircular

E. Round Scraper

F. Knife

- I. Single edged
 1. Straight
 - (i) Rectangularoid
 2. Oblique
 - (i) Rectangularoid
- II. Double edged
 1. Convex
 - (i) Rectangularoid
 2. Oblique
 - (i) Rectangularoid
 3. Straight
 - (i) Rectangularoid
 - (ii) Rectangularoid with projection
 - (iii) Rounded

G. Lunate

1. Sharp backed
2. Blunt backed
 - (i) More than half circle
 - (ii) Half circle
 - (iii) Notched
 - (iv) Concavo-convex
 - (v) Concave

H. Triangle

I. Trapeze

J. Burin

- (i) Rectangularoid
- (ii) Triangularoid
- (iii) Rounded
- (iv) Semicircular
- (v) Ovaloid

K. Point

1. Point
 - (i) Rectangularoid
 - (ii) Triangularoid
 - (iii) Rounded
 - (iv) Semicircular
 - (v) Ovaloid
2. Point with single edge trimmed

L. Borer

- (i) Rounded
- (ii) Ovaloid

M. Denticulates

1. Straight
 - (i) Rectangularoid
2. Convex
 - (i) Rectangularoid
 - (ii) Ovaloid

N. Unidentified

An overall survey of typology brings out a compact classification (Fig. 7). At Level 1, the basic raw material may have any one of four forms—(a) core, (b) flake, (c) bladelike flake, or (d) blade. At Level 2, the type may be (e) unretouched or (f) retouched. Further classification is not made of unretouched pieces. At Level 3, retouched pieces may be

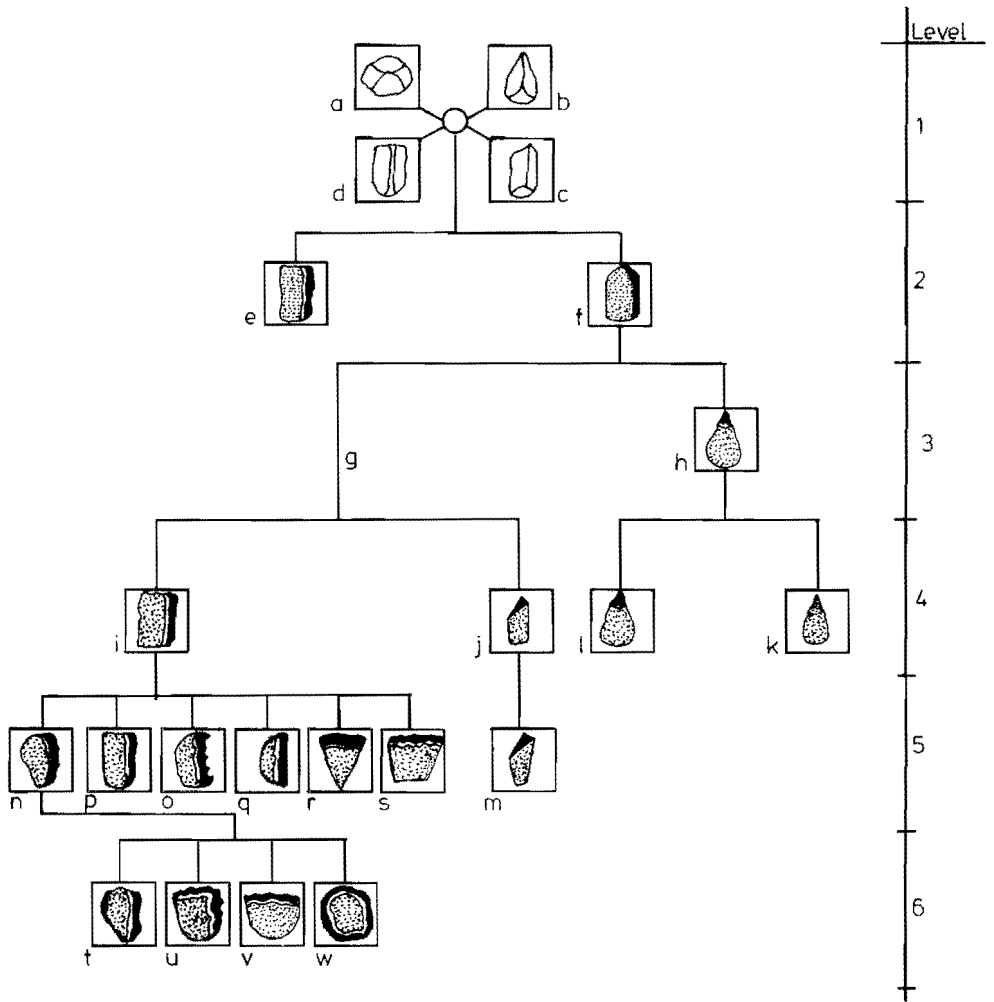


Fig. 7 Diagrammatic representation of major classes and subclasses of artifacts.

