Chapter III

The Arts and Crafts

The terms arts and crafts connote differently. Arts specify the creations made with an aesthetic purpose while as crafts are generally devoid of the element of aesthetics and utility is the basic principle. For the Palaeolithic man fabrication of stone tools from boulders and cobbles seems to have lacked any aesthetic consideration. Contrarily these skilful objects were plainly designed for the very survival of man. Strictly speaking, the earliest and naturalistic art objects were produced during the Upper Palaeolithic period in many parts of the world. This artistic activity of man was manifest in two principal forms i.e. (i) engraved and sculptured objects and (ii) the awe-inspiring decorations on cave walls. However, there is a complete

Such art forms like engravings and sculptures belonging to the Upper Palaeolithic period are particularly available in Europe, F. Bordes, The Old Stone Age, London, 1968, while as magnificent pre-historic wall painting were drawn from the Aurignacian to the Magdalenian time in France and Spain, Ibid. In India the cave art of comparable date is visible in Bimbethka, UP, D.P. Agrawal, Archaeology in India, London, 1992. There are some rock engravings in Kashmir at Gilgat, of which many have tentatively been dated to the Upper Palaeolithic and to the Mesolithic periods, A.H. Dani, Chilas: The City of Nanga Parvat, Islamabad, 1983, as well as at Ladakh which,
break between the Palaeolithic and the Neolithic traditions as far as artistic creations are concerned. There may have been many reasons for the decline of the naturalistic art but the primary one seems to have been economical that divides the two periods.  

*Early Art of Kashmir*

In Kashmir proper, no such naturalistic art manifestation of the Palaeolithic period are available. The two engraved stone slabs of the Neolithic period found at Burzahom, however, present a new dimension. These slabs depicting the artistic creation of the Neolithic period seem to have been the offshoot of the influence generated by the instances of the human and animal engravings on rock surfaces available on the outer-hills of Kashmir, many of which were created during the pre–Neolithic period. Both these engraved slabs were found from the stratified layers of the Neolithic period I. A study of the situation in which these were fitted in a structure leads one to infer that these slabs were used as building however do not provide any precise date, A.H. Franke, *Antiquities of Indian Tibet*, Calcutta, 1926; but many of these are thought to be of the Palaeolithic period, J.L Bhan, ‘Rock art as a clue to the cultural history of Ladakh’, *Journal of Central Asian Studies*, Vol. VI, No. 1, Srinagar, 1995, pp. 17-24. Such rock-art forms are, however, regarded by some art-historians, like Mulk Raj Anand as ‘heightened passion of man in search of food.’ *Marg*, Vol. XXVII, No. 4, Bombay, 1975, p.5. Jacquetta Hawkes, *History of Mankind*, (Prehistory and beginning of civilization), Vol. I, London, 1963, p. 330. Both Gilgit and Ladakh where from the rock art forms are known, supra note 1, are located on the outer hills of Kashmir valley in its north and north west as through both these regions ancient routes connected Kashmir with outside world authentically since the historic times, S.M. Ahmed, ‘Central Asia and Kashmir’, *Central Asia and Western Himalaya: A Forgotten Link*, Jodhpur 1986, pp.1-8.
These slabs, therefore, seem to have lost the decorative purpose and as such may not necessarily have belonged to the period II. Since these slabs depict scenes related to hunting, it is quite possible that they might have belonged to the period when hunting on large scale sustained the Neolithic economy. It is worth noting that the hunting of wild animals, like *cervus* as is represented on one of the slabs at Burzahom, was practised largely during the early phase of the Neolithic culture which was progressively over taken by the higher percentage of domestication of live stock.

The principal figure engraved on the slab bearing hunting scene (Fig. 18.2) is of a stag who has stripped or spotted body and multi-branched antler. This animal has a short tail and an exaggeratedly long male genital. The animal on the rear side is being attacked by a spear.

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5. Because these engravings were found in a structure of period II where their utility was mainly for building a structure and were in such a position that the engraved surfaces were facing inwards and in upside down position, they as such had lost the utility they were made for, B.M Pande, *Ibid*

6. A collection of animal bones from Gofkral shows that stag-hunting decreased from the Aceramic to the advanced stages of the Neolithic period there, A.K Sharma ‘Excavations at Gofkral 1981’, *Puratattva*, No 11, 1982; See also infra Chapter IV

7. The slab, measuring 70x 45 cms is flat on both sides, irregularly cut and smoother on the engraved face, B.M. Pande. *Asian Perspective*.


bearing human figure\textsuperscript{10} who holds the weapon in the raised right hand while the other hand rests on the hip of the hunter. In front of the animal, there is an archer,\textsuperscript{11} resting on his left bent knee and holding a bow in his left hand, with his right hand the archer releases an arrow which pierces the chest of the static animal. The scene further portrays a dog\textsuperscript{12} accompanying the hunters. The dog, engraved on the top register of the slab, has a lean body, a long curved tail and an erect genital. Besides, in the scene one finds two representations of the sun, one complete and the other incomplete \textsuperscript{13} formed of two concentric circles with radiating lines all around.

The subject matter embodied on the slab portrays hunting as it was the earliest occupation of the Neolithic people that sustained their life at the time the scene was conceived and executed. Besides, it also elucidates the skill of hunting and weapons employed in a particular hunt. Even though the graphic scene of the slab reflects some of the body parts and organs in exaggerated size,\textsuperscript{14} yet the figures are distinctly delineated and show the

\textsuperscript{10} The human figure is 13 cms in height. \textit{Ibid.}

\textsuperscript{11} The archer is 12 cms in height, \textit{Ibid.}

\textsuperscript{12} The dog is 6 cms in length and height, \textit{Ibid.}

\textsuperscript{13} S.S. Saar is of the opinion that the incomplete representation of the sun is because of the fact that during the process of its engraving a part of the sun got chipped off and as such a fresh engraving of the complete sun was made, \textit{Archaeology, Ancestors of Kashmir, New Delhi, 1992, p.47}; B.M. Pande, on the other hand, has said that the two representations of the sun were purposely made to demarcate the time span (from sunrise to sunset) that the people took for the hunt, \textit{Asian Perspective}.

\textsuperscript{14} In comparison to other parts of the body the size of the genitals of the stag and the dog are very long. This is also the case with the archer whose trunk is usually long and what has been called the genital of the archer (B.M. Pande, \textit{Ibid}) is too long for the man.
human figures in their partial profile while the animals are in their full profile. Though the primitive nature of the engravings is well marked by the contours of the figures which are not rounded but angular, yet the vivid and well marked lines on the scene facilitate to identify the engraved figures very clearly. According to B.M. Pande the human figures on the stone slab are that of a male archer and a female spear-bearer. He based his observation on the presence of male genital of an extra-ordinary size, hanging in between the legs of the archer. On the other hand, he identified the female figure on the basis of her akimbo pose – a characteristic of females to keep one hand on their hip with elbow pointing outwards, her dress comprising a skirt, and contour profile of the mammary glands. He further explained that the hanging object in between the legs of this female figure is not the male member but a natural break in the slab. The latter explanation is not acceptable to Saar who identifies this spear-bearer with a male figure with exposed male genitalia. Even though the nature of the rock surface as well as the pecking technique employed for the execution of the portrayal of the engraved figures restrict the scope of vividly describing the tiny body contours, yet such hanging objects in between the

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16 This is not shown in the drawing published by B.M. Pande, *Ibid*; but is shown in *IAR*, 1965-66, Pl. X, as well as in the drawing made by S.S. Saar, *Archaeology*, IL – 43, p. 47
17 S.S. Saar, *Archaeology*. He also does not mention that the stone slab has any break in between the legs of the spear-bearer, neither in his drawing the mammary gland is as pronounced as that of a female shown by B.M. Pande. This, however, is true that the gland is pronounced as is found from the Pl. in *IAR*, 1965-66 but not as much as has been depicted in the drawing by Pande.
legs of human figures have been interpreted elsewhere as tails of animal skins used as dress.\textsuperscript{18} Be it as it may be, the hunting scene delineations at the primitive stage of artistic creations are more or less realistic. These delineations are significant enough for they not only define human association and relationship but also the conceptual thinking underlying the projection of the scene. For example the two representations of the sun may indicate that hunting of large sized animals was carried from the sun rise to the sun set or, when the scene is analysed as whole, it may point to a custom, a primitive ritual or a religious belief based on the sun symbols\textsuperscript{19} prevalent during the period of its portrayal. However, whatever may be the reason for the secondary use of the engraved slab, the leading one seems to be that not only hunting but the conceptual projection at least in a displayed manner too, had lost its meaning during the middle stages of the farming economy.

The flat surface of the second stone slab\textsuperscript{20} has an engraving of an abstract design of a hut (Fig. 18.1). The hemispherical thatched roof of the hut is surmounted by prominent broom–shaped spire. Inside the hut, on the drum portion of the roof is said to be present the hind portion of an animal

\textsuperscript{18} A.H. Dani, \textit{Chilas}. He nowhere mentions such hanging objects as male genitals of human figures. Instead they are interpreted as tails of animal skins used as human dress during the pre-Neolithic times in the cold region of Nanga Parvat. On this analogy, the female spear-bearer is wearing one such animal skin and the hanging object in between the legs is the tail of the animal. This may as such be true in case of the archer too.

