A STUDY ON MATERIAL CULTURE
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MINENDRA NATH BASU
AND
MALAY NATH BASU

CALCUTTA
THE WORLD PRESS PRIVATE LTD.
1975
Minendra Nath Basu, 1911—
Malay Nath Basu, 1946—

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First Published: August, 1975

PRINTED IN INDIA
PUBLISHED BY S. BHATTACHARJEE FOR THE WORLD PRESS PRIVATE LTD.,
37A, COLLEGE STREET, CALCUTTA-700012 AND PRINTED BY A. K. ROY
AT SREE SARADA PRINTING, 31/1, GHOSE LANE, CALCUTTA-700006
PREFACE

Every man, either a primitive or a modern, craves for the material equipment to have his existence on this earth. These may be simple or complex material objects as per the ways of living with the environmental settings.

The study of material culture has stemmed from an interest in anthropology—the perspective study of man. To understand fully the conviction of comparative approach should be based on descriptive data collected in a systematic fashion. There is need for descriptive studies.

Material culture is a vital adjunct in the interpretation of human life. It is one of the major organs of cultural anthropology. So it is a bold undertaking for one, however ripe in experience he might be, to attempt interpretation of a people through material culture. It is an attempt to present to the public some measures of interest of the material existence and the absorbing problems of the human society which will inspire in them their long quest in the field and the library. Consequently the writers have attempted to give in this book a study upon the different aspects and phases of material culture of man, with a deep sense of humility. Their debts are perhaps greater than they can realise.

Academic indebtedness is of a different nature. The fraternity of science is a reality in which every practitioner has a part to play. One is greatly dependent upon inspiration, cooperation and criticism that fraternity affords. Their own dependence rests mainly upon literature, personal field experience and Ethnographic Museum of the Department of Anthropology, Calcutta University.

Beyond the debts apparent in the text, it is impossible to record fully the many sources of stimulus which have helped in writing the book. They would include some not directly referred to in the such as Dr. A. K. Das, Dr. S. R. Sarkar,
Dr. P. K. Bhowmik and Dr. N. C. Chaudhuri, a life-long source of illumination and insight. The writers are grateful to Dr. A. K. Ghosh, Dr. B. Bhattacharjee and Dr. K. L. Bhowmik for the comments upon some points and to Sri S. Bhattacharjee for publication.

August, 1975
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Calcutta University.

M. N. Basu
Malay Nath Basu
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INTRODUCTION

Struggle for existence is an innate urge with each and every human being—primitive or modern. To have his existence on this earth he is in need of three fundamental necessities—food, shelter and clothing. The other objects come as paraphernalia to him. Thus he requires two important things—material and spiritual. Both are interrelated. When the material comfort is satisfied he then turns to the spiritual one. The world of the day is more or less oriented into the material aspect of life. So the study of material culture offers a definite scope for finding out the unity and diversity of a culture. The study of material culture helps in the understanding of material traits of a culture, origin, distribution, environmental adaptation and diffusion, etc.

The study of the aspect of material culture of the life of a people is of great interest and importance not only from the intrinsic interests and values of the artifacts themselves, but for the sources of invention and the knowledge of diffusion. Besides, these artifacts and techniques have great importance by virtue of their relations to the whole economic and social organisation and to religious and other ceremonial practices. An anthropologist finds curious interests and technological processes are means of gaining confidence of a people. On analysing he finds the ritual aspects of the material culture are of great importance. Many ritual practices are so interlinked with technical processes that they are considered as an integral part of a given technique. Sometimes they inhibit the development of new methods and guide them in the line of predetermined channels. So any account of a particular occupation of a people gives full weight to both ritual and ceremonial actions on one hand, and to technical processes on the other. Therefore, the attitudes of the people with respect to their own techniques and their effects on the practical applications require
proper investigations for their material status. It is true that technological behaviour is the manifestation of many possible categories of human behaviour.

Sometimes a particular plant is cultivated with much more ritual than others. The same distinction applies to the construction of a simple digging stick and large types of appliances or implements used for hunting, fishing and agriculture, and so with other industries even. The ritual here is confined to an implement or to its manufacture, but not the things made by the implement.

The problems peculiar to each implement with its technique are considered but there are certain fundamentals which require the application to the study of techniques and their relations to economics. All techniques of manufacture require time and labour, to find out the relations between the output of the articles and their demand. The sources of motive power of the primitive man are his own muscular energy and animal power, and in advanced group of people the forces of wind and water leading to modern electricity.

Appliances and implements are considered in relation to the following questions – quantity of productions by the technique, complication and skill required in the process, physiological and psychological conditions of the workers either men or women, actual time devoted for this. This can be illustrated as ploughs vary considerably in shape, size and share; the shape of the plough and the nature of furrows are correlated. The full assessment cannot be done if concentration on a single appliance or a single phase of manufacture be made. So by a study of all the phases of a particular industry or occupation leads to obtain a scientific result. As an illustration, a finished textile material is not only the product of a loom but a chain of integrated processes starting from the growing of cotton to the finished condition passing through the various stages of yarn production, cleaning, spinning, weaving and finally dyeing. Each phase is studied in relation to the demands of the succeeding phase. The materials ready for trade take the place of the earlier processes. The final phase stands for the
means of exchange. So the interrelations of all the phases give the complete picture of the material life of a group of people. Thus economic, social, magical, religious, legendary and mythological considerations help in the understanding of the material culture of a people. All are inter-mingled, inter-related and inter-woven with material culture. So material culture is so intimately connected with the economic, social and religious conditions of the people that they cannot be separated in anthropological studies.
BASIS OF MATERIAL CULTURE AND ITS ROLE IN CULTURAL ANTHROPOLOGY

Man wrests from his habitat by means of his technology the food stuff, the shelter, the clothing and the appliances he must have if he is to survive. The objects he makes and uses for these purposes are termed MATERIAL CULTURE. In short by the term material culture it means all the objects used or made by man for his survival or for supporting and improving his life. In other words material culture of a man is represented in his technology. TECHNOLOGY is the combination of technics and techniques common to a group devised by man for his existence on this earth. Technics refer to tools, implements and machines; whereas techniques mean skill. So technics and techniques are mechanical, symbolic, and organisational. These three types of technics are always constant factors in an economy. So mechanical technics are represented by tools, instruments, implements and machines; whereas ideas, traditions, sciences and philosophies represent symbolic technics; and groups and institutions are the manifestations of organisational technics. The employment of the three types of technics develops three kinds of skills—mechanical, symbolic and organisational techniques. Technology is, therefore, broadly speaking an enveloping and inclusive term. The study of technology is essential for an understanding of culture, just as a comprehension of the material basis of social life is indispensable to those concerned with human group behaviour. Moreover, one has seen that the technological equipment of a man figures more than any other aspect of his culture when current judgments of advancement or retardation are drawn. There are various reasons why such judgments are made, but in short they may be referred to the fact that technology is the only aspect of culture susceptible of objective evaluation. These evaluations follow a pattern that, with rise of scientific tradition
and of a system of production based on the power machine, has become very congenial to the human culture.

Interest in technical problems serves as the foundation of a large number of groups in human society. By technology one means manipulation, doing things—behaviour of a specialised nature—in distinction to think about things and to solve abtruse problems, which are known as intellectual interests. In dealing with culture, the social scientists have pointed out that certain groups of culture traits and complexes can be regarded as specialties for the reason that they are not practised by the common people. Technological patterns form a part of these specialties. The number of technological specialties in modern culture is very large in comparison with the situation in most other cultures. Technological groups are also very numerous. They may range from a group of jockeys whose common interests lie in their skill of controlling horses to the expert pottery makers of an archaeological museum or groups of expert artists, writers, teachers, engineers, lawyers, surgeons and various types of administrators. The inter-relationships of institutions stand thus:

![Diagram of institutional inter-relationships]

It has been a common belief in the academic sphere that man has passed his earlier days through four major stages of livelihood—food gathering, hunting, pastoral and agricultural. In each of such stages one sees in him a particular way of his effort—the food quest which is again accompanied with a distinct group of implements or technological equipment. Whatever one could see beyond the historical reach into the early human life, purely depend on the prehistoric and archaeo-
logical finds which are in the main based on material culture of the remote folk. Whatever one could trace in the trend of evolution of human culture, therefore, mainly depend upon the study of material culture which thus forms an essential part of cultural anthropology.

