CHAPTER V

COMPARISON AND CORRELATION
The Pinjore-Nalagarh *dun* lithic industry belongs to the pebble-tool tradition like that from the Soan Valley in the Potwar, Beas Valley in Kangra and Jammu region. The character of this industry is seen in its peculiar typology and technique which are quite distinct from those of the Chelles-Acheul tradition. Therefore, comparison of the Pinjore-Nalagarh *dun* industry cannot be made with those industries that do not belong to this tradition. Nevertheless, with those Soanian industries reported from the adjacent sub-Himalayan regions with identical ecological situations, i.e., physiography, average height from the mean sea level, topographic
features and availability of the same type of raw material etc., a critical comparison is necessary in order to ascertain the position of the Pinjore-Nalagarh dun lithic industry in the Soanian lithic cultural sequence.

The valleys situated in the Himalayan foot-hills are identical to each other in their physiography and environment. Uniformity in the lithic cultures found in these valleys indicates their development under uniform pattern of past climatic conditions. This has been very well documented through the investigations made in several parts of the western sub-Himalaya (De Terra & Paterson, 1939; Sen, 1955; Lal, 1956; Paterson & Drummond, 1962; Graziosi, 1964; Mohapatra, 1966, 1973, 1976; Mohapatra & Singh, 1979; Krantz, 1973; Johnson, 1973 and Saroj, 1974). Mainly the Potwar region in Pakistan, Jammu and Kangra have provided the bulk of information regarding the Soanian.

POTWAR REGION

The pioneering research involving this region made by De Terra and Paterson (1939) has been supplemented in recent years by Paterson and Drummond (1962), Graziosi (1964), Johnson (1973) and Krantz (1973). A summary of their researches is given below:
Pre-Soan (2nd glacial)

It is found on the upper levels of the Boulder Conglomerate at a number of sites. In general these tools constitute large massive flakes with little retouch and are rolled. Its relation with Soanian is not known.

Early Soan (2nd interglacial)

It is found on the surface of the Boulder Conglomerate and the gravels of T-I. The general typology consists of steeply flaked flat-based pebble tools; less steeply flaked rounded pebble tools with a convex or scalloped working edge on one side; pointed pebble tools with flaking on the opposite sides towards one end; inversely flaked pebble tools; peripherally flaked pebble tools; alternatively flaked chopping tools. On the state of preservation it has been divided into A, B and C. All along this industry there is a trend towards neater forms. This trend is more manifest in the flakes.
Early Soan A (2nd interglacial)

Deeply patinated and heavily worn crude discoidal cores, having three or four flakes removed. On large chopper-like core with pebble butt, only two flakes are struck off on each surface. No flakes.

Early Soan B (2nd interglacial)

Deeply patinated like in A, but unworn. All types of pebble tools occur. Several roughly discoidal cores, fairly neat, flaked more or less all around on one or both sides usually alternately. Associated flakes have unfaceted platform with high angle, little retouch, but in some specimens chipping resulting from utilization. Primary flaking of the upper surface is crude often with part of original pebble cortex surface remaining, but in a few specimens it is much more regular. Step flaking is common.

Early Soan C (2nd interglacial)

Less patinated, slightly worked or not at all. All types of pebble tools occur. A probable development from this type is the disc, flaked all over one surface. Better made proto-Levallois flakes show more extensive primary flaking. The flakes have simple faceted platforms. There are two types of cores - large discoidal cores resembling Clactonian and early Levalloisian forms. There are no definite signs of retouch but distinct signs of utilization are present on the flakes.
Late Soan

The Late Soan industry is of third glacial age and it occurs at a number of sites in the gravels and silts of Terrace II. The flaking technique is more or less similar to that of Early Soan. Partly on the typology and partly on the stratigraphy it has been divided into two phases - A and B.