either (g) edged or (h) pointed. At Level 4 there is a dichotomy: the pointed varieties end with (k) point and (l) borer. Edged ones are divided into (i) laterally edged and (j) transversely edged forms. The latter (j) ceases at Level 5 with (m) burin. Also at Level 5, the laterally edged forms are giving rise to types like (n) scraper, (o) denticulate, (p) knife, (q) lunate, (r) triangle, and (s) trapeze. Only scrapers require further division, and in Level 6 the subtypes are (t) side scraper, (u) side-cum-end scraper, (v) end scraper, and (w) rounded scraper.

This scheme brings out the type classes of the Blade-Bladelet element in India and could be taken as a representative classification. However, in no way should the results of this work be regarded as the final product. There is scope for improvement in this basic model. The methodology involved in the present scheme is objective and the results achieved thereby are both meaningful and useful.

REFERENCES

BURKITT, M. C., and L. A. CAMMIADE

1930 Fresh light on the Stone Age in South-east Asia. *A* 4:327-329.

BUETTNER-JANUSCH, JOHN

1966 *Origins of Man*. New York: John Wiley.

CLARK, J. D., ED.

1957 Resolutions. In *Third Pan-African Congress on Prehistory, Livingstone 1955*, pp. xxxi-xxxiv. London: Chatto and Windus.

CLARK, J. G. D.

1932 *The Mesolithic Age in Britain*. Cambridge: Cambridge University Press.

1936 *The Mesolithic Settlement of Northern Europe—A Study of the Food-gathering People of Northern Europe during the Early Post-glacial Period*. Cambridge: Cambridge University Press.

GHOSH, ASOK K.

1966 Implementiferous laterite in eastern India. In *Studies in Prehistory: Robert Bruce Foote Memorial Volume*, edited by D. Sen and A. K. Ghosh, pp. 149-162. Calcutta: Firma K. L. Mukhopadhyay.

1972 Flake and flake-blade industries in India in the context of human evolution. In *The Origin of Homo Sapiens*, edited by F. Bordes, pp. 95-100. Paris: UNESCO.

GORDON, D. H.

1950 The stone industries of the Holocene in India and Pakistan. *Ancient India* 6:64-90.

1958 *The Prehistoric Background of Indian Culture*. Bombay: N. M. Tripathy.

JOSHI, R. V.

1968 Late mesolithic culture in central India. In *La Préhistoire: Problèmes et Tendances*, pp. 245-254. Paris: Éditions du Centre National de la Recherche Scientifique.

KRISHNASWAMI, V. D., and K. V. SOUNDARA RAJAN

1951 The lithic tool industries of the Singrauli Basin, District Mirzapur. *Ancient India* 7:40-65.

LAL, B. B.

1958 Birbhanpur, a microlithic site in the Damodar Valley, West Bengal. *Ancient India* 14:4-48.

MALIK, S. C.

1959 *Stone Age Industries of Bombay and Satara Districts*. M. S. University Archaeology Series, no. 4. Baroda: Maharaja Sayajirao University.

MISRA, V. N.

1971a Two microlithic sites in Rajasthan—a preliminary investigation. *The Eastern Anthropologist* 24(3): 237-286.

1971b Two late mesolithic settlements in Rajasthan: a brief review of investigations. *Journal of the University of Poona, Humanities Section* 35:59-77.

RAY, RANJANA

1975 Studies on Blade-bladelet industries in India. Ph.D. dissertation, University of Calcutta.

RAY, RANJANA, JOSEPHINE FLOOD, and ASOK K. GHOSH

1976 Typology of Blade-Bladelet industries in India. Paper presented at Ninth Congress of the International Union of Prehistoric and Protohistoric Sciences, Nice.

SANKALIA, H. D.

1956 The microlithic industry of Langhnaj, Gujrat. *Journal of the Gujrat Research Society* 18:275-284.

SHARMA, G. R.

1973 Mesolithic lake cultures in the Ganga Valley, India. *Proceedings of the Prehistoric Society* 39:129-146.

SUBBARAO, B.

1948 *Stone Age Cultures of Bellary (Being a Report of the Excavation at Sanganakallu)*. Deccan College Research Series, no. 7. Baroda: Maharaja Sayajirao University.

1958 *The Personality of India: Pre and Protohistoric Foundation of India and Pakistan*. 2nd ed. Baroda: Maharaja Sayajirao University.

WILKINS, JUDITH

1959 The mesolithic. *A* 33:130-131.