The inter-relation between material culture and other branches of anthropology, however, has long been a matter of much controversy. Hutton, in his presidential address of the Royal Anthropological Institute, London in 1944, has pointed out the prevalent view among the British anthropologists like Henry Balfour, Marett and Haddon, regards anthropology into three parts—physical anthropology, social anthropology and material culture. To this Hutton remarks—"The old three fold division of anthropology into physical anthropology, social anthropology and material culture appears to me obsolete. I should prefer a two fold division into physical, which would include both anatomical and physiological aspects of the science and cultural anthropology, the cultural side being divided correspondingly into branches dealing with material and social aspects."

Malinowski has said of material culture: "As a sociologist I have always had a certain amount of impatience with the purely technological enthusiasms of the museum ethnologists. In a way, I do not want to move one inch from my intransigent position that the study of technology alone....is scientifically sterile. At the same time, I have to realise that technology is indispensable as a means of approach to economic and sociological activities and to what might be called native science." Though Malinowski admits that he does not deny the value of material culture in relation to the economic life of the people. Here one sees, therefore, that whatever the functionists try to minimise, is not an importance of material culture but its independence from its other branches of anthropological studies. And whatever Hutton denounces is, then, only the attitude of the approach of the functionists in which too much emphasis has been given to the usefulness or the immediate aim in the studies. Hutton thinks that anthropological studies should
have their independent way of procedure irrespective of whether any immediate usefulness will be seen. Further he has made it clear that the material culture is in very intimate association with the social conditions of the people. He emphasises that one should not only concern with the objects made and used by the people in their shapes but should also see their ways of fashioning and use. He has cited one concrete example—when he was introducing the process of irrigation into the Naga communities of Assam in view of improving the dry paddy cultivation he found after a long trouble that the Nagas had been reluctant to receive this improvement due to the lack of a prescribed association of magico-religious ceremony for the process of sowing and transplantation. But indeed when he subsequently succeeded in providing such a necessary ceremony the difficulties were solved. Besides the importance of material culture and its association with the social field one has yet to see more of its importance in itself. One has a philosophical as well as practical basis that man has indeed since the remote past distinguished himself from other animals by adoption of his material equipment. One should, therefore, be contented with the fact that by a study of material culture the basis of judgment of people’s cultural states in the scale of advancement can be thoroughly understood. Material culture has got so intimate a connection with the social conditions of the people that they can not be separated in anthropological studies. Material culture has, therefore, a position on an equal footing as the other branches in the studies of anthropology and it is more important to have a co-operation and co-ordination among all these connective branches of studies.

From the very early days of this earth the subsistence of human life has depended upon the gifts which this old soil chose to grant to him. Vegetables, fruits, soil products out of which bread or rice was produced, fish and meat—the basis of the present day human diet are still the same basic means of existence as they were when the first man began to walk on this earth. Even today when man has reached the highest peak of his mental development i.e. living in the Atomic age he has
not yet been able to create a philosopher’s pill as substitute for these basic food stuffs. The only difference noted is this that this earth has shrunk into what is known as the one world.

When drought dooms, the meat production of the animal producing countries lets down, starvation rules this earth exactly as hunger harassed the much smaller earth of the primitive than as the animal herds stayed away from the prairies, the animals failed to appear, and the water of the rivers refused to rise.

Human food exploits are still based on the old traditional practices of his forefathers. Like them, man is still dependent upon the vegetable products and the animal kingdoms. Today, as millenniums ago, the tilling of the soil and the art of animal husbandry are the basis of human food for nourishment. It has not been possible either for the modern man or his forefathers to overcome the hazards of the climate. All plant and animal foods depend mainly on the climate. Human life is also shaped indirectly by the influence of the climate. So man has to adjust his habits and also his material needs to the climate in which he is born. During the Palaeolithic period man had no knowledge of plant cultivation or of animal husbandry so it was perhaps possible for him to live under continuously changing conditions. He subsisted on whatever nature offered him. Even today the hunters and the food gatherers are scattered all over this earth under different geographical and climatic conditions. The Veddas of Ceylon, the Andamanese of the Andaman islands, the Birhors of Chotanagpur, the Bushmen of South Africa are hunters and food gatherers of the sub-tropical steppes and deserts. The Feugians of extreme south American coast and their sub-arctic counterparts, so are the Eskimos of the arctic. The economic pursuits of these peoples show well marked relation to the different climatic conditions in their respective habitats. Lack of stability in their lives due to scarcity of food, is the main feature in their lives. To have their existence on this earth they have to exploit large territories, which forces them to make continuous migrations. At this very rudimentary stage of social
development, a division of labour was developed. The women folk were mainly collectors and gatherers of vegetable products like roots, tubers and fruits from the jungles, while men hunted on lands for meat and also in water for fish. The women's tool to break the soil and to get tubers, is the simple digging stick, while men use various types of tools such as clubs, spears, bows and arrows, etc.

Man is really inventive when it comes to the full exploitation of plant foods. As soon as one area has been exhausted new areas are taken up, until the whole forest region sometimes covering several miles, has been totally exhausted. The gathered products change with the change of the seasons. The Bushmen collect melons in the dry season from the sands of the Kalahari desert. They live on these melons without water. If we take the Bengal villages we find the villagers' likings to the mango, jack fruits, etc., during the dry season. During the rains they live on marshy products but in winter they get vegetable products. But the hunting and the food gathering peoples do not take everything as their food to the sight. They discriminate between the useful and harmful plants and exclude the latter from their food. The selection or choice of new plant food by discovery is really a great invention to them. The hunting and the food gathering peoples move in very small bands as we find among the primitive peoples of Tasmania. According to H. L. Roth, the average Tasmanian group consisted of only 3 or 4 huts inhabited by 3 or 4 individuals in each. The primitives of Malacca had 27 people as shown by Martin Seligman observed the Veddas living in bands of one to five families. The Australian aborigines roam in units of 2 or 3 families with 6 or 9 persons and the Andamanese settle in groups of 50 individuals, as observed by Malinowski. The Birhors of Chotanagpur even now move with 7 to 12 families consisting of 35 to 40 persons.

The hunters and food gatherers are the adherent of the oldest form of economic pursuit. Their technical skills, their knowledge of weapons—spears, bows and arrows, and bolts, and traps and also various hunting methods and devices, and
lastly their use of fire for cooking, are the evidences of a long previous development. Man's intellectual superiority had made him surpass the animals who are still in the process of adjusting their bodies to the food available in the natural form. Man had learnt the proper method of preparation of food to suit his system. With fire he made his food tasteful and digestible.

It is really a great problem with the scientists specially the anthropologists, sociologists and also the economists to note how man advanced from his early economy to the higher stage of agriculture. Three forms of human economy can be distinguished:—

I. Hunting and food gathering—an acquisitive system.
II. Domestication of animals—i.e., cattle breeding.
III. Agriculture.

One idea is that sedentariness was the result of agriculture. This idea holds that it was not until the invention of agriculture that man became sedentary and that sedentariness was a consequence of, and not a prerequisite for the invention of agriculture. The inventors of the higher form of economy had to possess the attitude of waiting for the ripening of the fruits. The economic form of the later Palaeolithic period upto the beginning of the Neolithic was based on the harvesting of the wild fruits and grains. The ancient reindeer breeders of North East Asia were probably originally fishermen and harvesters before they were reindeer breeders. The major population of the Chukchis and the Tungus living in the arctic region even today live on harvesting wild roots, onions and garlic. Comparing with the hunting and food gathering groups who move within their known territory and live on day to day hunting and collection, these peoples store food when in plenty, thinking for the future needs. They do not live in temporary huts like those of the acquisitive economic groups. They live in permanent huts at one place near their harvesting field. They have no planned agriculture but their attitude towards the wild plants is different from that of the hunting and food gathering group. The harvesting field becomes the centre of their lives and also of
their social activity. Their strength is increased in number and much more than those of the hunting and gathering groups due to the certainty of subsistence. In America the wild-rice region has been the centre of expansion of the Algonquin tribe. The wild bread-fruit tree was responsible for the migration of many ethnic waves in Polynesia. These people of the harvesting culture have fulfilled the prerequisites for development of agriculture and domestication of animals. So the arts of agriculture and of animal breeding have developed from this acquisitive economy of man. This economy was finally united with the characteristic features of high culture—the tilling of the soil with plough. Hoe culture finds its role even today, in Africa, America, Oceania and in parts of India.