Late Soan A (3rd glacial)

It occurs in the basal gravel of terrace II. The tool types are smaller and neater and have been derived from the Early Soan type of tools but are associated with a large number of flakes and cores. For the first time 'Levallois' flakes occur along with simple high angled flakes. Some of the flakes are parallel sided and even true blades appear for the first time. The number of flakes retouched to form tools is comparatively small.

Late Soan B (3rd glacial)

It is found from the bottom of the Potwar silt. The tools are exceedingly fresh and unworm. All the pebble tools of the earlier period occur but the main the industry consists of flakes and blades. Nearly 50% of the flakes have faceted platforms. Retouch is not seen on them. The industry recalls the late Levallois of Europe.
Dhok Pathan Industry (4th glacial)

This industry was found from a site near Pindi Gheb. This site was dated to 4th glacial. It consists of pebble tools and flakes similar to those seen in earlier Soan industries. The flakes show convergent and parallel primary flaking. Such type of flaking is also seen in flakes of the Late Soan A. In the opinion of Paterson and Drummond (1962) it represented a late survival of the Soanian. The industry has been called 'Evolved Soan' by Movius (1944).

It becomes quite evident that the Yale-Cambridge expedition considers the first evidence of Early Man to be occurring in the Boulder Conglomerate datable to the 2nd glacial. The succeeding period, 2nd interglacial, seems to have been a time when the Soanian not only took its peculiar form but also was very vigorous as attested from the proliferation of tool types and techniques. Next industry discovered from the 3rd glacial period shows development over the preceding industry and is found in two specialized forms in Late Soan A and B. The Late Soan B exhibiting the preponderance of flakes and flake-blades strongly suggests the probability of Soanian heading towards specialization in flakes and flake-tools. From 3rd glacial onward to the end of the Pleistocene what direction the Soanian took is not clear from the work of Yale-Cambridge expedition. Also, the industry found at Dhok Pathan displays no further development of the Soan although it is termed as Evolved Soan by Movius. Whether Paterson is right in calling it a late survival of the Soanian
or not and what happened to the Soanian after the 3rd glacial is settled from the later work by Paterson and Drummond (1962) as summarized in the following account:

Pre-Soan (2nd glacial)

It is based on a few worn and water-polished artefacts recovered from the highest levels of the Boulder Conglomerate and their age is not quite certain. It consists of simple pebble tools and high angled cortexed flakes.

Lower Soan (2nd interglacial)

It comes from the first phase of the Middle Pleistocene and occurs unworn on the high depositional surface of the Boulder Conglomerate. The most common pebble tools are convex oblates and unilateral nucleates. The flakes have been struck from the proto-biconical cores and pebble cores. The flakes have thick, high-angled and unprepared striking platforms. Except perhaps the coarse utilization-retouch there is no retouch worth the name.

Middle Soan A (2nd interglacial)

The tools belonging to this culture are found unworn but patinated at the beginning of the second phase of the Middle Pleistocene, on the highest depositional terrace surface of the Boulder Conglomerate and from the erosional slope E. Most common tool types are unilateral nucleates, terminal and bilateral flat-bases. In the cores 75 percent are proto-biconical: spindle core and proto-tortoise cores also make
appearance during this period. The flakes are as a rule heavier, have low angled platforms and simple faceted platforms. A few are of proto-Levallois type. Rough step-flaking seems to be the only method of refining the working edge and occurs only sparsely.

Middle Soan B (2nd interglacial)

This group is found fresh in the gravels of Terrace -I (2nd interglacial) and worn in the gravels of Terrace - II (3rd glacial). The most conspicuous Soanian types are: convex oblates and unilateral nucleates. The majority of the flakes are struck from the proto-tortoise cores and show straight, convex and notched working margins. Retouch is still poor.