\textsuperscript{19} Infra Chapter V for details.

\textsuperscript{20} The stone slab is broken along the edges and appears roughly triangular or conical in shape. B. M. Pande, \textit{Journal of Indian Anthropological Society}. 
with a tail. This abstract graphic representation of hut with the trapped animal is known as tectiform – connected with the magico-religious rites of the people.

Ceramics, too, have a claim to attention among the artistic creations of the Neolithic people of Kashmir. In shape, the pottery of Neolithic Kashmir is as good as of other civilizations elsewhere. The virtue of this pottery lies in its fine mastery of form and style. The best of these, especially, were the high necked jars having a flaring rim and a shapely rounded body. Its form, a fine blend of curves and bulges, is as if an expression of female spirit in art (Fig. 11.13). The potters seem to have excelled only in giving a definite shape and look to their vessels but seem to have possessed not too much of talent for decorations. The best of their decoration which breaks the monotony of these pots is, however, demonstrated by notching, twisting, pinching around the neck portion of some of the vessels as if replacing the ornaments, like necklaces, in the human form. Such decorations may be the reasons for some one to claim that pottery was entirely expressive of the sex - a feminine work, but it is true that such treatment is expressive of the decorative taste of the people. Another such artistic creation was attained by the incised graffiti markings.

21 B.M. Pande, *Ibid*, the identifications and explanations thereof are after him.

22 *Ibid*. For religious beliefs see infra Chapter V.


24 Graffiti is marking on the pots, in the form of tiny lines, as if scratched, to form certain markings on the body of pottery, and are mainly post-firing but sometimes these are also pre-firing, B.B. Lal, *Ancient India*, No.16,1960, pp. 4-24.
Again, whatever may be the conceptual thinking underlying the projections on the vessels, they show a degree of superiority so far as abstract and naturalistic artistry is concerned. The graffiti marks, like framed panels of trapezoidal and square designs, inverted branches of trees and bird representations\(^{25}\) (Fig. 15.1-4) though not available in large numbers\(^{26}\) show great formal beauty in spite of their rigidity. But these engravings particularly the incised small designs of birds give a faint idea of the artistic urge of the potters of the times. The potters, however, seem to have been handicapped in the application of colour to produce painted pottery – in which Neolithic Asia excelled.\(^{27}\) It is therefore rather curious to find only one large globular pot at Burzahom which is painted in black and has a

\(^{25}\) S.S. Saar. *Archaeology*, pp. 34-36. He is probably the first researcher involved in the excavations at Burzahom who has reported these from there with excellent drawings, belonging to the Neolithic period II on the burnished gray ware. Earlier A. K. Sharma, *Puratattve*, reported such instances from Gofkral (period IC) as well.

\(^{26}\) In the Indian sub-continent such scratch marks are hardly found on the Neolithic pottery but are found in the south Indian Megalithic pottery as well as Harappan pottery. They are mostly geometric in form besides of such forms as the sun, fish, tree, man, boat, ladder, arrow heads, etc. According to Ghulam Yazdani, these designs are of 130 types, *Annual Report of Hyderabad Archaeology Department*, 1915-16, pp. 9-10; while B.B. Lal short lists them into 60, *Ancient India*. According to B.B. Lal, taken together these marks may represent the identification marks of potters or their users or else they might be either pictographs or representation of magic, *Ibid*.

\(^{27}\) From many Neolithic sites in Asia, the main pottery types are painted, e.g. in Turkmenistan, Iraq, Iran, and China (A. H. Dani and V. M. Masson, *History of Civilization of Central Asia*, Vol. 1, UNESCO. 1992; P. Sing, *The Neolithic Cultures of Western Asia*, London, 1974; Ping-Ti Ho, *The Cradle of the East*, the Chinese University of Hongkong, 1973).
large horned head of the bucranian bull on its surface (Fig. 14.5). This painted manifestation, therefore, lies in total isolation in Kashmir and though it might have a symbolic significance in the decorative arts of those bygone times yet it provides a clue towards the artistic aspirations and practice of the people who found it a necessary part of their living pattern.

Put together all these art creations, they are not as great as in the Upper Palaeolithic times elsewhere. This is possibly because the newly born peasants 'had lost the excitement and the intense sensuous observation of nature, the immediate magical urge and religious wonder at animal life that inspired the hunters; perhaps, too their unconscious mind was less often stirred in their quieter moments and more routine way of life, and so were less able to inspire them for high imaginative art'.

28 K.N. Dikshit and T.N. Khazanchi, 'The Gray ware culture of Northern Pakistan, Jammu and Kashmir and Punjab', Puratattva, No. 9, 1980, p.49. They report the find of this pot from the earliest levels of period II, while S.S. Saar (Archaeology, pp. 13-14) records that 11 shards forming this pot (incompletely) were found from period I (Aceramic) and were intrusive at the site. The drawing he has made of it has no eyes on the homed head, while the one published by H.D. Sankalia, Prehistory and Protohistory of India and Pakistan, Pune, 1974 fig, 88 K-E has the eyes, possibly on the analogy of Kot-Diji example.

29 Many such horned designs, painted in black, on such pots are found outside Kashmir, particularly in the pre-Harappan context in India and Pakistan, as at Kot-Diji, Sarai Khola, Banawali, etc.; see infra chapter VI.

30 Infra Chapter V.

31 J. Hawkes, History of Mankind, p. 334. He further puts it that a perfectly successful but unambiguous decorative art might well be expected in peasant cultures in which women were powerful.
Crafts of the Neolithic Period

The material culture recovered from the Neolithic sites of the Valley imply the knowledge of many specialized crafts pursued during the period under review. These crafts are as given below.

Pottery: There was a defined pre-ceramic phase in the Neolithic culture of Kashmir when the people settled here pursued fishing, hunting, farming, husbandry, etc. for their survival. This phase represented by a long occupation of about 600 years at our sites without any kind of pottery being produced. It may, therefore, be suggestive that this period of aceramic may have allowed the people in the Neolithic Kashmir the necessary time-space for an independent invention of the skilful crafts of pot making. What, however, is lacking for such an assertion is the evidence that could be indicative of any tentative effort or in other words experimental or developing stage of pot making at our sites as this craft after first emerging in Kashmir, evidently progressed beyond the experimental stages. It is an invention that could easily be made at any place in the world observing the structural change that takes place in clay

\[32\] The exact period of time for the Aceramic phase at Burzahom is to be worked out on the basis of C14 dates available for period I which was named so by R.K. Pant, (IAS & ISPQS Conference, Allahabad, November 1980) and S.S. Saar, (Archaeology) as well as on the theory we have put forth on the basis of pottery development (in supra of Chapter II), then it lasted for about 600 years meaning thereby it started around 3000 B.C. and lasted till 2500 B.C. This is what Gofkral excavations have indicated, as the time span for this phase was said to have lasted for more than 500 years, A. K. Sharma, Puratattva; see also chronology supra Chapter II.,

Like the ill-fired or half baked pots, the evidence of which is not reported from out sites.
when it is baked and its chemically combined water is expelled at $350^\circ$-$450^\circ$ C to transform it into partially hardened material, like the clay plaster in a hearth lit with fire. During the period of our study, as has been found, well levigated and plastic hard clay was used to make a pot of a desired shape and after its sun drying, the clay pot was baked to convert the clay into terracotta. These three important steps required for pottery were first attempted in Kashmir around 2500 B.C. when hand-made, coarse but watertight vessels were made. These fully baked, completely made vessels

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Clay is keolinite, tiny, platy and flat crystal having the formula $\text{Al}_2\text{O}_3\cdot2\text{SiO}_2\cdot2\text{H}_2\text{O}$ drawn from feldspars like calcite feldspars, potassium feldspars, $\text{CaO}\cdot2\text{Al}_2\text{O}_3\cdot2\text{SiO}_2\cdot3\text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{Al}_2\text{O}_3\cdot2\text{SiO}_2\cdot3\text{H}_2\text{O}$.

The water molecule attached to the clay crystal is water of crystallization. When water is mixed with clay an indefinite number of water molecules get attached to the clay crystals to remain outside the crystal lattice. These are physically attached water molecules which make it plastic. The suitable plastic clay or leather hard clay has 8% by weight the physically attacked molecules of water. The moulded objects of this clay and sun dried retain 3% by weight the physically attached water molecules. When baked at $110^\circ$ C the sun dried moulded objects loses all of the physically attached water molecules as vapour. A temperature below $350^\circ$ C makes the outer surface of the object hardened but leaves the core soft, called ill fired or inadequately baked. Between $350^\circ$ - $450^\circ$ C a change in clay takes place, it loses water of crystallization and aluminium silicate changes into alumina and silica.

During the Neolithic period in Kashmir the pots found were often well baked. This became possible when these were baked between $700^\circ$ - $1000^\circ$ C so that their outer surface and core became hard to make these completely baked objects, and at a temperature upto $1200^\circ$C, alumina and silica recombine to form new aluminum silicate, $2\text{Al}_2\text{O}_3\cdot3\text{SiO}_2$, to make the object hard, dense and durable and are thus called fired clay or terracotta.