Plough was unknown to ancient America, possibly due to the scarcity of animals. In the higher culture-centre of America—Mexico and Peru the economic form of hoe culture developed into horticulture and the construction of terraced fields.

The systematic fertilising of the soil and the development of the irrigation systems are the main features of the plough culture. Originally the plough was without an iron share—as is found being used even today by the Bataks of Sumatra. Later on the wooden part was replaced by an iron. Today the plough is operated by mechanical power, such as steam engines and motors. The plough and the knowledge of domestication of animals have not only enabled men who own the great global granaries and live-stock resources to feed themselves but they have also made them trustees of the needs of modern man as a whole.

Cultivation on the plain lands by plough is called agriculture. *Jhum* or shifting hill cultivation is practised by the Nagas, the Kukis, the Khasis and other neighbouring tribes of the hills of North Eastern India and also the Baigas and Marias of Madhya Bharat, and the Khonds of Orissa. Forest lands are cleared by a process called *jhuming*—single trees are cut and felled usually in the beginning of the winter months and they are after being dried, burnt. Ashes are flown away by the

* Baigas – Bewar ; Marias – Penda ; Khonds – Podu.
wind. No manure is required except the wood ashes on this soil. There is neither irrigation nor any watering system for this. The soil is dug by the hoes and the crops are sown by broadcasting generally when the first rain sets in. After two or three successive crops the area (soil) is abandoned for a period of eight to ten years or more. So a village has longer period of rotation of jhum cultivation if it has more lands. This type of cultivation is also known as 'dry cultivation.' 'Wet cultivation' is usually done on the low-lying area, the slopes of the hills or on the valley region. On the slopes of the hills terracing is done to dam rain water. Terraces are so carefully graduated that water flows down from terrace to terrace. Such terrace fields are tilled both by the ploughs and the hoes. Hoes are used on steep slopes as are practised by the Khasis of Assam and the neighbouring tribes but ploughs are used on gradual slopes as are used by the Hos of Seraikella and the tribes of the neighbourhood. Seeds are not sown broadcast in these fields. Paddy seedlings when grown in any convenient place, are transplanted. Cultivation done on these terraced fields, is known as Terraced cultivation practised by the Nagas and the Kukis of Assam, the Juangs of Orissa and the Garwals of North Western India.

Agriculture is always concerned with all the earth’s natural renewable resources. Man is concerned with sea and lake, forest and farm, from the point of view of how they are serving man and how they might be made to serve man better. Man is concerned, for instance, with maintaining and improving the possibilities of farm land; with bringing back into production farm lands which have been adversely affected by poor farming; with gaining food from land which has never yet supported human life. Man is concerned with improving the plants and live-stock which the land supports and with protecting them from disease and pest. Man is concerned with the welfare and efficiency of the people who derive their living from the land; with quality of their implements and their stock and plants, with the system of tenure under which they work their land, with the ways in which they get credit to finance their
operations, with the ways in which governments help or hinder their efforts. Man is concerned with processing, storage, distribution and marketing of the products of nature. Through all these efforts runs a continuous thread of concern with what are man's needs, particularly what are his nutritional needs, how the earth is satisfying those needs and how it could be induced to satisfy them to an even greater extent. Thus was this agency born in an atmosphere of hope and optimism. This is very appropriate time to ask whether that hope and optimism were justified—whether that spark of hope ever became a fire of achievement.

Human food stuffs are of two types—plant and animal. These are either in their wild state or in a state of domestication. The four fold classification that results from those alternatives is so important that it was for a long time used as the basis for distinguishing the different economic conditions of the peoples. in the following way :—

<table>
<thead>
<tr>
<th>Economy</th>
<th>Food</th>
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<tbody>
<tr>
<td>Food gathering</td>
<td>Plant (wild)</td>
</tr>
<tr>
<td>Hunting</td>
<td>Animal (wild)</td>
</tr>
<tr>
<td>Herding</td>
<td>Animal (domesticated)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>Plant (domesticated)</td>
</tr>
</tbody>
</table>

Food gathering and hunting economies require technical competence, despite their simplicity. To find and gather wild roots, tubers, nuts, etc., and to hunt or trap the food animals man must have the knowledge of tools.

Men who live on what their habitat yields must command more than a knowledge of location of edible plants or habits of wild animals. They must have containers for their gathering and collecting; they require traps, spears, bows and arrows, nets and other tools or appliances for hunting and fishing.
HUNTING APPLIANCES

In the animal kingdom man is superior to all other animals by his mental development. But in his body structure he is strikingly short of natural means of offence and defence. He is however, a tool making and tool using animal. He had to live at first by merely gathering food—vegetables and animals. His tools and weapons were accordingly adapted for this purpose.

The first and the most primitive type of weapon used by man was simply a branch of a tree—a tool used almost in common with the higher anthropoid apes. This simple type of weapon—a branch of a tree gradually developed into various other types according to needs and functions. Such types are clubs, spears, etc. They can be classified according to functions under the following heads:

1. Bruising and crushing weapons—Club, mace, boomerang, etc.

2. Chopping and cutting weapons—Axe, adze, sword, knife, etc.

3. Piercing weapons—Spear, harpoon, arrow, etc.

*Club and Boomerang*—As described above a club is evolved out of a simple branch of a tree and is used by man as his weapon. It is generally thick at the striking end and at the handle the thickness is reduced for easy handhold. A club with a spherical head is known as mace.

Clubs can be broadly divided into three following groups according to the materials used in them:

1. Simple club—when it is entirely made of one and the same piece of material.

2. Compound club—when it is made of more than one piece of the same kind of material.

3. Composite club—when it is made of more than one type of material.

Clubs can also be classified according to their manipulations:

(a) Clubs held in hand.

(b) Throwing or missile club.
The first type which is already described as a weapon used when the enemies or the games are at a close quarter. The throwing or missile clubs are thrown at the object aimed at a distance. They are generally short and baton like. One such type of throwing club made of bamboo is known in some parts of Bengal as *pabra*. It was formerly used by the knaves who lay in ambush on the side of the public roads in lonely places and whenever found any man passing through the way they aimed their *pabra* at him from a distance and the passerby was wounded, they approached him and snatched away all money and valuables from him. The Oraons of Chotanagpur use one such type known as *lebda*. This is made of wood and usually thrown at small games.

Boomerang is another type of throwing club. It is flattened and slightly curved into an arc. It is when aimed at any object held in the hand by one end and projected forward with a slight upward and forward jerk (vertically) so as to make it spin in the air when thrown.

Boomerang is of two types:— (i) Non-returning and (ii) returning. The non-returning variety when once thrown

![Diagram of Hunting Appliances](image)

Figs. 1-3. (1) Lebda; (2) Non-returning Boomerang; (3) Returning Boomerang.
does not come back whether the thrower is successful in striking the object or not. But the returning variety has one advantage over the former type. When it is projected it describes a peculiar curved path and if it fails to hit the object aimed at, it returns to the thrower. If, however, it strikes the prey, animal or bird, it drops with it and does not come back. It is more curved than the non-returning variety. It is flat at one face and the other face is slightly convex. The two segments of the flat face are sloped in two directions and the curve is on two planes. At the time of throwing, it is held in the hand by the flat face facing the palm of the hand. The resistance of the air is differently directed on the two segments and this kind of boomerang describes a peculiar curved path and returns to the thrower as noted. The non-returning type of boomerang is used by the Bhils of Rajputana whereas the returning variety is prevalent among the Australian aboriginals.