Upper Soan A (3rd glacial)

It is found in the basal Potwar gravels of the 3rd glacial age. Almost all the pebble tool types are found. Cores are asymmetrical, biconical, unfaceted tortoise, single unfaceted tortoise and double unfaceted tortoise. Majority of the flakes are unprepared, cortical and have high angled platforms. There is no tendency towards blade form. But along with these, for the first time, there appear some flakes with sub-triangular and oval forms struck from prepared cores. Retouch is not very common. There is little step flaking, much less than in the Middle Soan. There is greater use of free, stone trimming of edges, not well controlled and leaving somewhat broad retouch scars.
Upper Soan B (3rd interglacial)

A working floor of this type was discovered at a site called Adiala. The tools have been fabricated out of small pebbles of Dhok Pathan conglomerate. Almost all the Soanian types are present, the most common being terminal flat-base. The turtle-back type fully appears for the first time. The flakes are mostly struck from the double tortoise and disc cores. Steep core showing blade like-flake scars also appears in this industry. The flakes are thin and uniform in thickness. A gradual development of the prepared core technique is seen. The percentage of retouched flakes is, however, very small. The flakes show convex, nosed, pointed and notched working margins. The increase of the core-flake element is more marked here than in the Upper Soan A. The industry has been dated to 3rd interglacial period.

SOAN OF THE FINAL PLEISTOCENE

Final Soan (4th glacial)

It is known from two sites, Dhok Pathan and Pindi Gheb. The most conspicuous Soanian types are - terminal flat-base, unilateral flat-base and bilateral flat-base. Tools belonging to convex oblites, peripheral nucleate and turtle back types are not found. Asymmetrical and disc cores are very common. Disc cores are the only advanced form in this industry. Flakes are smaller and mostly without retouch. This industry belongs to the 4th glacial period.
In the revised study of the Soanian, Paterson and Drummond (1962) have brought out the continuity without any gap. The sequence of the Soanian which was somewhat discontinued after 3rd glacial was found to be continuing till the end of the Pleistocene. When the two works of De Terra and Paterson (1939) and Paterson and Drummond (1962) are combined, the picture emerges as under:

i) Pre-Soan - 2nd glacial (or earlier)

ii) Lower Soan and Middle Soan/Early Soan/Middle Stellenbosch - 2nd interglacial.

iii) Upper Soan A/Late Soan A & B/Upper Clacton A & B - 3rd glacial

iv) Upper Soan B/Upper Stellenbosch (Paterson & Drummond) - 3rd interglacial

v) Final Soan/Dhok Pathan industry (Evolved Soan of Movius) - 4th glacial.
Graziosi's (1964) work: Graziosi discovered a few sites in the Soan Valley. On a few sites, he discovered pebble tools, bifaces and flakes occurring together at the same place. After analysing, he concludes that there is a complete technomorphological inter-dependence between the pebble tools and the bifaces. He is of the opinion that handaxes have been prepared out of pebbles, ortholiths, slices and big flakes in the Soan Valley and that their growth is autochthonous. Since the relative stratigraphic position of the material collected by him is not known, the question of relationship of pebble tools and the biface needs much more work before accepting such a view.

Krantz's (1973) work: The recent discovery of Krantz in the Soan Valley is worth mentioning here. He studied 216 pieces collected by Elden Johnson in 1964, from the second terrace of the exposed surface of a Boulder Conglomerate at the Soan River site called Ghila Kalan. The tool-kit from this site consists of Pebble tools or choppers (34), Discoidal flakes (105), Levallois-like flakes (34), Blades or part of blades (16) and Indistinguishable pieces (21). Since this collection comes from second terrace, it is equivalent to the Late Soan.

Kashmir

Near Pahlgam in 1969 Sankalia et al. (Sankalia, 1971) discovered massive flake and crude (Abbevillian) handaxes from well stratified deposits of the second Glacial and second Interglacial respectively. Further work in 1970, was
carried out by Sankalia along with his colleagues produced nine more tools from deposits of second through third Glacial period. Two of these were borers. According to Sankalia (1974), typo-logically and stratigraphically they are significant as they represent a tool-type characteristic of Middle Palaeolithic in peninsular India.