Supra note 32.
besides the storage of cereal food and alike might possibly have fulfilled an important necessity for cooking and serving the food.

The raw material required for these pots was clay – a product of decomposition of rocks, containing minerals of hydrated aluminium silicates with admixtures of alkalis and iron oxides. Such a clay was easily available as secondary clay in and around the Neolithic habitations in Kashmir. This clay when worked with appropriate quantity of water is plastic hard and less sticky to handle. Pant, who carried researches on the Burzahom pottery, was able to find through radiography that the clay after prepared plastic hard was strengthened by the addition of siliceous grit. This tempering material was added possibly to counter stickiness and to obtain greater porosity that prevents cracking and warping when the pots are fired. Thereafter the clay was kneaded, possibly by hand like the bakery dough, the actual and skillful job of the potters was the first task to begin to build up their ambitious vessels.

Pant, after studying the structure of these pots under microscope and through radiography, was able to find that the body of these Neolithic vessels mostly contained gaps and horizontal grooves of asymmetrical sizes and shapes without being uniform and appearing at intervals. Where

The loess in Kashmir is a secondary clay, which is the topmost layer on the Karewas (supra chapter I), on which most of the Neolithic settlements are available in Kashmir, (supra Chapter II, Appendix I) and which is still used by the present day potters for their pot-making, particularly its weathered layers. The coarse thick gray ware was found to contain coarse sand filters, the fine gray ware had crushed rock material like large sized angular grains of milky quartz as fillers, the burnished ware show few fillers whileas gritty red ware contain lots of coarse sand fillers, R.K. Pant, IAS and ISPQ, 1980 J. Hawkes, History of Mankind, p. 302.
groove traces are feeble clay appears to have been dragged downwards to overlap the lower band of the clay, sometimes overriding it. This he understands was the offshoot of the manufacturing techniques employed for the building up of these pots. Accordingly, the suggestive mechanism employed for the pot making was either strip or coil technique\textsuperscript{40} wherein a part of kneaded clay was worked into a round base and placed on a reed mat,\textsuperscript{41} as on the turning wheel which is used today for the production of pottery and which was not used during the early period of pot-making in Kashmir. Thereafter either coiled or strip (ring) technique was used for the preparation of the ambitious vessels. In the first technique thin and long rolls of clay were used spirally wherein one coil was mounted along the round base, and at each turn the coil spiraled one above the above. The latest spiral of the coil was pinched on the one below to put the pot roughly together. In the second case the procedure of making a pot was similar except that separate strips in the form of rings were built one above the other. The shape of the pot was then perfected by thinning the walls by manually pressing and smearing the coils with each other. Possibly with the assistance of a helper the underneath reed mat or the basket was turned

\textsuperscript{40} R.K. Pant, IAS and ISPQS, 1980.

\textsuperscript{41} Mat or cord impression on the base of pottery is suggestive of it, or alternatively it might have been a reed basket which would have served the purpose particularly when the shape was to be maintained during the thinning of clay walls, with the fingers, on the inner side. In that case the basket would not have been smaller in size than the pot itself like a vase, the required size of the basket should necessarily have been upto the point where size of pot was maximum beyond which the basket would not have been used while as for a bowl or dish the basket in that shape would had helped particularly well.
round and round so that the potter working with one hand inside the pot and the other outside was able to flatten and pat the walls both internally and externally to unite the clay strips into one piece of the desirable pot. It is because of employment of such techniques that asymmetrical grooves were left in the matrix of the pots. The pots built by strip technique were the thick coarse gray ware and the gritty red ware while in coil technique these were the fine gray ware pots.

The pots further reveal that brushing with a reed brush was employed to remove the excess of clay and to make the wet surfaces of the pots even, which in many cases were left as such as on the fine gray ware. Thereafter, in many cases certain kinds of designs, like notching, twisting, pinching were made to decorate their exposed wet surfaces either on the neck region or near the rims. Many other pots were characterized by graffiti marks. These marks might have been incised either before firing or after firing. But in any case the built in clay pot was subjected to the sun drying to retain the desired shape and to reduce the water content in the leather hard clay object to 8-15%.

During the mature stages of the Neolithic culture in Kashmir i.e. around 2000 B.C. superior ware pots, called burnished ware, were also

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42 J. Hawkes, History of Mankind, p. 303.
43 R.K. Pant, IAS & ISPQS, 1980. He has further found that thick gray ware pots show irregular fracturing but the cores are more or less uniform in gray colour and their matrix is fine but porous. The fine gray ware are uniformly ash gray and have medium to thin fabric, they show regular fracturing and their matrix is fine and less porous. The gritty red show irregular fracturing and cores appear often dark in colour.
44 Supra note 24, 25 and 26.
45 Supra note 34.
produced. These pots are more watertight and their fabrics less porous. To facilitate the production of burnished ware, the potters seem to have used a roundish pebble as a burnishing tool for the rubbing or burnishing of the sun-dried pots to prepare an agreeable glossy surface. These pots after firing are almost lustrous or polished in appearance and their exterior or exposed surfaces are very smooth. At the later stages of this culture i.e. after 1700 B.C., the hand-made pots were replaced by the wheel-turned ones with the introduction of spun-wheel. These pots became thinner in fabric and had greater finish and smoothness.

The clay pots thus made were subjected to firing to change its status into terracotta. The firing of clay pots is possible without the use of kilns where pots are stocked along with the fuel and covered with a covering of earth, etc. to form an open or smoother fire. In such fires a temperature of about 800°C can be attained. However, it is certain that the potters of the times in Kashmir fired their pots in closed kilns. These kilns, which were plastered internally to retain a high temperature, were in use from the very beginning of pot making i.e. around 2500 B.C. and would have allowed to prepare the fired clay pots which were available in different shades of red, buff, gray or black. Firing had a great effect on the colour of these finished

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46 R. K. Pant, *IAS and ISPQS, 1980*, he has found that these pots were made both by coil and strip technique and were gray to black in shades with an occasional red tinge. These have fine to medium fabric and show irregular fracturing and crumbles down into pieces.


48 One such kiln with a mouth and having a diameter of 1.70 meters, with inner and bottom wall plastered, was found at Gofkral (period IB – the period when pottery was first made), A.K. Sharma, "Excavations at Gofkral, IAS and ISPQS Conference*, New Delhi, 25-27, Oct, 1982."
pots. The factors involved for the colour of pots are complex depending upon the constituents in clay. However, the general rule is that if firing is carried to a high temperature with plentiful of oxygen supply, the clay will fire red (especially if it has iron oxide) while if oxygen is kept away the colour will be gray or black. As both these colours i.e. shades of red and black are available in the archaeological remains of the time, it is safe to believe that both these firing techniques were available to our Neolithic potters.

**Weaving:** The material objects like skin cutters, scrapers, knives, awls, needles, etc found at the archaeological sites in Kashmir make it certain to expect that animals skins were widely worked, for the probable use of making leather bags for storage and carriage of goods and grains, or for making fur pelts for floor furnishing to provide warmth and comfort, and also for making human dress to resist climatic severity. Such usage however, entailed very little processing, like cleaning and scraping the leather surfaces with scrapers, stitching with bone needles using leather strings as threads or buttoning these dresses with small bone points. Even though all such leather goods would have been handy at any given time, yet it seems that with the development of their culture the people in the Neolithic Kashmir had familiarized themselves with the art of weaving.

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49 There are certain pots which are of bi-colour wherein black colour is attained by placing the pot in ashes and leaving rest of it exposed in the kiln to attain the red colour, J. Hawkes, History of Mankind, p. 304.

50 No material culture made of animal skin was found during the excavations. Being perishable it is rather difficult to get one. However, what has been suggested by A.H. Dani (Chilas) regarding the animal skin used as human dress, we might likewise have had such use of it, (supra note 18).
earliest of such evidence comes from the beginning of the ceramic period when pottery was developed for the first time around 2500 B.C as weaving impressions are preserved on the various pottery specimens at their bases (P. X.1). These impressions indicate that two types of materials were utilized for the weaving of articles; one of reed/straw and other of cord. As the straw or reed impression on the pottery was carried into the clay that was placed on a reed mat or in a basket during the process of pot-making, it seems probable that such woven material consisted of articles used for floor furnishing, like mats or for the storage of domestic articles like baskets. The pottery impressions further reveal that both cord and reed materials were woven in a uniform pattern wherein warp and woof were interwoven to produce a closely knit material. For such a plain weaving technique, it was rather uncomplicated to spread reed material, after it was uniformly cut into required size, side by side in opposite quadrennial direction as warp and woof threads to be interlaced alternately with the fingers of the weavers.

On the other hand, the pottery specimens having cord impression on their bases are indicative of textile production wherein its manufacturing technique seems to have developed complicatedly. In the

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51 Many pots are carrying such impressions on their bases found from almost all the Neolithic sites throughout the length of Kashmir. It is reed/straw impression, called mat-impression, that is reported from Burzahom, IAR, 1960-61 to 1971-72 and from Gofkral IAR 1981-82. Nevertheless, there are many instances which show that cord weaved into thick cloth was also used for the purpose and hence cord impression, IAR, 1981-82.