Slings are appliances for throwing small stones, pellets, etc., at an enemy or game aimed at a considerable distance. A sling consists of a pouch to hold its missile and the two chords are attached to the horns diagonally opposite to each other. At the time of slinging, the sling with its missile in the pouch, is spun over head and when sufficient force is developed, one of the chords is released and the stone flies out tangentially to the circle of spinning to the object aimed at. Grasses, fibres, leather, etc., are the materials used for slings. The Oraons make virio (sling) out of bark fibres and the Santals with the help of sabai grass. The Fijians and the Hawaiians use plaited human hair for making slings.

Axe and adze—An axe is a weapon used for chopping i.e. cutting and crushing. The stone coup-de-poing or hand-axes of Palaeolithic times might have been used by men in fighting or killing animals but their main function was probably skinning, digging, scraping, etc. They were held in the hand, hafting probably was unknown to men of that age, but the Neolithic stone axes were hafted. Metal axes came into existence with the discovery of metals. Iron axes are used by the modern
men for domestic purposes in cutting woods, trees, etc. Primitives use different types of battle axes with stone and iron heads in wounding and chopping games and against enemies. Steel headed battle axes are widely distributed over Europe, Asia and Africa. The African and the Indian (Jaipur) battle axes show a great deal of variety, sometimes resemble a spear head with cutting edges usually lengthened and the whole blade has often the shape of a tin-cutter. Beakshaped, flat celt like, semi-lunate, bat's wing like or forked bladed battle axes are also common among them. The tangi of the Santals and the Hos is one of the variety resembling the out stretched wings of a bird. Battle axes with double blades and even with a piercing point at the tip of the haft are also found.

Adze is essentially a domestic tool rarely a weapon of war, used in shaping canoes and other wooden objects. Modern carpenters use steel bladed adzes as their tool for carpentry. The plane of the cutting edge of an adze, unlike an axe, is at right angle to the plane of working. In Bengal, the adze used by the carpenters is known as doash or bais.

Sword, dagger and knife—A sword is a cutting weapon used mainly for warfare. It has a wide range of variation in its form—the blade may be straight or curved, single or double edged and pointed or broadened. Asia is the home of the curved single edged sword, while straight or double edged sword is the characteristic of Europe. Africa uses both straight and curved swords. Sometimes the blade of a sword becomes small and heavy and the end broad—the Naga dao, resembles a chopping weapon like an axe. Leaf-shaped, two edged and pointed swords which were common in Metal Ages, also occur in Europe.

Dagger is a small weapon used in stabbing a game or an enemy. It may also be used as a parrying weapon held in the left hand. The blade of the dagger must be pointed and sharpened at one or both edges—one edged dagger is called a knife. The earliest knives and daggers were found in Palaeolithic period, where knives were made of stone blades, with parallel flakings. Daggers of bone were also known to the Palaeolithic cave men and with the discovery of metals—copper,
bronze and iron 'weapons came into existence. Modern primitives still use stone, bone and bamboo daggers. Knives and daggers are probably the precursors of swords.

*Spear and Harpoon*—A spear is a piercing weapon that can either be held in the hand and thrust at the object nearby or thrown at an object aimed at a distance. The former type is known as *lance* which is more or less heavy and long, while the latter type is somewhat lighter and shorter in size and is known as *javelin*. But there is no hard and fast rule as to the use of the two types, both of them can be used as weapons for thrusting at object near at hand or throwing at the object aimed at a distance.

A spear has two main parts—(1) the head and (2) the shaft. The head of the spear is again divided into three parts—(i) the point or the pointed tip of the head, (ii) the shank, the two lateral parts below the point, (iii) the tang or the spike or the socket, a hollow conical portion of the head in which the shaft is driven for attachment.

The shaft is a long rod of wood, bamboo or similar other materials and is held in the hand near the middle at the time of throwing or piercing objects. The butt end of the shaft is sometimes pointed and fitted with protecting socket of bone or metals to make the implement easily go into the ground for keeping it in vertical position, when not in active use; sometimes the butt is provided with a heavy metallic counterpoise. The shaft is sometimes provided with gird and it may be decorated. In between the head and the shaft the spear is provided with a small foreshaft which prevents the Simple Spear, shaft against any damage or breaking.

Spears like clubs can be classified according to the materials used in them, as follows:

1. **Simple Spear**—when it is made of one and the same material as is illustrated from the Mishmi spear of palmyra wood.
2. Compound Spear—when it consists of more than one piece the same kind of material.

3. Composite Spear—when it consists of more than one kind of material. The Naga spear is an example of this type.

A harpoon is a modified spear which unlike the spear has its head detachable, a string is tied to both the shaft and the head for keeping the two connected after throwing when the head is detached from the shaft. The Ho harpoon gives a typical example of this implement.

*Arrow and Bolt*—An arrow is a missile weapon resembling a miniature spear. It has three parts—

1. **Shaft**—is a long light rod of reed, cane, bamboo or similar other materials. It is sometimes notched—single or double at the butt end to keep the arrow in position on the string at the time of throwing often split or occasionally entire feathers of birds are attached longitudinally in one or more rows near about the butt end. Sometimes such feathers are set longitudinally but slightly twisted. All these feathering of the shaft are for the true and direct flight of the arrow.

2. The foreshaft—it may or may not be present. It is made of heavier material than the shaft (usually a wooden piece) and it keeps the direction of the arrow more perfect at the time of flight. It is fitted in front of the shaft.

3. The head or the point—is the pointed end of the arrow generally made of metal (iron), but it may also be the pointed end of the shaft. Stone and bone heads are also found. The head when of a separate piece, is socketted or gummied to the fore shaft if present or directly to the shaft. Very often the heads are provided with barbs.

A bolt is almost similar to that of an arrow, but its head unlike an arrow is blunted and octagonal in shape. An arrow
is used both for wounding and piercing the game but a bolt is
used simply for wounding it without any blood shed.

**Bow**—A bow is an appliance used for discharging missiles—
like arrow, bolt, pellet, etc. Its origin and development is not
known. No early prehistoric remains of bow have been
discovered, probably they have been destroyed during this long
period. In late stone age or perhaps earlier, it was in use in
Europe, Asia and some parts of Africa. It has gone out of use
in most places owing to the development of fire-arms. Its use
as a weapon now persists among the modern primitive hunters.
But the aborigines of Australia and Tasmania have no know-
ledge of the use of bows.

Bows can be classified into the following types:—

1. Plain bow—which consists of a stout piece of elastic
material—wood, bamboo, cane, etc., known as bow stave which
is fitted with a string or cord made of animal sinews or vegetable

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Figs. 7-9. (1) Simple Bow; (2) Pellet Bow; (4) Chinese Cross Bow.
fibres or such other suitable objects. The missiles of the plain bow are arrows and bolts.

2. Pellet bow—It uses missiles of clay pellets or bullets and there are two parallel strings on it which are provided with a pouch for throwing these missiles. This type of bow is not used as a weapon of great importance but used for hunting and fowling. In Bengal it is called Gulti and the Bunias of Bengal call it Gurali.

3. Cross-bow—In this type of bow there is a handle or stock to which the bow stave is attached transversely. In using the weapon, the bow is bent by pulling back the bow string till it catches on a trigger arrangement on the stock. The arrow is then placed in position and is discharged by pulling or pressing the trigger and releasing the string. This type of bow is used by the Chinese, the Nicobarese and the Nagas with variations and modifications in structures.

Bows may again be classified as simple, compound and composite according to the nature of materials in them.

1. Simple bow—When the bow stave is of a single piece of the same material.

2. Compound bow—When the bow stave is made of more than one piece of the same material.

3. Composite bow—When the bow stave is made of different materials.

D I F F E R E N T  T Y P E S  O F  R E L E A S E  O F  A N  A R R O W

I. Primitive or Primary release—The bow is drawn with the arrow being held between the thumb and the fore finger, which do not press on the string.

II. Mongolian release—The arrow is held between the thumb and the second joint of the fore finger, the tip of that and any other finger resting on the string.

III. Mediterranean release—Three fingers are placed across the string, the arrow is held lightly between the first and the second, the thumb not being used.
IV. Oriental release—The thumb is laid across the string with the fore finger across the thumb nail.