JAMMU

Some sporadic discoveries were made by the officers of the Archaeological Survey of India (I.A.R., 1965-66, 1968-69). The tools consisted of Pre-Soan type of huge flakes, rolled and heavily patinated, Early Soan unifacial pebble choppers and Clactonian and Levallœois flakes. Their exact proportion is unknown.

Saroj's (1974) work: Saroj found no clearcut stratigraphic evidence to separate one clearly obvious group of tools from the other except by means of their typo-technological analysis. He divides his collection into pebble tools (28.5%), flakes (56%), residual cores (10%) and functional cores (5.5%).

He found flakes retaining cortex on the platform to be as high as 73.5 percent. Faceted flakes were few, but there were large number of flakes which showed a single facet or scar on platform. Nearly 48 percent of the flakes showed varying amounts of retouch.

After analysing various features of the components of the Jammu lithic industries as a whole, Saroj (1974) opines
that the entire collection falls into following four distinct 
typo-technological groups, namely A, B, C and D, which 
constitute the evolutionary stages of the Stone Age cultures 
of Jammu.

Jammu A (T₁, 2nd Interglacial)

A few basic tool types, both pebble tools and flake 
tools, take definite and variegated forms in the succeeding 
industries. Pebble tools belonging to Single edged and Pointed 
edged types represent those classes which are basic and 
fundamental in the pattern of cultural format. This is also 
true for the flakes belonging to this industry.

Jammu B (T₂, 3rd Glacial)

It is the outcome of flowering of basic techniques and 
types present in Jammu A. The pebble tools in this industry 
represent the same classes - Single edged and Pointed, but 
display a larger number of types made by bidirectional and 
multidirectional flaking. In flakes dominance of such flakes 
as have been called semi-prepared show an advance over the 
cortexed, segmental flakes of Jammu A. Both in Jammu A and B, 
flaking is bold and free.

Jammu C (T₃, 3rd Interglacial)

The pebble tools display two other classes - Arched 
and Continuous edged. Pointed pebble tools show elaborate 
marginal retouch and tapering profile. Fully prepared flakes
is the most notable feature, and due to sharp edges they are generally devoid of any retouch. For the first time the dominance of the step-flaking in all categories of tools occurs.

Jammu D(T₄, 4th Glacial)

It has all the elements of the previous industries. The appearance of a number of diminutive pebble tools is another feature which appeared for the first time in this industry. The flake tools show many new features - sudden increase in use of chert as raw material, influx of finely retouched flakes, emergence of micro flakes and flake blades in later stages of this industry.

KANGRA VALLEY

This valley is situated to the southeast of Jammu and is drained by the river Beas and its tributaries, the most important being the Banganga which joins it at southeast of Guler. B.B.Lal (1956) explored the area in the first instance and thereafter by a joint expedition of Geological Survey of India, Deccan College and M.S. University, Baroda (Sankalia, 1974). Most recent report of an investigation is given by Mohapatra (1974a) about the material relics and also Pleistocene formations.

The implements obtained by Lal from various terraces in and around Dehra Gopipur are similar to each other. The specimens coming from Guler number 52 (chopper 24, chopping tools 3, proto-handaxes 4, cores 5 and flakes 16).
In flakes, 12 belong to Clactonian technique and 4 to proto-Levallois. Most of the flakes are said to have obtuse unprepared striking platform and a little irregular retouching. This valley has been subjected to a detailed study by Mohapatra (1966, 1974a). The most prolific site in the valley is Dehra Gānipur which has yielded Early Soan type tools on pebbles and flakes. Another industry in the region has also been brought to light by Mohapatra and this is located at a place called Ror. The main components of the Ror industry are prepared flakes, asymmetrical cores, side-scrapers and incipient borers. The pebble-side-scrapers, which look like miniature Soanian pebble choppers, indicate, that the pebble-tool tradition of this region continued to influence the later lithic industries.