52 Supra note 41.

absence of evidence of fibrous plants like cotton grown in the Neolithic Kashmir, the possible source of raw material for textile yarn, then seems to have been the fleece of sheep – the animal that was widely domesticated during the period. After the necessary steps of the teasing out the wool, spinning and twisting was the important step necessary for the textile weaving. Spinning is forming of threads by drawing out fibers and twisting these; the processes are carried out either separately or simultaneously. Drawing consists in pulling out the fibers lengthwise by arranging them in more or less parallel order. Even though such a process can be handled with a technique of easing out fibers with human fingers and twisting such fibers between two hands or between a hand and a thigh, yet it is laborious, time-consuming and produces clumsy and uneven thread of shorter lengths. The spinning and twisting of woolen fibers simultaneously was facilitated with the use of spindle whorls. The terracotta and stone specimens of such whorls that have been found from the Neolithic sites in Kashmir are spherical and perforated at the centre for the reception of the spindle shaft, like that of bone awl. These whorls when rotated with fibers attached to the spindle shaft tip, wind long twisted thread. Such spun thread seems to have been used in the weaving of cloth with or without the use of framed loam. While stiff materials, like reeds used in the mats could be weaved with fingers, the woolen threads on the other hand could be

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54 Infra Chapter IV.
56 Terracotta and stone spindle whorls are reported first from period IC at Gofkral, *IAR*, 1981-82, alongwith was also reported from the period the pottery having cord impression on their bases.
woven on warps stretched out and held firmly. An effective type of device might have consisted of two bars pegged out horizontally on the ground with the warp threads held tight between them. The woof threads can be darned in with the hands or bone needles; or a shed-rod devised to raise one set of warps and heddles used for raising of another set. Instead of this horizontal loom, there is even possibility of the upright loam used in weaving of Neolithic textiles. In this case, one upper loam held the warps in upright position and the warps at the bottom were tensioned by using loam weights. Such loam weights as found in Neolithic Kashmir might have been mace heads, net sinkers or weights which would have allowed the weaver to work at the top, as in the modern framed loom, as against the double beam loom which is worked at the bottom. A fabric thus produced in either way would show plain weave with regular alternation of warp and woof thread as in the pottery impressions. However, as the fabric material is softer than say of reeds, the weave threads in the textile seem to have been pushed together during the course of weaving with the help of an implement called card—a saw-edged comb-like bone tool as found at Burzahom. Such a weaving technique might have ultimately produced thick coarse woolen cloth, impressions of which were transformed on clay

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57 Grace M. Crowfoot, *A History of Technology*, p. 425-27. This is the technique still used in Kashmir for the delicate hand made *pashmina* fabric before the woof threads are loomed in.

58 Ibid.


60 B. M. Pande, ‘Toilet objects, combs’, *An Encyclopaedia of Indian Archaeology*, Vol. I, ed. A. Ghosh, Delhi, 1989, p. 345. He reports that this bone tool found from period I was an implement for weaving, dressing wool or removing hair from skins of animals.
that had been placed on the thick coarse cloth during the process of pot making. The stitching of such cloth material for tailoring of garments was finally done with the fine quality of bone needles, as a large number of these needles was found at our sites.\textsuperscript{61} carrying through their pierced eyes the strings of the spun thread.

\textit{Neolithic tools and their Technology}

The tool assemblage of the Neolithic Kashmir is mainly represented by stone and bone types, of which a great number and variety is available. There are some metal types also but they are in limited number and types. During the excavation some miscellaneous objects of utility were also found which have been clubbed here along with for the sake of convenience.

\textit{Stone Tools:} The Neolithic Kashmir featured in invention and development of stone tool technology which was fairly advanced and distinct from the preceding Palaeolithic period. As compared to the past, the Neolithic tools were smooth, with razor sharp, fine cutting edges which advanced the working efficiency of these tools and thus would have rendered the life of the man quite easier. Most of the stone tools in the Neolithic Kashmir were made of basalt and a few of felsite rocks (divitrified glass, which is mainly acidic and is equivalent to rhyolite). Since these rocks are of softer nature, the implements made thereof, therefore, entailed less labour for chipping and grinding to acquire the desired smoothness and sharpness.

\footnote{117 bone needles are reported from Burzahom alone besides 88 awls, supra Chapter II.}
Most of the times, large flakes were taken from the cores for fabrication of the tools but on occasions elongated river pebbles resembling tools like grinders or pounders were fashioned by grinding their edges for utility purposes. Even though smoothening and grinding was the technological innovation of the Neolithic people, yet we do not have a complete record regarding the stages involved for the fabrication of these tools in the development of this technology in Kashmir. Nevertheless, Kashmir tool-technology might have had a history similar to those found elsewhere. For example, B. Subbarao's contribution in tracing out the stages of development of the Neolithic stone tool-technology at Ballary and Halagondi is worth appreciating. He found a large collection of unfinished tools with primary flake surface and bulb of percussion intact and, therefore, obliges to believe that these stone tools, like celts, were made of a flake struck from a core. This flake in the first instance was roughly chipped off with the help of a stone hammer to give it the general appearance of the desired shape. The technological stage involved for the chipping was bold, convergent, alternate step flaking which left high ridges and sharp zig-zag cutting edge on the tool (Fig. 19.1). Subsequently the angles of the ridges on the tool were removed, probably with a pointed

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62 To define the technology and development of tool making it is necessary to have a collection of unfinished tools at various stages of their make. No such assemblage is reported from our sites. It is only ring stones that are found in such stages of make from our sites in Kashmir.

to perfect the cutting edges. (Fig. 19.2 & 3) called technically battering or hammering. The working edge was further sharpened by employing secondary alternate step-flaking (Fig. 19.4). The tool was thereafter ground on a coarse stone surface with a little water. The process of grinding or frictional abrasion was undertaken in two stages. In the first instance, the excessive roughness was removed by the process of preliminary abrasion so as to render rounded shape to the tool (Fig. 19.5). In the second instance the tool was grounded to obtain a smooth and even surface (Fig. 19.6). In some cases, the excessive abrasion was affected on the cutting edge and its nearby areas which correspondingly produced a gloss on the tool. On systematic analysis of the facts, one understands that the Neolithic tool-making in Kashmir, too, might have gone through similar stages of fabrication and development to produce a similar and comparable tool assemblage. However, the factory sites in South India were generally located near the Neolithic habitational sites, because of which all the stages of tool-making was possible to know.

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64 Allchins believed that it was done with a small cylindrical or discoid hard hammer, Bridget and Raymond Allchin, The Birth of Indian Archaeology, London, 1964, p. 86.

65 Because of this gloss these were termed as polished tools, M. C. Burkit, Our Early Ancestors, Cambridge, 1926. This name is still retained by others as well. The smoothness of the tools depend upon the degree and extent of grinding rather on actual polish.

66 Robert Bruce Foot found in Bellary well polished grooves, 7 to 8 inches long and 1 to 1 ½ inches deep, worn by ground of axes, on rock surfaces. These grooves lie together parallel and in close lines within a space of less than 20 inches square. Such grooves were also noticed at Halagondi in Kurnol (c.f. B. Subbarao, Stone Age Culture of Ballary, p. 57) and other places in South India, B. Subbarao Ibid, p. 57.
Contrary to this, in Kashmir no such evidence is traceable, therefore, these tools might have been fabricated away from the habitational sites.67

These tools, thus made, attained different shapes so as to be used for different purposes. However, we have no definite mechanism to determine the original names and actual functions of the tools. What we generally depend upon is the morphological resemblance and parallels from the modern tools besides scientific reasoning. A micro-wear investigation carried by Pant,68 to study the microscopic ‘use’ or ‘wear’ or ‘striation’ marks69 on the functional parts of some of the Neolithic tools of

67 The menhirs at Burzahom and Gofkral have big and small cup marks, about 2 inches deep. These are round and regular as if worn by the ground of tools, like small tools in bone. But these were planted at these places very late and might have been transported from places where these would have been left as erratic. Unlike these, de Terra and Paterson found a large erratic block (possibly derived from the higher level) on the smooth surface of which were found seven elongated and highly polished (grinded) grooves. These grooves are 2 ½ inches deep and placed in a row next to each other. (H. de Terra and T. T. Paterson, Studies in the Ice Age in India and Associated Human Cultures, Washington, 1939, p. 154), like the one’s found in South India, supra note 66. They however, do not mention the exact location of the stone block even though they say it was on terrace T3 comparable with Burzahom in height and placement.


69 A tool used for a work encounters friction resulting in microscopic damage on its functional parts. The nature and pattern of damage called ‘use marks’ or ‘wear marks’ or ‘striation marks’, will depend on the factors like, composition of the tool and worked material, mode of tool use, its angle of fall, type of pressure on the tool during operation, body mass or angle under pressure, the time of operation, etc. Studied under a microscope or scanning electron microscope these microwear marks provide an element of objectivity as compared to tool morphology which is a subjective criterion. Ibid.
their constant use for dressing of wood. Contrary to unifacial marked celts, the formation of long and deep bifacial friction marks on some of the chisels are indicative of their being used as axes. Similar type of friction marks, both in orientation and in intensity, found on some of the celts were thus indicative that these two types of tools were put to a similar type of use. It has thus allowed Pant to infer that such tools were used to fell trees, to cut wood and to chop meat. The scientific reasoning proves that man might have used a certain type of tool for a particular or different purpose together as a mark of usage to exploit these tools for socio-economic survival. To investigate this, a brief description of tools, diverse in shape and size, is given herein for broader comprehension of the subject. Even though in the present scientific world, the morphological or ethnographical parallels of the tools cannot be solely relied upon for determining their prehistoric use yet such parallels may definitely help one to arrive at certain hypothetical conclusions regarding their functions.