Figs. 10-13. (1) Oriental type; (2) Mediterranean type; (3) Mongolian type; (4) Primitive or Primary type.

Weapons of Defence—The most simple mode of protecting the body against the blow of a weapon is by means of weapon itself. Clubs and swords, held in hand, are used both as weapons of offence and of defence. But such two fold functions are not possible with each and every weapon, also simultaneous functions of offence and defence by the same weapon is impossible. Such disadvantages were overcome by the ingenuity of human mind in the invention of special devices of defence.

The most primitive and simple weapon of defence was probably a small stick prepared out of a single branch of a tree. During fight, it was held in the left hand and the blows from the weapon of the enemy were resisted by it or directed away
at an angle. This weapon is known as parrying stick, which later on was provided with a grip for holding purpose. Bones and horns are also used for parrying purposes. Daggers held in the left hand were also used as a parrying object in sword fight. Weapons like swords provided with a guard do not only protect against the blows but also to some extent for parrying the blows.

When the parrying stick is widened an idea of a parrying shield is obtained as is noted in the specimen used by the natives of Indonesia. The ordinary shield is wider than the parrying shield and can protect a greater portion of the body from the blows of the sword, spear, arrow, etc., either by directly obstructing the blows or by changing the direction of the blows at an angle. Shield when considerably long can protect one side of the body, such a shield is not generally held in hand but hung from the neck or the shoulder. Two such long shields, one in front and the other at the back are equivalent to a body armour.

The materials of which the shield is made, vary considerably and include wood, cane, leather, metal plates, etc. The Garos have leather shields and the Santals use metal plates. In Bengal the shield is made of cane and used by the Namasudra caste. It is known as dhal. The armour is also made of leather and metal plates but chain-armour is a later development. The Jaipur chain-armour illustrates the variety.

Other devices for defence are helmet and gauntlet for providing head and extremities from the blows and attacks. Helmet

![Fig. 14. Dhal.](image)

is worn on the head and gauntlet is a long glove covering hand and wrist. The Abors and the Daflas use cane helmets. Steel helmets are used in modern times.
HUNTING METHODS

Hunting was carried on first by tamed animals, traps, snares and weapons. In the arctic region horse and other animals were useless for rapid transport, so the Eskimos, the Swedish and the Laps used snow shoes for chasing the animals. These shoes had greater advantage over them. The use of animal was common in Asia and Europe. The common animal was leopard. In Rajputana there are tamed leopards which are set after deer. The use of the hawks is another variant of it. They are tamed to kill animals for their master. In central Asia we find the use of hooded falcon. It reached its maximum use in the sixth or the seventh century A.D. and right up to French revolution. Among the ordinary people dog is the animal all over the world and has definite value in proper food supply by hunting. Many of these dogs have gone from Asia minor to Europe. Dog has been keeping company with man from pretty early time. In Malay and Indonesia deer hunting was done by riding on horse. The Tungus, the Kirgiz and in India the Santals and the Khasis have hunting dogs. The Haghars of Midnapur have dogs for hunting jackals.

Traps and snares fall into two categories:—

(1) Manipulated trap and (2) Automatic trap.

Montadon has observed that some delayed actions are created by traps and snares. Some obstructions are set up which arrest the spread of the chased games. These are acknowledged in Egypt and East Africa. In Egypt strings are kept stretched horizontally, small animals are driven towards them as they try to fly, they are kept decoyed and the people rush to the place to catch them. Similar contrivance is used in Borneo by the Dyaks for killing deer. In East Africa strings are set vertically. The Sakais of Sumatra use the same method. A comparable type to this is conical open palisades which are like *kheddas*. The games are beaten and made to pass through them. These obstruct the speed of the animals. Elephant is decoyed in closed palisades or passing through the pitfalls. It is found among the Angami Nagas. The process of bird
Decoying is not only found in India but also in Polynesia, Indonesia and East Africa. Similar manipulating devices are the bird lines. These are thin strips of bamboo which are put into the earth. The strips are smeared with gummy substance. Food materials are thrown over them. As birds came down over them their feet are stuck to the gummy substance. The bird line is found among the Santals known as latha and the Lodhas as athakati. A similar modified type is used by the Bunas of Bengal. The Bunas use a thin thorny cane instead of bamboo and no food materials are thrown over them. This is known as chahir by the Bunas. Bats are usually caught by this.

There are various types of automatic traps. They are—

I. Pit traps—False traps are dug out on the regular path of the animals and are covered by leaves. In some cases sharp pointed spikes are placed vertically. The animals passing over them fall into it and are transfixed by the set up spikes. The Nagas and the Gonds use this type of trap. The Nagas of Manipur hunt monkeys by this device. The Santals use a type known as suri.

II. Deadfall—It consists of a stockade on either side with a cross piece at the entrance. The cross piece is supported by a forked branch. The bait is attached to a stick supporting the heavy beams placed over the cross bars. The arrangement is such that if the bait is pulled the cross piece will get loose and the heavy beam will fall upon the animal entered in the stockade. It is found among the Gonds. Another variety of it with arrangement of trigger is found among the Santals. A slight movement of the trigger will dislodge the heavy beams. The Oraons have mouse traps of this type.

III. Noose trap—A small oval ground is selected which is fenced by long sticks planted into the earth. The noose is placed at the entrance of the fencing. The noose is connected with a bamboo placed at the opposite end which is provided with a trigger. The hare enters the fence and dislodges the trigger which tightens the noose.
The hare is caught. It is found among the Maria Gonds.

IV. Wheel trap—When an animal particularly the deer goes on the legs of the animal gone through the middle portion of the top line the animal will not be able to pull its feet. In Africa this trap is used for capturing antelope.

V. Torsion trap—in this variety spring is furnished by torsion. The Korku *photka* for capturing birds is an example of this trap.

VI. Transfixing trap—in this type of trap it is usual for an arrow or bolt to be released. It pierces or stuns the game. It is current among almost all the tribal people of the world.

VII. Cage trap has three varieties:—

(a) Drop trap—Automatic cage traps are also used to imprison animals as are found in use among the Lhota Nagas for leopard. The leopard enters the stockade and tries to take away the bait (usually a goat is kept inside the trap). This releases the trigger making the door to drop down. The leopard is then speared or shot.

(b) Valve trap—The Korkus use a cage trap which is a hemispherical basket made of bamboo strips in hexagonal open work. There is a valve directed inward. Food grains are scattered inside.

(c) Valveless trap—it is a thorn lined trap. The Baigas use similar trap.

By Functional method we can divide the implements:—

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>THROWN BY HAND</th>
<th>THROWN BY IMPLEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Stunning</td>
<td>{Club, mace, Boomerang}</td>
<td>{Blow tube, Sling, Bow with bolt.}</td>
</tr>
<tr>
<td>II. Piercing</td>
<td>{Spear, lance, Javelin}</td>
<td>{Bow with arrow, Harpoon}</td>
</tr>
</tbody>
</table>
FISHING

Man collected animals on land by hunting and carried his search for food in water to gather aquatic creatures like fish. The method of fishing varies in different parts of the world. The most primitive type of fishing was by means of bare hands. The Lodhas of Midnapur catch fishes by bare hands when water in the paddy fields begins to dry up. This is still in practice with the Bengal villagers particularly before the rains when the bilis and water-logged areas are in very soft muddy condition. The Bunas of Bengal usually during this time have their catches like the fishes—singi, lata, tengra, etc., by bare hands. But as fishes slip away very much and it was very difficult for the primitive man to get sufficient food only by this means, he

Fig. 15. Polo.

probably devised a trap with long radiating rays which enclose much bigger space and can catch fish more easily than that
with bare hand. The Parois (fisherman) of Bengal are usually found to catch before rains in the soft muddy place and sometimes in shallow water, with the help of this trap instead of using bare hands. Such type of cage trap is known in Bengal as the polo. The Oraons of Chotanagpur and the Santals of Santal Parganas use similar type with very simple structure known as the chopa and the muchu respectively. Various other cage and basket traps—hand operated as well as automatic were devised for this purpose. The automatic cage boxes are provided with valves or trap doors through which fish can enter but cannot come out of them—some with single valve known, as the baichna and the chaora used by the fishermen of East Bengal (now Bangladesh) and others with double valves in the same direction—the doar of Bengal. There is another variety which has also two valves but placed in opposite directions to allow fishes coming against and with the current of water to get into the trap. This is illustrated by the specimen known as the vombuchanhai used by the Chakmas of Chittagong hill tracts. There is also a special type of trap. It is made of
Fig. 18. Ghuni.