**SIRSA VALLEY**

In the Sirsa valley (Pinjore-Nalagarh dun), on the hint provided by Olaf Prufer (1956), Sen (1955) reported the occurrence of Lower Palaeolithic artefacts from the upper and middle terraces. According to him (Sen, 1955), chopper-chopping complex is accompanied by the unprepared cores and flakes. He found proto-Levallois flakes with faceted platforms occurring rarely with a complete absence of Levallois element. Besides, he suggested that Clactonian flakes seemed to be unprepared flakes obtained during the manufacturing of pebble implements. In his opinion the tools are of Early Soanian type.

In later studies, Mohapatra (1966, 1974a, 1976 & 1979) argued in favour of Late Soan industry present in the Pinjore-Nalagarh dun because of its developed character. Sen's
assignment of the Sirsa valley culture to Early Soan perhaps resulted from the nature of his meagre collection which showed less diversity of forms in the flakes.

PINJORE-NALAGARH DUN

The present collection which has been made from seven different localities on the 2nd terrace in the Pinjore-Nalagarh dun belongs to one single industry. Excepting its occurrence on this terrace it has no other stratigraphic context.

The collection comprises of 602 specimens, out of which 301 (50%) constitute regular tools and the 301 (50%) other artefacts. Among the regular tools, those on pebbles and cores constitute 40 percent and those on flake 60 percent. It is thus evident that the industry has more flakes. The flake element is dominated by prepared atypical (Levallois Atypical) and prepared typical (Levallois) followed by unprepared, semi-prepared and bladish flakes in descending order (Table 6).

Viewing the tool types fashioned out of pebbles, cores and flakes as described in Chapter IV, it is quite clear that the present industry comes very close to the 3rd glacial Late Soan/Upper Soan A as a whole (De Terra & Paterson, 1939 and Paterson & Drummond, 1962) of Potwar region.
Correlation of the Quaternary Stratigraphy and Stone Age Cultural Development in Different Parts of western sub-Himalaya
It is quite evident from the analysis of the Pinjore-Nalagarh *dun* industry that it belongs to the Pebble Tool tradition, like those in Potwar, Jammu and Kangra. This tradition has got its peculiar techniques and typology which is distinct from the Chelles-Acheul tradition. In this context two ideas current in Indian Prehistory are worth considering:

i) Extension of the Soanian towards the Peninsula and its meeting the Chelles-Acheul culture in varying proportions.

ii) Equation of small flake tool based Middle Stone Age culture of India, with the flake culture found in the Soanian complex (Late Soan).

The Soanian-Acheulian problem:

The idea of meeting Soanian and Chelles-Acheul cultures was first mooted by De Terra and Paterson (1939) in which they mentioned the presence of the Chelles-Acheul tools in Chauntra and other sites in Soan area. Although this contention was further substantiated first by Paterson and Drummond (1962) and later by Graziosi (1964), yet no trace of Chelles-Acheul element has so far been found in Jammu, Kangra and Pinjore-Nalagarh *dun*. However, there is a doubtful report made by Joshi (1967-68) regarding the occurrence of handaxe in Kangra valley which has not been corroborated by any more finds by later researchers. Reviewing his own work in Kangra later, Joshi has put aside the handaxes previously reported by him on the ground that they are not at all convincing (Joshi *et al.*., 1978).
However, taking the idea from De Terra and Paterson (1939), and V.D.Krishnaswamy (1947, 1953), B.B.Lal (1956) hypothesised extension of Soanian influence towards Peninsular India. For this he had considered all the flaked pebbles occurring in various palaeolithic sites in Peninsular region as Soanian. Accordingly, the percentage of Soanian tools as worked out by Lal (1956) shows nil figure in the Upper Godavari valley, Khandivli, Malaprabha Basin, Lower Basin of Krishna, Giddalur and around Madras at Vadadamurai and Attirampakkam. In the opinion of Krishnaswami more one moves towards south, the less one finds the influence of Soanian, i.e., in the sites around Madras the Soanian influence is nil. For this, the reason given by Lal is that Madras was the centre of biface industry which had a very strong grip over the adjoining areas. The high percentage of the Madrasian or Chelles-Acheul artefacts in an industry coincides with the proportionately low percentage of the Soanian depending upon the situation of site either close to Madras or the Punjab.