The Celt and its functions: Celts or ground axes of Kashmir are roughly cylindrical in form and are broader, narrower, squarish or elongated (Fig.20.10). It has two broader surfaces and two narrower lateral surfaces. The broader surfaces invariably meet in a gentle or oblique slope to form a median cutting edge, which is convex in outline and very smooth on

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75 The striation marks that are available on the blades of such tools have been found to have developed because of their use for dressing of wood. Ibid.

76 The marks here appear diagonally to edge line and are equal in intensity and length on both faces and are comparable with such celts that have similar marks. Ibid.

77 Ibid.

78 Ibid.
account of having been formed by bifacial grind. The lateral sides are thick, square or rounded, tapering in a sharp slope, first horizontally and then in a gentle slope. The lateral sides often intersect at the broader base. The butt end is generally rounded. Among the large collection of celts, some have convex lateral sides, slenderly longish or flatish body and flatish butt-ends. There are many of them which have sharply sloped cutting edges. A variant among these celts is a shoe-last celt, 10 cms. long having tongue like projected edges with full ground surface and cutting edge. Accordingly, on the basis of their size, form and cross-section, these celts of Kashmir are classified into two boarder categories:79

i) Heavily built celts, about 15 cms. long, meant for heavy work.

ii) Thinly built celts about 7 cms. long meant for light work

Both these categories of celts are further classified into many sub-types according to their morphological diversities.80 Besides these, mention may be made of such celts which are 40 cms long, or still longer, as found from


80 Sankalia (Ibid) further classifies each of these two categories into three sub-types:

Category (i) tools are over 15 cms long and,

a) have avoid section, round hammered butt, straight ground edge (medial and otherwise).

b) butt is pointed and not hammered, edge is finely ground.

c) the edge is flaring and ground.

Category (ii) axes are about 6.5 cms long and are,

a) fully ground, section lenticular, facetted sides, flaring edge.

b) fully ground, section lenticular, tapering sides, round butt and ground convex edge.

c) adze type – this solitary specimen is 10 cms long and is fully ground and double edged (faceted).
agricultural fields at Turkepur in Bandipur on the bank of Wular lake. These recently found tools are having rounded butt ends, long slender body with lateral sides rounded, having sharp median cutting edge.

We have no evidence pointing to a definite method employed for the hafting of celts in the Neolithic Kashmir. Nor do we have any extent prototype tool to define a function suggesting that of Neolithic period. What we have at present is a metallic woodman's axe almost identical in shape to the Neolithic celt. The difference, however, is that while the woodman's axe is socketed at the end, the Neolithic celt on the contrary was devoid of such a perforation. It may, therefore, mean that the celt was either held free-hand for cutting, chopping, slicing of fruits, vegetables, meat, grass; etc. or was hafted itself in a perforated wooden handle to make out the deficiency of a socket and to be used as a woodman's axe in which case the cutting edge was parallel to the haft. The hypothesis regarding this slot hafted axes being used finds logical support in the Western Europe where many archaeologists found that the slot-hafted celt worked on wood effectively. Since in the Neolithic Kashmir, soft wood like pinus was

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81 This first appeared during the Chalcolithic period, in the Indian sub-continent, from the Indus culture, Bridget and Raymond Allchin, *The Birth of Indian Civilization*.

82 M. C. Burkit, *Our Early Ancestors*, p. 69, reports that in 1879 in Denmark many archaeologists found that the Neolithic axe felled forest fir trees without the aid of any other tool. H. D. Sankalia, *Pre and Protohistory*, p. 84), has quoted Gallard who observed effective wood cutting with this tool. He also cites Coghlan who found that an oak tree 8 inches in diameter was cut down with this tool without injury to the blade.
extensively used for building purposes, it becomes, therefore, reasonable to suppose that man in the Neolithic period, too, might have used slothafted axes here (Fig. 20.10A). Besides being a wood cutting tool, the celt in Kashmir was used for digging too. This is proved by the celt marks on the wall surfaces of the pits at Burzahom. As the slothafted axes with cutting edge parallel to the haft are not technically suitable for digging deep pits as in that case it splits the striking medium, therefore, an improved mechanism might have been employed. According to Robert Bruce Foot, celt becomes a digging tool when it is hafted like a spear-head wherein the butt-end of the tool is fitted in a bamboo cane and this in return is tied to a wooden handle with a rope. Since bamboo does not grow in Kashmir, we, therefore, fitted the Neolithic celt in an antler sleeve and this way it sufficed.

The wooden remains from the post-holes of Neolithic period I and II structures at Burzahom were of pinus besides charred remains used possibly for fuel, fire etc. were of Betula, Salix and Ulmas, G. M. Bhat and R. N. Kaw, 'Plant husbandry in Neolithic Burzahom, Kashmir', Climate and Geology of Kashmir and Central Asia, the last 4 MY, New Delhi, 1985, pp. 109-110; the charcoal record from all levels was of Pinus wallichiana, Picea smithiana, Cedrus deodara, Parrotioppis jacquemontina, Quercus sp., Betula utilis, Ulmas wallichiana, Celtis australis, Aesculus indica, Buxus sp., Juglans sp., Platanus orientalis, Fraxinus excelsior and Ficus sp., F. A. Lone, M. Khan and G. M. Butt, 'Five thousand years of vegetational changes in Kashmir: The impact of Biotic factor'. Palaeoclimatic and Palaeoenvironmental Changes in India, New Delhi, 1988, p. 165; and from Gofkral Pinus wallichiana (IA), Aesculus indica and Juglans regia (IB) and Pinus wallichiana, Picea smithiana, Buxus wallichiana, Ulmas wallichiana, and Pronus cornuta (IC) were identified as the woods utilized there, IAR, 1982-83.


Robert Bruce Fort, 'Indian Prehistoric and Protohistoric Antiquities in Govt. Museum Madras, 1916.
to dig the agricultural land already prepared. On its being hafted with a handle, with the cutting edge slightly at a right angle (slanting or leveled) the celt was found to serve as a digging tool, particularly such hafted celts, measuring more than 15 cms in length might have been employed for digging operations at our sites, while those which are as long as 40 cms as found at Turkepur near Wular lake (Pl XI.3) might have served as a ploughing tool in agricultural digging, thereby meaning that these people at some stage of their development knew ploughing as well for which necessary driving force of cattle was available. This might have happened particularly after 2500 B.C. when the cattle was domesticated by the Neolithic people in Kashmir. The 'double edged pick' as found at Burzahom certainly might have been used for effective digging operations (Fig. 20.9). This rare specimen has a rectangular section with faceted and fully ground surfaces and perfectly made perforation at the centre for

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86 This we found sufficed to dig around saplings like a hoe.
87 In this way it did help us to dig virgin soil but not as efficiently as an adze type tool or hoe did which has one side slightly convex and underneath side almost straight.
88 Because of their find in agriculture fields and their extra ordinary sizes, these seem to have been fabricated exclusively for digging in the agricultural fields possibly as agricultural plough share, when the cattle required for driving the plough were available as domesticates. The earliest archaeological evidence of cattle drawn ploughing in the sub-continent has come from a pre-Harappan site of Kali bangan in Rajasthan, Bridget and Raymond Allchin, *The Rise of Civilizations in India and Pakistan*, New Delhi, 1983, pl. 6.30, p. 161; in Western Europe long bars of flint about 25 cms in length found from the Neolithic sites have worked as part of plough, M. C. Burkit, *Our Early Ancestors*, p. 55, while as at Kali bangan the tool used for ploughing has not been located.
89 It is broken at the hole in the centre and only half of the tool is available.
employment of a haft there. Since this pick resembles modern metallic pick-axe, which has an adze type cutting edge on one side and pointed end on the other side of the central perforation, it is very likely that this tool might have been, as such, employed for digging of pit-chambers and agricultural fields.\footnote{90}

**The Adze and its functions:** An adze in general appearance is celt-like, but is slightly thin and cylindrical and is usually made on a flake (Fig. 20.11). One of its broad faces is flat, while the other is somewhat curvilinear which meets at the edge. The cutting edge is unifacial on the curvilinear side. It is bevelled, finely ground and almost razor sharp while as the entire surface is rounded off. These tools are generally smaller than axes measuring on an average about 10 cms and have a few types.\footnote{91}

The adze is almost similar in appearance to the present-day carpenter's metallic adze. The difference, however, being that modern carpenter's tool is socked for the hold of a haft, the Neolithic tool is without any such arrangement. This short-coming, however, might have been

\footnote{90}{Even though this is probably the most efficient tool to carry the digging operations, yet the perforation in its centre, the length of the working ends and the nature of the material used for its fabrication makes it very vulnerable for an easy damage.}

\footnote{91}{H. D. Sankalia, *Pre and Protohistory*, p. 302, divides the Burzahom adze into four groups:}

i) adze with flat, sharp butt, section biconvex, tapering sides and convex edge.

ii) adze with broad cutting-end, almost fully ground body and faceted bevelled edge.

iii) similar to (ii) but has steeply sloping sides intersecting with the lower surface.

iv) this is a rare type having parallel sides, convex edge and is fully ground.
effectively overcome by tying the tool to an angular haft (Fig. 20.11A) so that the cutting edge, with its bevelled face inwards was held transversely to the handle. Like the modern carpenters adze the Neolithic adze so hafted may have been used for chipping, slicing, dressing of the timber surfaces before their employment for the construction of habitational apartments. Besides, this defined purpose such a hafted adze may have evenly been employed for digging the earth as it shaped like a hafted hoe.92

*The Chisel and its functions:* The Neolithic chisel of Kashmir is narrow, cylindrical or rectangular in shape, very much like a narrow celt. Its two boarder surfaces are slightly wider than the lateral sides, and taper half way down to form a straight cutting edge. The bifacial cutting edge is finely ground while the body is rounded off. The butt edge is flatfish round (Fig. 20.8). The chisels on an average measure 10 to 15 cms, and are of few types.93

The Neolithic stone chisel is a prototype of metal chisel presently used by carpenters. The difference, however, being that unlike the Neolithic

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92 A. H. Dani reports that this tool may have served as hoe where the flat face was underneath during digging. *Prehistory and Protohistory of Eastern India*, 1960, p. 47.