Fig. 19. Paron.

Fig. 20. Gungi or Toradang.
thin bamboo sticks tied together with cane strings in the shape of a rectangular box. There are small vertical openings in the two longer vertical sides, one in one side and two in the other, but in some cases one in each side and also two in one side and three in the other, are found. The first one is known as the *ghuni* in Bengal and the second one is the *toobo* of the Bunas of Bengal and the *jhimri* of the Santals of Santal Parganas and the third one is used by the Oraons of Chotanagpur and the Koras of Midnapur. It is named as the *jhumri*. The thorn-lined trap known as the *paron* in Bangladesh, is another type of automatic trap which is provided with thorn-twigs (cane) on the inner side of its rays. These thorns compel fishes which enter within the trap to remain quiet in the narrow region of the trap to avoid pricking of the thorns. The automatic traps are without any valve—the *gungi* or the *toradang* of Chotanagpur, the *kaichu* of Mayurbhanj, and the *ultakukri* of Madhya Bharat. Some of the automatic traps are known as plunge baskets such as the *hocha* used in Bengal.

When man learnt the use of fibres he no longer confined his materials to wood, bamboo and cane but began to make nets. The nets are of various types:

1. Hand operated nets—with or without bamboo frame. *Chhaknijal, chant, chatuni, ghatgati* of Bengal and *pilni* used by the Oraons of Chotanagpur, are all belonging to this type.

2. Cast net—with sinkers at the edges which when thrown spread on water in a circle. The *khepla* or *jhanki jal* is the typical type.

3. Seine—Long net provided with floats along the upper edges while along the lower edges sinkers are tied. The example is the *beraja!* used by the Nuliyas of Orissa coast and the fishermen of Bangladesh in the Padma and the Madhumati rivers.

4. Trawl net—is a bag like net provided with a bamboo frame which by a string arrangement can be operated or closed. Trawl net is so called because it is used
with a boat. The shangla jal used for catching hilsa fish, is a typical example.

Fig. 21. Chhakni jal. Fig. 22. Khepla or Jhanki jal.

(5) Automatic net—is a long net with floats along the upper edges stretched across a current or stream. The kaijal used for catching specially koi fish in the paddy fields during the rains, is an illustration.

Fig. 23. Shangla jal.

(6) Dip net—is known locally as the vesal. It is almost triangular in shape. The three sides of the net are bound
to the bamboo poles. The two sides forming an acute angle are placed on the gunwale of the boat or attached

Fig. 24. Kajal.

to the fixed bamboo poles set up in the river or water logged area and are entirely of long bamboo, but the extreme side of the net is secured by a double split bamboo.

Fig. 25. Vesal.

Another way of fishing is by means of piercing devised specially for the purpose. They are:

(1) Arrows—are shot with the help of a simple plain bow and are used by the Andamanese, the Bushmen of South Africa and the Santals of Mayurbhanj. Shooting with arrows is a device found in many places while shocking, the fish with the help of a dynamite and then collecting them is certainly a modern device.

(2) Spears—the simple spear known as the konch used by the fishermen and also the Bunas of Bengal. The other variety known as telescopic spear—the kole is used by the Bedias of Bengal specially for the khorsula fish. In both the cases the head points are not detached from the body or the shaft.
(3) Harpoons—which have their head points detachable but after their detachment they remain together by a string tied to both of them. The shaft floats on water and thereby indicates the position of the head within the water. The head points of these weapons vary from one to many—when the weapon has one head it is called the *eknala*; three head points—trident, the *teta* also known as the *arho* by the Bunas of Bengal and the *chabak* by the Parois of Bengal; when multi-
headed is called leister, the local Bengali name is the \textit{juti}.

(4) Hooks—are small curved rigid steel wire with or without barbed point. They are attached to a string known as line tied to one end of a fishing rod. This is the \textit{barsi} of Bengal. The rod and line method of fishing is comparatively a recent device. Here the fish is lured with the help of a bait, which when swallowing the bait is caught in the hook. In modern times developed rod and line such as the wheel rod and the line are used in catching big fish. In rod and line method thorough knowledge about the habits of fish is essential.

Some times a number of hooks are attached in bunch or each at an interval to a very long string provided with a float at the upper end. This is called the \textit{done barsi} used by the Malos of Jessore (Bangladesh). Hooks are always provided with baits at the point to allure a fish. But there is another variety of hooks in which no bait is required. Gaff is really fish hook or otherwise fastened into a handle. The Parois call it the \textit{angoj}.

(5) Fish gorges—are small spindle shaped pieces tied in the middle by a string and hung with a bait to its string but when the fish swallows it the string is pulled up automatically the gorge within the gullet of the fish keeps itself at right angle to the string and the fish cannot free itself. The materials used are commonly of bamboo splits, reeds, etc. Gorges of stone are also found from the upper palaeolithic (Magdalenian) sites of Europe. Spring gorges which occur in China, Mexico, Africa (Congo area) are made of small pieces of flexible strings generally of bamboo slips and baits like earthworms or grass-hoppers are pierced by the two pointed extremities of the spring gorges after
FISHING

bringing them together. When a fish swallows the bait, the earthworm in the mouth of the fish detached from the gorge and spring gorge spreads out to its normal position which being in want of sufficient opening for exit automatically fixed within the gullet of the fish. Spring gorges of bamboo slips and reeds also occur in India, specially in Bengal. The Parois during the rains catch kai fish in the paddy fields by means of gorges known as the barsa. They use earth worms and grasshoppers as baits.

Fishing with the aid of an animal is rare but is found to be in use by the fishermen of Bangladesh. They employ a trained animal known as the otter. The otter is used in driving fish towards the net. The net known as the vesal (dipnet) is spread from a boat in a river and this animal is let loose at a distance around the net, dives in porpoise fashion when the frightened fish within the limits rush inwards and then the fisherman understands that a large number of fish has thus been driven towards the net. The net is drawn in with the catch. In Sindh otter is also employed and in Indonesia and in China pelican and cormorant birds are of much help in getting fish.

Another peculiar method of catching fish is by means of poisoning the stream and thereby stupefying the fish. Poisonous and narcotic plants are thrown into the head waters of the stream and crushed by beating until sufficient juice extracted from those plants polluted the water and the stupefied fish float on its surface. Sometimes instead of throwing plants their extracted juice is poured into the water. The stupefied fish are then collected against the erected dams and weirs or simply taken out by means of nets, baskets, traps or by some other way. Poisoning method is still in practice by the Andamanese, and the Kukis, the Garos, the Khasis of Assam and the Oraons of Chotanagpur. The maona fruit is usually used by the Oraons.
Weirs are fences of twigs or reeds raised across a water course of a stream or river to catch fish without confining water. This is done by the fishermen of Bengal and is called chanda or chik. In Orissa it is called thatta. This screening method is usually practised in tidal regions. But damming of a stream or river is done by raising stone barriers to confine and regulate the flow of water for catching fish by baskets, traps, nets, etc.
DOMESTICATION OF ANIMALS

Animals from the wild state when come to man are neither shy nor hostile to him. Animals may be of tamed variety i.e., animals do not breed in captivity; and of domesticated one i.e., breed in captivity. Animals are used as play things or pet objects of man. The Brazilians hang lizard in their huts and the Australians catch frogs and rats and tie them up. Besides cats and bees which do not affect human life so much there are domestic animals such as dogs, cattle, sheep, goats, pigs, horses, donkeys, camels and reindeer.

The earliest domesticated animal dog, according to Zeller, is probably derived form a Tibetan species. The dog is a companion of the Arctic Eskimos, the Australian natives and also of the people living in far distant islands. Almost all the primitive people except the Tasmanians, of old and modern days have dogs. The remains of dog occur in Mesolithic deposits of Denmark. It seems that dog was domesticated by 8000 B.C.