To reach at such a conclusion was natural at a time when the Soanian evidence from Indian side of the sub-continent was too meagre and those from Pakistan side of the sub-continent obsolete. Later, when the characters of the Soanian were analysed in detail by Paterson and Drummond (1962), Mohapatra (1966, 1973, 1974, 1976, 1979), and Saroj (1974) only then the typical traits of the Soanian industries became well defined. When one compares the so-called pebble tools from various places in Peninsular India with those from the Soanian described by some of those mentioned above, one cannot fail to notice
that these Peninsular flaked pebbles neither conform to a standardised pattern nor do they have any genetic relationship with the Soanian. Several authors (Sankalia et al., 1960; Mohapatra, 1962; Sounder Rajan, 1961; Saroj, 1974) have pointed out, by critical typo-technological analysis, the hypothetical extension of the Soanian towards Peninsular India as irrelevant. The general consensus of these authors is that in Peninsular India these tools are either cores or unfinished/half finished tools and Mohapatra (1962) considers these irregularly flaked pebbles, some of which of course can be considered as choppers, as part and parcel of whatever industry they stratigraphically belong to.

It is quite interesting to note that percentage of such pebble artefacts in Peninsular industries increases or decreases depending upon the availability of river-worn pebbles as raw material. Interestingly one finds no trace of pebble tool/artefact in Karnataka in the valleys of Malaprabha and Catprabha where the fabricators of the Chelles-Acheul culture never used the river-worn pebbles as raw material.

A critical observation of the pebble-tool culture reveals its fairly strong grip not only in the Himalayan foothill zone but also in quite a number of other places in the old world. At all these places they are independent cultures exclusively on their own merit. These cultures at many places flourished in their cul-de-sacs, as is evidenced from Anyathian of Burma (Movius, 1943), Tampanian of Malaya (Collings, 1938; Movius, 1949; Walker and Sieveking, 1962), Fingnoian of Thailand
(Van Heekeren, 1948; Heidar, 1960), Cabalwanian of Philippines (Von Koeningswald, 1960), Patjitanian of Indonesia (Heekeren, 1955), Choukoutienian of China (Cheg, 1959), Soviet Central Asia (Oklandnikov, 1949 vide Movius, 1954) Vallonet Cave (de Lumley et al., 1963a, b and c) and Vertesszöllös (Kretzoi & Vertes, 1965) in Europe, North Africa (Biberson, 1967) and East Africa (Leakey, 1971). As the matter stands today at Jammu, Kangra and Pinjore-Nalagarh dun, the Soanian is exclusively a culture which specialised in tools and artefacts made out of pebble and pebble flakes in the early as well as throughout its later evolutionary stages. Analysis carried out by Paterson and Drummond (1962), and Saroj (1974) establishes the pebble working, the first and foremost character of the Soanian, as not confined to one particular stage of the culture but continues till the end of Pleistocene, gradually evolving to meet the needs of changing environments.

Contrary to the position in Pakistan, no trace of biface - cleaver culture is available in the Jammu and Pinjore-Nalagarh dun. In these areas we have no invasion of the so-called Stellenbosch element as is noticed by Paterson and Drummond (1962) in Pakistan. Recently, Mohapatra (1980) has discovered the Acheulian artefacts - handaxes and cleavers, typo-technologically comparable to any middle to late Acheulian specimen in the Šivaliks of Punjab. The number of artefacts collected comes to one hundred and twenty from twenty one sites located between Marwari and Chandikotla (Long. 75° 59': Lat. 31° 48' and Long. 76° 54':
Lat 30° 45' respectively). These sites are situated between Kangra and Pinjore-Nalagarh dun. Mohapatra's analysis of the new evidences regarding the Acheulian in the western sub-Himalayan region brought forth by the recent discoveries assert the separate entity of this culture vis-a-vis the Soanian (Mohapatra, 1980). The fact that the vast stretch of Indo-Gangetic plain is more or less devoid of lithic cultures is an additional hurdle which comes in the way of accepting Lal's hypothesis regarding the meeting of the two cultures. It will remain unconvincing until the absence of lithic artefacts from the big alluvial stretch, and the reason for the Soanian shifting to Peninsular India crossing the semi-arid zone and natural barriers like the Aravalis and Vindhayas, are explained.