93 H. S. Sankalia, *Pre and Protohistory*, p. 302, divides these in four groups as:

i) large and heavy, over 15 cms long

ii) small and heavy, about 10 cms long

These two types may be further distinguished by round or rectangular body and straight or convex edge.

iii) long, about 8.5 cms, tapering sides, slightly pointed butt, faceted butt, and faceted sides.

iv) pointed triangular.
chisel, modern chisel is fitted in a wooden base to be struck with a hammer. In view of the fact that the butt end of the Neolithic chisel is mostly hammered, it is very possible that it was used by being struck with a hammer stone on the butt end for cutting and splitting operation on wood in a way as to cut the timber on a wide front across the fiber of the wood. 94

The Wedge and its functions: The wedges found of the Neolithic Kashmir are short, ground axe-type tools in which the broader two surfaces abruptly taper down to form a bifacial cutting edge. The cutting edge as a rule is finely ground while the rest of the surface is rounded off. 95 As these tools have hammered out or worn out butt, one may, therefore, logically suppose that the wedges were used as purchases or intermediary tools for splitting of wooden logs by striking on their butt-ends.

The Hoe or Pick and its functions: Another tool looking in appearance like a celt or chisel is hoe or pick. These cylindrical tools are of two types; in one we find that both the broader surfaces are slightly curvilinear, one convex and other concave; (Fig. 20.12) in the other type, the convex surface is curvilinear and the other surface is more or less flat. However, in both the cases their surfaces taper downwards to form a cutting edge which is almost bevelled on the flat or concave side. As their shape more or less

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94 What R. K. Pant (Man and Environment, Vol. III) found in his microwear studies it was possibly hafted like an adze to be used for wood dressing.

95 H. D. Sankalia, Pre and Protohistory, p. 302, divides the wedges from Burzahom into four groups, particularly on the basis of their form at the butt-end, as:

i) broad square butt, hammered, with ground convex medial edge.
ii) round butt, hammered, with tapering sides and convex medial edge.
iii) like (ii) but the section is oval.
iv) round butt and body, sides as well as the edge ground.
resembles modern semi-pointed or small wide metal pick, they might have been used in a hafted manner wherein the cutting edge is placed transversely on the short handle and the curvilinear convex surface appears as the exterior face. In this way the hoes might have been used for digging purposes. Besides, facilitating excavation of post-holes, niches, drains for the residential apartments, these might have even helped in agricultural activity. The hafting of the tool would have made it possible to drag the hoe through the surface soil to prepare the land for sowing and plantation of crop plants. In free hand and without a haft it would have even helped in the subsequent operations of loosening the earth around the crop plants and removing weeds.

The Ring-stone or Mace-head and its functions: These stone tools are flat, round or oval in shape and measure on an average between 5 to 8 cms. Each tool bears a small perforation or hole made by working a depression at the centre on both sides through pecking method. The depression was subsequently ground on both sides with a suitable stone to cerate a perfect hole in such a way that the perforation is wide on the upper surface and narrow at the centre. Both the faces of the ring stone are finely ground to make a biconvex sharp bevelled cutting edge all along the outer periphery (Fig. 20.1). Several uses are attributed to the ring-stones. Some experts are of the opinion that these were employed for net-sinking during fishing.  

It is also believed that these were used as weight units for digging sticks. These stones, however, seem to have been mace-heads used as agricultural harvesting tool. Pant, on the basis of his microwear study of these tools, has found such type of 'use marks' on them as reveal that they were hafted through the centre perforation and plugged to hold them tight, whereupon they were used as harvesting tools. In this operation the mace head mounted on a long stick was struck against the standing ripened agricultural crop and its sharp edges ensured the harvesting of the agricultural produce.

The Harvester or Knife and its functions: It is flat, thin in section, either rectangular or semi-lunar in shape (Pl. VII.2). One of its long sides along the periphery is bevelled and sharp to serve as cutting edge, while its other edge is blunt. This has two or four perfectly made small holes along the long blunt side. Made of both stone and bone, (Fig. 20.2 & 21.6) the surfaces of the tool are ground. Sankalia's observation that this object was not an implement but a neck-ornament – a pedant, seems to be far from truth on the ground that no such object with a sharp edge could be utilized

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97 H. S. Harrison, 'Discovery, Invention and Diffusion' A History of Technology, pp. 59-60.
98 R. K. Pant, Man and Environment, Vol. III.
99 The harvesters reported from Gofkral are rectangular in shape, IAR, 1981-92. Similarly from Burzahom these are said to be rectangular in shape, IAR, 1961-62. But there are also semi-lunar types available at Burzahom as published by M. Sharif and B. K. Thapar, 'Food producing communities in Pakistan and Northern India', History of Civilization of Central Asia, eds. A. H. Dani and V. M. Masson, Vol. I, UNESCO, 1992, Fig. 4-C, p. 140. This we have carried as Pl. VII.2.
100 H. D. Sankalia, reports that ornaments similar in shape are still being used by some tribes in Kashmir, Pre and Protohistory.
for the above purpose. Since the description of the tool resembles the modern butcher’s metallic knife having a wooden handle, it is very likely that this novel Neolithic knife of Kashmir too, when tied to a handle with a string, might have been used likewise. Added to this purpose the hafted knife might have been used as a harvester also as the described details of the tool suggest.

Besides these objects we come across several grain processing implements like querns, pounders and grinders which could be used at one or the other stages of food preparation.

*The Querns:* The stone querns are made of coarse grained rocks and are roughly square or rectangular in shape (Fig. 20.7). Even though the size and shape vary, yet all of them have a symmetrical depression carved out, possibly by pecking and subsequent grinding, in the centre of stone.

*The Pounder and Mullers:* These are evenly looking objects made of coarse grained stones, which were often readily available in the form of elongated river pebbles otherwise they had to be grounded to achieve the desired shape. Both pounders and mullers are normally large thick and cylindrical in shape. The difference, however, being that the pounders have a flat working surface on one of the elongated surfaces while the mullers also called pestles, on the contrary, have cylindrical or faceted surfaces at their both extremities (Fig. 20.4). Since these stones have abrasive working surfaces and have buttering marking, it seems logical to infer that these might have facilitated the Neolithic man in his food processing. Querns found at Burzhahom with deep depression of around 22 cms (Pl XII.3), for instance, must have been used for pounding of gains with the support of
pounders and mullers. Like wise the querns with lesser depression and relatively plain and straight working surfaces must have been used for grinding the grains with active support of grinders the flat surfaces of which were rubbed against the grains.

_The Stone Points:_ We also come across a large collection of stone points measuring on an average 8 to 10 cms. These points are long, cylindrical, triangular or trapezoidal in section with one or the both extremities pointed (Fig. 20.3). The points show fine ground surface even on their angular body. Besides, there are about 15 cm long double pointed tools called poker which have groves on one end. The points might have been multipurpose tools; which may have been used by the potter to remove excess clay from the pot during pot- building, to carve graffiti and other designs on the pots. The tools might have been employed as drill points on bow string set on wooden shafts to bore and drill eyes on the bone needles. These points could have been even used in pressing the weft and web to reduce the intervening spaces between threads during cloth weaving. A point tied to a long wooden handle might have been used like a javelin for hunting of the chased game. Likewise in a spindle it would have helped in spinning operations.

_The Bone tools:_ The largest collection of the Neolithic tools recovered in Kashmir are in bone. These tools are mostly made of animal bones, a few of the antlers. However we do not have a complete and precise information regarding the technology involved in their manufacture. Since Kashmir bone tools more or less resemble in shape and form to such tools

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101 H.D Sankalia, _Pre and Protohistory_.