Dog is of great importance in the life of the primitive people. The Onas employ it to chase and kill guanaco, the Veddas hunt deer, the Hottentots—antelope, and the Hagaris of Midnapur—jackals.

The Polynesians, the Peruvians and the Iroquois relish much the flesh of dog. The Angami Nagas also like the meat of dogs. Barking of dogs is an asset for the primitive people as it announces the coming of a new comer—possibly a thief, an enemy, etc. The Laps use dogs to guard their herds against the attack of the wolves at night. The Indian tribes keep dogs for keeping watch.

Man cannot ride on dogs but carts with or without passenger can be drawn by them. Arctic dogs can drag the passenger sledges over the ice at the rate of 4 to 5 miles per hour on a continued run for about 12 hours. The Eskimos also employ dogs for this. The French-Canadians still have their
journey in dog cart. In Hamburg (Germany) as late as 1924 vendors use dog carts for bringing vegetables to the market.

In New Zealand dog's hair is often found to be sewn on the cloaks. Thus we find the primitive life is enriched in various ways by the use of dog. They are—(i) hunting, (ii) meat, (iii) guard, (iv) carrier, and (v) ornamentation.

Cattle, sheep and goat were domesticated in Neolithic times by 3000 B.C. The Babylonians and the Egyptians milked cow as early as 3000 B.C. In India this practice was also an early one. The word *duhita* comes from one who milks a cow and as this was done by the women folk so the name *duhita* means daughter. The Mongolian groups of people particularly the Chinese, the Japanese, the Indo-Chinese and others have never milked any cow. Among the primitive tribes of Chotanagpur and Assam, though cattle is known and used for the plough, there is an avoidance of milk, which was considered to have such a magical potency in ancient Egypt. The ox was a special object of veneration in early Egypt, Sumer and the Indus valley cultures. All over the Negro land there is love for a cattle. Lowie has justly remarked, "The Shilluk pay cattle for a wife, sing poems in praise of a cow, and honor a friend by addressing him as 'my ox'". Cattle is slaughtered in religious ceremony but beef meat is taken when it dies normally. The Kirghiz prefer mutton instead of beef that is why they do not kill cattle. They prepare number of dairy products from the milk. The children also use cattle as their ride. In course of time zebu in Africa and yak in Tibet of the cattle variety were also domesticated. They were used first as the beasts of burden. Their meat is eaten, and cheese is prepared from the milk. Their long hair is used for ropes and blankets and the hide is used for bags, tents and shoes, and dung for fuels. The nomadic group of Tibet who have settled to agriculture, are now using ox to harness to a plough. Besides the meat and the dairy products the sheep and the goat's wool are preferred for rugs, mats and clothings, etc.

The domesticated banded pig, as found in the Neolithic lake dwellings of Switzerland, probably came from the eastern
DOMESTICATION OF ANIMALS

variety. Recent discoveries in North Western India and the remains of bones of the domesticated pigs from the Neolithic sites of China reveal that pig might have first come to the use of man either in India or China.

Cattle and pigs are used by man as his food, as religious offerings sometimes as a source of pride and prestige. Besides these, they are used for milking though milking is comparatively late. They are harnessed to a plough and are also used as a carrier.

The transport animals are donkeys, horses and camels. The earliest and the oldest of the three animals are the donkeys. The use of this animal in Egypt was found in 3000 B.C., but it was domesticated earlier. In the Mediterranean region donkeys are very favourite animals. They are used for threshing grains and sometimes harnessed to the plough in Palestine and Syria. Above all their main use is that of a beast of burden. The registration of domestication of camel and horse came in about 1000 B.C. and 2300 B.C. respectively in Babylonia but horse was domesticated earlier probably in the steppes of central India. The idea of domestication of horses probably came from the donkeys which later on applied to camels in the desert areas. The Kirghiz, the Tungus, the Mongols and the Turkish nomads are really good horsemen and they also developed cavalry. In early days horses were used as war chariots in Babylonia. Harnessing of horses to ploughs and common carts were and are even now in existence in England and America. Meat is also taken with relish in the west. The Kirghiz and the Mongols milk mares and live on that milk during summer months. References are found of horses in history. The king of Persia presented the king Chadrapira of India the horse named Indraud. Alexander has one great horse named Bucephalus and even in India Rana Pratap had one Chaitak by name. Some of the herders of the desert area live on camel’s milk. In the heart of the desert of Arabia some have saved their lives by killing the animal and taking out water from the pouch of the animal and finally to quench their thirst. Camel’s meat is taken and its hair ranks
above the sheep wool. 'In short, the camel serves the Arab with food, drink, as a pack and mount animal, provides hair and hide for rugs and clothings, and dung for fuel.'

The domestication of reindeer is of very recent origin. A Chinese source says it to be 499 A. D. This animal is mainly found in North America, Alaska, West of Bering Strait, etc. The Eskimos of the American Indians never domesticated this animal. The Tungus, the Chukchis and the Laps use this animal for different purposes. The Tungus use it for riding, the Chukchis harness it to a plough, eat its flesh and also use it as carrier sometimes harnessing it to sledges. The Laps milk the reindeer and prepare from it many dairy products like butter, cheese, etc., and the meat of reindeer is also taken by them.

In the New World specially in Peru new types of animals, Llama and Alpaca, were domesticated very early. In fact the Old World civilisation is distinctive for its cattle, cereals, wheat and plough as Wissler quotes it, all of which are absent in the New. The centre of higher culture in the New World was between Mexico and Peru, whence spread agriculture, pottery, weaving etc., both north and south. In the Old World the oldest centres of civilisation are Egypt, Mesopotamia, North West Persia, Central Turkistan, and the Indus Valley. Thus somewhere between the Nile and the Indus there have arisen the great new stone age.

Which one either the fowl or the pigeon was first domesticated by man, is still disputed problem among the scientists. Zeuner inclines to say that the pigeon was first domesticated. He thinks that the New Stone Age people bred pigeons. But the earliest proof of the pigeon or the dove as a doorway animal consists of terracotta figurines from the Halafian period at Arpachiya in Iraq dated about the middle of the fourth century B. C. By the fourth century B. C. several bred's of pigeon were known. In Roman times the pigeon seems to have been used as a message carrier. This custom has started during the time of Pharaoh Rameses III in and about twelvth century B. C., and in Egypt by the thirteenth. The pigeon post was effectively
used in warfare until the World War I (1914-1918). The pigeon-race even now involves millions of enthusiasts. This shows the effective breeding, care, training and management of the pigeon by the people in the modern world.

The dove has been kept and trained for show and food since early times. The next oldest domestic animal is probably the domestic fowl. Some give it a multiple origin but the domestic fowl has some wild species (specially of the red jungle fowl) of the combed variety which is obtainable in Assam, Chittagong and Burma. But there is a difference of opinion among the archaeologists about the first images of domestic fowls found in the digs of the ancient cities. In the earliest known cities of India, Mohenjodaro and Harappa (from 3000 B.C. to 2500 B.C.) clay figurines have been found which prove that the fowls were domesticated by the people of that time. But Zeuner puts full domestication before 2000 B.C.

The fowl was possibly domesticated in Jerusalem at the time of Solomon in the tenth century B.C., as shown in the Biblical evidence. In the eighth century B.C. poultry system was found in Assyria, Mesopotamia and on the Mediterranean coast. But in the fifteenth century B.C. there was poultry system in China and by seventh century B.C. it had its existence in Japan in the east and Italy and Greece in the west. Then gradually farm yard fowls came in Turkey, Crete, Cyprus and France. The fowls were domesticated in England after the birth of Christ and this domestication technique spread to Central Europe and then to the whole of Europe.