The small flake-tool culture problem:

As has been already discussed the whole range of tool types, both on pebbles and flakes, found in Himalayan foot-hills has to be viewed in the context of the Pebble-tool culture because of their close genetic relationship. Keeping this in view, the small flake tool industry found at Ror in Kangra (Mohapatra, 1966, 1973, 1974a) cannot be equated with the Middle Stone Age of India, as has been done by Senkalia (1974). From a closer investigation, these flakes and flake-tools which are considered to resemble the Peninsular Middle Stone Age culture appear superfluous because in Potwar, Jammu, Kangra and the Pinjore-Nalagarh dun flakes and flake-tools do not exist exclusively as the Middle Stone Age flakes and flake-tools do,
but are meant to supplement the pebble tools. Unlike the Middle Stone Age culture flake-tools clearly deviating from the older Chelles-Acheulian tradition, the flake tools of Pinjore-Nalagarh dun do not completely break off from the pebble tools. This has also been observed in Kangra (Mohapatra, 1974a) and Jammu (Saroj, 1974). It has been noted that till the last stage of the Soanian a good amount of basic tool types on pebbles continue to recur without any change. Unlike the peninsular Middle Stone Age culture, the flake-tools do not form a separate existence of their own without the pebble-tools. Although the proportion of flake and flake-tools considerably increases towards the later Soanian industries, they continue to complement the pebble-tools till the last without any indication of separate existence whatsoever.

Technologically also the flakes and flake-tools of Pinjore-Nalagarh dun industry do not stand any comparison with those of the Middle Stone Age culture of India. The Middle Stone Age culture is characterised by a distinct switch over to a siliceous and fine grained raw material. The tools consist of various types of scrapers, borers, points, scraper-borers, knife-blade, etc., and are characterised by intensive retouch. In Pinjore-Nalagarh dun there is no trace of use of any fine grained raw material. All flake-tools have been fabricated out of hard quartzite and retouching on the edges is rare. It is probable that due to the hardness of the material retouching was not that essential as in the case of softer and fine-grained material.
It may be pointed out that the Upper Narbada industry, designated as Late Soan by De Terra & Paterson (1939), should be included within the Middle Stone Age culture rather than within the Soanian. Since the emergence of the Middle Stone Age as a distinct cultural entity in the Peninsular India is comparatively recent one, the equation of Upper Narbada industry with the Late Soan was done when the Middle Stone Age culture was not known. But to equate the Upper Narbada flake-tool industry with the Late Soan (Allchin, 1963), ignoring their genesis, traits and contexts when the details of the two cultures are widely known, can be construed as nothing but deliberate distortion.

It is interesting to note that the Upper Clacton industry described by Paterson and Drummond (1962) does not belong to the Late Soan but is close to Middle Stone Age industries. The Upper Clacton A & B occurs in the Potwar silt and in the fine gravel lying at the base of 3rd glacial (U1). A group of about 100 specimens, perfectly fresh and unpatinated, were found by Paterson and Drummond (1962) of which 35 to 40 percent were cores of discoidal and faceted tortoise types. According to these authors this culture is quite distinct from the Upper Soan A and represents an intrusive element in the Potwar area. The flake industry reflects the preponderance of faceted cores and convergent preparation. A strong tendency towards the triangular outline of the flakes has been noticed. Retouching has been confined to the working of small notches and convex edges. In Jammu C & D, a number of flakes show convergent
flaking and are triangular in outline. According to Saroj (1974) such flakes are the linear products of the evolutionary processes and their isolation from other types of flakes is not possible.