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recovered elsewhere it is as such possible that their mode of fabrication
must have been much more the same as that recorded for bone tools in
India.\textsuperscript{102} and elsewhere.\textsuperscript{103} Accordingly, it becomes known that these tools
were made of long animal bones which were generally spitted,\textsuperscript{104} to remove
the hallow centres on an anvil to create splinters of suitable size after
parallel grooves were cut deep enough at required distances. The splinters
were subsequently flaked with a chisel to transform them into definite
shapes. Thereafter the pieces were rubbed against a coarse stone with a
little water so as to produce smoothness and sharpness in them. This is
why the bone tools of Kashmir like points, arrow heads, awls, needles,
harpoons, etc are very smooth and shining. An idea about their utility can
be gauged through the given morphological details.

\textit{The Bone Points}: They were the major component of the collection of the
bone tools found at Burzahom. Comprising eleven hundred tools they were
of various types like pin type, dagger type, spear types, long, short and
medium types. Broadly speaking, the bone points are circular, oval,
triangular or trapezoidal in cross section with one extremity fairly broad and
the other pointed (Fig 21.4). Added to these, there are double edged points
which have both their extremities pointed. A large collection of these double
edged points are even made of animal horns.

\begin{footnotes}
\item[102] P. Mehta, \textit{Bone and ivory Objects in India}, a dissertation submitted to the
Department of Archaeology, M.S University of Baroda, 1972.
\item[103] J. Hawkes, \textit{History of Mankind}, pp. 155-56; L. S. B. Leakey 'Working stone,
bone and wood'; \textit{A History of Technology}, pp. 140-41
\item[104] Many bone tools like long awls were made of small limb bones without
splitting them and as such they retain the bone hollow within their bodies.
\end{footnotes}
The Arrow-heads: These are small, tiny, triangular in shape, often flat, having one of the extremity either shouldered or rounded while the other is pointed and sharp (Fig 21.5). The pointed tip in most of the cases seems to have been charred before final grinding to create extra strength and sharpness at the tips.

Considering their smallness the arrow heads could not have been used by free hand. These must have been, therefore, hafted on slim and light wooden handles to work as stems for their use, as on a bow during shooting of animal hunting. The use of bow and arrow in Kashmir is well established during the Neolithic period in the representation of a hunting scene. This depiction on a rock also authenticates the use of spear, mounted on a long wooden shaft for hunting wild animals. Some of the bone points like the long type, spear type, might too have been mounted on wooden handles and used for the above purpose. In addition to hunting, the bone points might have been employed in the fabrication of other tools, like making grooves or notches in the awls, cutting barbs on the stems of harpoons, piercing eyes in the needles, piercing holes in the bone harvesters, smoothening of wooden handles for the implements and even in buttoning up of coats and clothes. Taken together, these tiny bone tools of Kashmir in one way or the other were an alternative to non-available microliths found elsewhere.

The Harpoons: These are made either on a flat or cylindrical piece of bone splinters. It has a pointed stem or shaft, on the one or both longitudinal vertical sides of which are cut small barbs like notches pointing downwards (Fig 21.8). These barbs when present on both sides are placed either
opposites to each other or alternatively. The tool at the base is slightly grooved or serrated for a provision of its being attached to a haft. The hafted harpoons would have facilitated the job of fishing as its barbs pointing downwards would have effectively penetrated in the final captivity of the prey.

The Needles and Awls: The bone needles appear to be cylindrical and round in section with one end slightly flattened and the other tapering into a fine point. At the flat end the needles often have a pierced round eye (Fig 21.1). The awls, on the other hand, are plain and oblong. Usually their one end is pointed and the other slightly rounded or flatish (Fig. 21.2). The pointed end in many cases is notched or grooved all around. Both these implements as is evident by their given shape had the utility of stitching the woolen garments and leather articles. Another tool used in stitching was a long and hallow bone. It is like a cobbler’s poker, having a long point and a long thick round body – to work as a handle in the stitching process of leather goods.105

There were many other bone-tools used in the Neolithic Kashmir, like bone harvester (Fig. 21.6), antler pick (Fig. 21.7), scraper (Fig. 21.3), borer, polisher and chisel which would have been utilized for different purposes by the Neolithic man. In his tool-kit he also had a composite tool in bone which is saw-edged and almost comb-like.106 This might have been used for setting and holding human hair in order. This tool is believed by

105 H.D. Sankalia, Pre and Protohistory. Alongwith he describes another tool found at Burzahom called pen-shafted point, it has a groove for hafting

106 B.M. Pande, Toilet object-combs’ An Encyclopedia of Indian Archaeology, Vol. I. P.344-45
Pande to have sufficed the purpose of the card, which holds together the weft with the web during cloth preparation. Pande further holds that this multipurpose tool might have been even used in teasing out animal hair for the spinning of textile cords, removing of hair from animals or incising decoration on pottery.

The Metal Objects: The metal objects such as arrow heads, hair pins, rings, bangles and antimony rods found at Burzahom and Gofkral (Pl. IX) are made of copper. Most of these metal objects are brittle; few of them are almost fragile. Since the use and manufacture of the copper objects was a characteristic feature of a Chalcolithic culture, and not that of the Neolithic culture, the pertinent questions, therefore, remain as to wherefrom then the aforesaid objects came; who were the people responsible for their make and how were these objects made?

We may begin with the observation of two leading archeologists, Khazanchi and Dikshit, who have held that ‘the copper objects in the Neolithic Kashmir were an intrusion from the pre-Harappan/Harappan cultures as they show clear affinities with these cultures’. The observations of Khazanchi and Dikshit are quite representative far they tend to recognize the Harappan technology involved in the formation of the metal objects of Kashmir. They, therefore, do not suggest in anyway that metal objects were fabricated in Kashmir under the Harappan influence but argue that they were imported into the Valley from the pre-Harappan/Harappan cultures in that form.

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107 Ibid.

This contention is reinforced less by the very dating of the copper objects found at the Neolithic sites of Kashmir. Even though the cultural sequence at Burzahom from where these were found provide a general time bracket of 2500-1700 B.C.\textsuperscript{109} yet the Gofkral objects, in particular, seem to have been used around 2000-1700 B.C.\textsuperscript{110} a date that coincides with the latest of the Harappan civilization, the post Harappan Chalcolithic age. As the dating does not suffice to establish that the copper objects of Kashmir were an intrusion from the pre Harappan/Harappan cultures, so are certain noticeable distinctions in the tool typology of the two regions. For example the copper arrows at Burzahom are triangular leaf like in shape with pronounced mid-ribs and the narrow arrow leaf has pointed barbs at its lower extremities. Each of these arrows has a long tang.

Copper objects were first located from the layers belonging to period II at Burzahom, \textit{IAR}, 1964-65, 1971-72, and then continued in the successive periods, \textit{IAR.}, 1964-65. However, S. S. Saar, \textit{Archaeology}, p 14, reports that all copper objects were found from a layer belonging to the period I. He seems to have missed the stratigraphical location of these objects as becomes known from the availability of copper objects from different cultural periods at Gofkral, infra note 110. These objects at Burzahom consist of arrow-heads and a coil from period II, a knife from period III and a double edged point from period IV, \textit{IAR} 1964-65; two copper rings and copper needles from period II, \textit{IAR} 1971-72 However, Khazanchi and Dikshit, \textit{Puratattva}, have reported that the arrow heads, bangles and a pin belong to the earliest levels of the period II. They have provided a photograph of these objects wherein there are 7 arrow heads, a ring, a part of a ring bangle and 6 antimony rods/awls/pins, as produced by us in PI. IX.1.

From Gofkral these first appeared in period IC and continued in period II, \textit{IAR}, 1981-82. These include an ornamental hair pin, having flattened coiled head, from the upper levels of the period IC, a copper point from period II, \textit{IAR}, 1981-82, and a copper bangle from period II, A.K. Sharma, \textit{IAS, and ISPQS Conference}, 1982.
and, in one case, the tang has two barbs at the center. One such arrow head with a long tang has been found at Chanhodaro, but it is devoid of other dominant features which characterize the arrows of the Neolithic Kashmir. Still interesting is the fact that it is assignable to a phase of the post Harappan culture. From the rest of the sites of the Indus Civilization the arrow heads found there even fail to contain the long tang, not to talk of other features. On the contrary, they are possessing broad arrow leaves, which, as discussed above, are totally uncharacteristic of Kashmir arrow-heads, and hence fail to provide any significant analogues in the Harappan culture.

The copper pin unearthed at Gofkral is very interesting for having many analogues available outside Kashmir. This thick copper pin has an ornamented head, made by turning round the splitted ends into two small circles at the top end (Pl. IX.2). Almost similar in general appearance and made of copper wire which is splitted and turned at the top to form two flat spirals side by side, these double

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112 Ibid.
113 While speaking of affinities of the copper objects of Kashmir with the pre-Harappan/Harappan objects, Khazanchi and Dikshit, Puratattva, have only the Burzahom metal objects available, the Gofkral pin was excavated thereafter in 1981.
spiral pins, dating around 2000 B.C., have been traced out at the Harappan sites of Mohanjodaro, Chanhodaro,114 Banawali,115 Manda116 as well as at the later Bronze age Central Asian sites at Murghab117 and Anderson.118 Stuart Piggot carried out a study of such sites where double spiral headed pins have been located. Besides Mohanjodaro and Chanhodaro in the Indus, he has traced down seventeen other sites, spreading from Greece to the Indus and Caucasus to the Persian Gulf where such pins are available.119 Piggot opines that the double spiral headed pins actually originated in the Aegean Anatolian region wherefrom they spread to the north Persia and onwards to the Indus around 2500 B.C. The retrieval of such copper pins from Harappan sites of Banawali, Manda, Mohanjodaro at a later date authenticates Piggot's opinion that the double spiral pins reached to the Indus from the north Persia. Wherever be the home of these copper pins,120 their distribution and spread over a vast area

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118 Ibid, p. 349.