Very recently a series of Early Palaeolithic sites from North Thailand have been brought to light by Sorensen and his collaborators (Sorensen, 1976). The tools and other artefacts prepared on quartzite have mostly been recovered from the highest of the four river terraces in the two intermontane basins of Lampong and Phrae. The tool assemblage includes chopper-chopping tools, flake tools and points which closely resembles the Soanian. Since Sorensen (1976) estimates the age of this industry (Mae Tha) as 0.7 myr to 1 myr, only the earliest of the Soanian Industries can be considered homotaxial to it. But closer typo-technological comparison reveals that it may be the Late Soan specially its earlier manifestation which fits very well with the description of Mae Tha artefacts.

In their review article on the Soviet Central Asian Palaeolithic, Ranov and Davis (1979) find certain close resemblance of the pebble tool industries from the loess localities of Southern Tadzhikistan with the pebble chopper-chopping tool industries of South and Southeast Asia, specially with the Soan industries of Pakistan. Commenting on this, Yerietsin (1979) opines "it would be reasonable
to regard the existence of two separate cultures - cultures of bifaces in the north and cultures of choppers made on flakes in southern Central Asia - as representing not varieties of the Lower Palaeolithic in the general sense, but their survivals in the Upper Pleistocene of the given region. Both cultures are rather more comparable to the Middle Palaeolithic (Mousterian of Eastern Europe or Late Soan of northern India) than to the Acheulian of southwestern Asia".

Closer still to the Soan culture area, is the Iranian Baluchistan from where latest prehistoric investigations have revealed the existence of a closely comparable Late Soan Industry which is named as Ladizian. The results of the study of this industry extend the geographical range of the Soanian complex to the west, which the author (Hume, 1979) designates as the Eurasian non-handaxe culture. Dated to Late Riss and dominated by pebble tools and flakes, the Ladizian is probably the closest to the Pinjore-Nalagarh dun industry than to any other pebble-tool culture of the Old World.

Summing up the results of this study in the perspective of the geo-ecology of the whole of the western sub-Himalaya it can be confidently said that the second terrace (T-2) in the general sequence of the five sub-Himalayan river terraces (including the study area), not
only represents the major phase of Quaternary sedimentation, but also contains an industry which happens to be the best developed among the three units of the Soanian. Incidentally, it may be pointed out that as regards the duration this industry (Late Soan), probably occupied the longest span which spread over a glacial as well as an interglacial (the 3rd glacial and 3rd interglacial), i.e., extending from Middle Pleistocene it had telescoped into the Upper Pleistocene. All throughout this long duration the industry did not remain static which is attested by multiplication of techniques and tool types as seen in its ultimate manifestation in the form of Late Soan B. Its wide distribution not only in India but across the Hindukush and Pamirs also speak of its vigour which otherwise is very clearly perceptible when we compare it with the tools and distribution pattern of the later industry called Evolved/Final Soan.

As part and parcel of this widely spread, most powerful of the Soanian cultures, the Pinjore-Nalagarh dun industry is its eastern extension. At the present state of prehistoric research in the sub-Himalaya it is difficult to ascertain the extent of diffusion of this culture towards the east. But from the faint traces available in the Markanda valley (Joshi et al., 1978) and Kalsi-Chakrata area (I.A.R. 1961-62) it can be assumed
that the culture had actually extended from the Indus to as far east as the banks of the Yamuna. Dividing the whole of the western sub-Himalaya into several geo-ecological units according to the main drainage pattern, that segment which occurs between the Sutlej and the Yamuna probably constituted one cultural zone within which the Pinjore-Nalagarh dun was the focus. In this segment detailed work in the Paonta dun, which is similar to Pinjore-Nalagarh dun in almost all respects, if taken up in future, will further extend the results obtained from the preliminary investigations dealt with in this work.