119 S. Piggot, *Ancient India*.

120 In North Persia, many sites have yielded the double spiral headed pins of the date of 2500 B.C. but pins at Sialk date as early as 4th millennium B.C. and still earlier these appear as motifs on the pottery there, S. Piggot, *Ancient India*; because of this Sialk may actually have been the place of origin for the double spiral headed pins.
do suggest an outside influence for the origin of the Kashmir pin. Even though their is analogy in tool typology and synchrony of dates, yet the Gofkral pin is not an accurate copy of the double spiral pins found elsewhere. On close comparison of their shape, one discerns a marked difference in them. Whereas all pins found outside Kashmir contain spirals, the Gofkral pin does not have any such spirals. This, therefore, leads to suppose that either it was not imported in the form that was available across the hills or else the metal objects including the copper pin had an indigenous character, and were manufactured in Kashmir.

Indeed, the basic question then arises were the Neolithic people acquainted with the art of manufacture of copper objects. Not only in Kashmir but elsewhere also metal objects have been used by the Neolithic people. To explain this situation it is regarded that such Neolithic copper objects have been made from naturally occurring native metal, without ever fulfilling the pre-requisite process of smelting - the metallurgical technique adopted by the Chalcolithic people. These technical variations could have been ascertained had the copper objects under context been put to

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The Neolithic Halafian's in West Asia, had small beads of copper, obtained from native copper without implying knowledge of metallurgy, J. Hawkes, *History of Mankind*, p. 229; at Neolithic Sialk were found few copper pins and little awl, hammered from native copper, *Ibid*, p 230; while as Summerians at, al'Ubaid had copper implements as axes and small spear heads during the Neolithic period, *Ibid*, p.232; The south Indian Neolithic sites also had some copper objects in their stock, as at Hallur, *IAR*,1964-65, p. 31; Brahmagiri, *Ancient India*, No. 4, 1947, p. 202, as well as a copper chisel at Piklihal, F.R. Allchin, 'Picklihal Excavations' *Andhara Pradesh Government Archaeological Series*, No. 1, 1960, p. 106.

the spectrometric and chemical investigation to find out the source and metal composition as well as to trace the quantity of impurities. But no such analysis till date has been carried out for the Kashmir copper objects. Added to this limitation is the important problem related to the technique involved in the fabrication of copper objects from its ore. To overcome such obvious limitations, we need to study the process followed by the Indian Chalcolithic people in the manufacture of the copper objects from the copper ore. By this, we may be able to ascertain if the process pursued by the two peoples coincided with each other at any given stage.

Chalcopryrite was the basic copper ore used for the manufacture of copper objects in India. It contains several impurities in the form of arsenic, antimony and sulphur which render the metal brittle. These impurities are however, volatile and are oxidized if the ore is roasted at 500°-600°C on a charcoal fire. Copper itself melts at 1083°C. To attain this temperature, it is necessary to smelt the substance in a furnace, an enclosed space wherein heat is raised to 1200° - 1250°C and the same is retained until the charge inside gets smelted. A higher temperature than that of the melting point of copper renders possible the effective separation of the molten metal from the slag. Since charcoal fire may at the most generate heat up to 700°C, the furnace, therefore, entails extraordinary heat for building up the required melting temperature of 1083°C and above. For this purpose

natural draught or forced draught in a furnace is inevitably required for generating high temperature required for melting the metal and casting copper in a mould so as to attain the desired shape of an object.

But for the copper objects made of native metal it was necessary to heat it up to re-crystallization temperature of 500° - 600°C and the wrought forged in the desired shape by cold hammering. As such metal objects of native copper can not be made by casting them in moulds as the temperature attained would hardly allow the melting of the metal. This is the process that is attributed to the Neolithic people for the making of their copper objects of native metal. But the case of Neolithic metal objects under reference is different; they seem to have been cast in desired shapes, as the Chalcolithic people in India did. The ornamented hair pin and arrow heads recovered from Gofkral and Burzahom reinforce our contention that the Neolithic people of Kashmir were familiar with casting techniques. The Gofkral pin is a cast article. Likewise the arrow heads exhibit very pronounced midribs which cannot be attained by simple forging technique; instead it is casting technique that makes such prominent high ridges in the centre of arrow leaves. Similarly the Burzahom metal objects being brittle in composition, might again be due to a fault in the casting technique which the Neolithic people might have not been known of. It seems that casting was done in ill-designed or unventilated moulds which in the process did not release the gasses and instead entrapped them in

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124 Where as in forced draught furnace air is blown in by bellows through a tuyere, in a furnace of natural draught air is induced by a high chimney. Ibid. K.T.M. Hegde, *Indian Prehistory*. 

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The brittleness of the excavated copper objects of Kashmir might, therefore, be because of the presence of gasses in the cast objects. Likewise, the recovery of a crucible, a heat resistant container, from Burzahom supports our argument that the Neolithic man of Kashmir was conversant with the knowledge of using the crucible as a container for smelting of metal in a furnace. The recovery of the reminiscences of a pottery kiln from Goffkral must have served the purpose of a furnace to the Neolithic man. It is worth maintaining that the Harappans themselves used pottery kiln with a chimney as a substitute for a furnace and used crucibles as well for the smelting purposes.

It is therefore clear from the above account that the copper objects of Kashmir were not imported from the outside world. These objects were

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126 K.T.M. Hegde, *Indian Journal of History of Science*. Both the casting techniques, the ill-ventilated and the ventilated techniques, were known to the Harappans and both were employed by them for the fabrication of their articles, *Ibid.*


130 K.T.M. Hedge, *Indian Journal of History of Science*, argues that Harappans like iron culture people might have used the forced draught furnace for which however, no contemporary archaeological evidence was available. But he has produced a figure of pottery kiln from Mohanjodaro, as a furnace for the purpose having a chimney for air, in fig. No. 52 in his latest article, K.T.M. Hedge, 'Technology Furnaces', *An Encyclopaedia of Indian Archaeology*, p. 322.

131 H.C. Bhardwaj, reports these from the Harrappan context at Lothal and other from Chalcolithic sites of Ahar and Inamgoan, *Encyclopedia of Indian Archaeology*, p. 326.
locally manufactured from the processed copper ore\textsuperscript{132} even though the Neolithic character of this civilization does not seem to have changed even with the adoption of this Chalcolithic characteristic. The techniques adopted, however, were that of the Harappans who had by then attained a name in the metallurgy. This can not be ruled out in view of the contacts between the peoples of the two regions.\textsuperscript{133}

\textit{The Ornaments:} Besides about 1400 carnelian and agate beads found at Burzahom, many other types of beads like 26 in gold, paste, steatite, bone and wood are reported from Kashmir.\textsuperscript{134} Of these the beads found in the

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\textsuperscript{132} Copper in the form of ore like chalcopyrite, bronite, chalcocite, malachite and azurite is reported from many localities in Kashmir; e.g. In the Sindh valley (Kangan, Ganderbal being important), Shamuhal near Aishmuqam in Anantnag and Lashtee area in Kupwara; Gazetteer of India, Jammu & Kashmir State, Kashmir Region, ed. Dr. Bashir Ahmad, Vol. I, Srinagar, 1999, p. 31.

\textsuperscript{133} The evidence pertains to a find of a Kot-Dijian type black painted pot depicting a bucranian head, T.N. Khazanchi and K.N. Dikshit, \textit{Puratattva}, as well as similar type of other Harappan traits like the existence of carnelian and agate beads at Burzahom; see also last Chapter for such contacts.

\textsuperscript{134} At Burzahom 950 carnelian and agate beads are reported as a hoard contained in a terracotta wheal made red ware pot, from the layers of period II, IAR, 1964-65. In addition, over 400 carnelian and agate beads and pendants (period not mentioned), and 26 beads, possibly of gold, were found from Burzahom period III, IAR 1971-22. Besides, five carnelian beads were recovered from the neck region of a burial of period II, one soap stone circular bead and one small barrel shaped paste bead were found from graves of two burials of period II, A. Basu and A. Pal, \textit{Human Remains from Burzahom}, Calcutta, 1980, p. 14. The beads from Gofkral are: one cylindrical and one barrel shaped steatite bead from period IA, one wooden bead from period II, a terracotta bangle from period IC, IAR, 1981-82; two semi precious beads one of which is of carnelian from period IB and a canine shaped pendent from period II, A.K. Sharma, IAS and ISPQS, 1982.
hoard are believed to have been acquired from the Indus people given their resemblance in shape.\textsuperscript{135} This is also because the carnelian entailed for the making of beads was not available locally. All these beads might have served the people to make ornaments of these, like the necklaces. Given the availability of bone, wood, paste, etc. the Neolithic people were, therefore, better placed to manufacture the beads other than the one's made of carnelian.