In early Greece and Rome particular breeds of fowls were done for both sport and palatable dish. However, a foreshadowing existed of the present intensive poultry industry and a trade that has recently involved in high activity among the peoples of different countries. Cock fighting, which dates back to the fifth century B.C., has been prohibited with the evolution of human ethics both in the British Isles and in some parts of North America since 1849 and 1836 respectively. In Asia cock fighting sport is still in existence. In India among the aboriginal
peoples specially of Assam and Chotanagpur fowls are domesticated for divination, cock-fight and lastly for food. Some zoologists believe that in Burma chickens were probably first domesticated for the use of divination and cock-fight. Thus we find that the practical uses are the results of domestication of animals and not the cause.
SHIFTING CULTIVATION

The different types of soil, climate and vegetation are responsible for the different types of agriculture prevalent in the world. The patch agriculture of the forest without draught and animals but with simple appliances like digging stick, hoe, etc., prevalent in many places of the world is the most primitive among all the types. In the forest regions the tribal people cut trees to make small clearings, and burn them. At the end of the dry season or at the beginning of the rains they fire the cuttings and with the help of dao, digging stick or hoe plant roots and tubers or sometimes broadcast seeds of cereals, etc. After raising two or three crops the area or the plot of land is shifted to another site where they repeat the same practice. This type of cultivation is called shifting cultivation and is found practising among the tribal people in the tropical forests of Africa, India, Southern Asia and even in some islands of the Pacific Ocean.

The main object of primitive cultivation is for procurement of food. In the forest areas except from the new introduction of crops, the cultivation of roots and fruit trees is predominant. In these regions the people do not care for any special period for their cultivation. They plant practically all over the year. So storing of agricultural products for long periods is not an imperative one. This cultivation is found to supplement the stock of cereals and fruits with hunting on land and fishing on water. Where the nature of cultivation is greater and it absorbs the greater number of people of the community the importance of hunting and fishing automatically declines. The spread of cultivation in the form of true agriculture reduces game and there remains very little time and energy in the people for hunting or fishing. But hunting and fishing are sometimes the supplementary food of the tribal communities. When these cannot find place their innate urge is expressed in the form of domestic animals for food. Thus sociological implications of this primitive agriculture play equally important. A
uniform level of culture is not distinctly found among the root
and fruit cultivating peoples differing from the grain growing
people. The primitive agriculturists have less permanence and
security of life and also less chances of steady social progress.
Heterogeneity in their life is introduced by environmental
factors such as climate, topography, and the nature of vagaries.
Their technique of production is rough and crude in nature.
Their different agricultural operations are not initiated by the
individual such as preparation of field, time of seedling, sowing
and harvesting, etc., depend on the direction of the community
as a whole. The priest or the headman of the village organises
planting and harvesting ceremonies and also propitiates Gods
as the saviour and prosperity of crops and the village. Thus
primitive agriculture works co-operative effort in which the
community people participate. So it not only promotes
simple culture by supplying food to the primitive people but is also
responsible for close social knitting and disciplining humanity
itself by bringing individuals together for observing rituals and
ceremonies in connection with agricultural operations.

By shifting cultivation we mean impermanent cultivation
on the hill slopes by cutting and burning the forests for a
period of two or three successive crops and after that the people
move to another forest areas to repeat the same process. Over
11% of the tribal population in India practise shifting cultivation.
This type of cultivation is called Jhum in Assam and Tripura;
Bewar, Dahiva or Penda in Madhya Pradesh; Podu in the
Deccan and Andhra Pradesh: Rama, Dahi or Bringa in North
Orissa; Gudia or Domgar Chas in South Orissa.

The Garos, the Khasis, the Mejos, the Abors, the Dafias, the
Kukis and the Nagas in Assam, the Angami Nagas and the
Kabui Nagas in Manipur, the Kharias, the Korwas and the
Malpaharis in Bihar, the Bondos, the Saoras, the Khonds and
the Juangs, the Gonds and the Korkus in Madhya Pradesh and
in Andhra Pradesh the Reddis are accustomed to the shifting
type of cultivation.

The Garos, the Malpaharis and the Reddis use digging
sticks, the Abors, the Nagas and the Dafas—dao (for cutting
trees), the Khasis and the Juangs—hoe, and the Korkus and the Santals—plough and hoe (Kudi).

Shifting cultivation has some advantages and more so of disadvantages. The advantages are:—

1. Large area can be acquired as per the requirement of the cultivator.
2. No irrigation system is required.
3. Practically no manure is used except the ashes for the first time.
4. Time and labour are saved i.e. less time and labour are required for the production.
5. Simple and crude type of implements serve the purpose.
6. More products are available with minimum expenses.

The disadvantages are:—

1. Shifting cultivation process causes the streams down the hills to dry up.
2. It causes floods on the valleys endangering the lives and property of the people.
3. It causes the soil of the cultivable land to be washed away.
4. It brings down heavy silt i.e. drying up of lakes, ditches, ponds, etc. of the lower area filled up by the deposition of silt.
5. It destroys the vegetation in the hills and thus expose the rocky surface by the quick run-off of the soil by erosion. As a result the fertility of the soil is lost quickly.
6. It causes deforestation that affects the rainfall i.e. rainfall diminishes, as a result the climate fluctuates i.e. a little more extreme.
7. It affects the animal life as the animals cannot live without vegetation.
8. It causes valuable loss of timbers thus deprives the people of forest products.
9. It leads to the nomadic habits of the people, and so
10. difficulty arises in administration due to the mobility of the people.
The causes for the adherence to shifting cultivation are numerous. They are:

1. Ignorance and reluctance to learn better methods.
2. Indolence.
3. Socio-religious beliefs i.e. hurting the Mother Earth as found among the Baigas and the Gonds.
4. Scarcity or non-availability of suitable lands for practising settled cultivation.
5. Due to paucity of fund for cattle, implements, seeds and manure.
6. Alienation of land and thus driven to hills and forests by powerful foreigners.
7. Due to non-availability of alternative employment.

Thus summing up altogether it can be said that cultural factors are possibly mainly responsible for the tribal peoples adhering to shifting cultivation for many years. But the process of change has been controlled by exploitation, alienation of land, lack of fund, suitable land, knowledge of improved method and implements and also non-availability of alternative employment and these being associated with the disruption of their socio-religious beliefs in case of change to settled economy i.e. agriculture.

Suggestions for remedial measures in the case of shifting cultivation are to call for a change over to new life. So they are as much economic as a human problem. These involve all psychocultural aspects inherent in the situation of change. Hence an integrated approach should be taken into consideration.

Some suggestions are given below:

1. Social education specially proper regular education for ploughing in settled life i.e. teaching the method of settled agriculture should be imparted to the tribals who practise shifting cultivation.

2. Allotment of land and money at the initial stage for cattle, implements, seeds and manure should be given priority.
3. Provision for alternate or subsidiary occupation in the form of arts and crafts, e.g. carpentry, weaving, beekeeping, dairying, piggery, poultry, tailoring, making toys and fancy objects, lac and cocoon raising, spinning, weaving, sawing, oil-pressing, bidi-making, road and house-building, etc., should be taught or provided.

4. With the help of the social welfare workers and other non-official agencies co-operative undertakings in terraced and low cultivation, fruit orchards, etc., should be encouraged.

5. Control of deforestation, climate and raising of standard of living should be the main criteria.

So the abolition of this wasteful means, i.e. shifting cultivation is necessary. A change is beneficial to the economy of the people and the country also. Practical experiences are found among the Purum Kukis, the Bhumijas and the Pauri-Bhuiyans. They have gradually come to settled cultivation from the shifting one.

The problem of rehabilitation of the tribal peoples of India who practise shifting cultivation to settled cultivation is a costly affair and it requires a long time process. The problem can be met by three ways as suggested by the Report of the Commissioner for Scheduled Castes and Scheduled Tribes for 1956-57. They are:—

1. Improving methods of shifting cultivation.
2. Colonisation.
3. Terrace cultivation.

Experiments carried out in the different States of India by improving methods of shifting cultivation indicate encouraging results but the results of colonisation scheme are not very satisfactory for two reasons—due to non-availability of sufficient wet land and the non-eagerness for the tribals to settle on land. Terrace cultivation requires proper irrigation facilities. So due to lack of regular and proper introduction of irrigation this is not working on a large scale. But in some places like Naga hills this system is working already by the tribal peoples.
CULTIVATION AMONG THE TRIBAL PEOPLES OF INDIA

During the Rigvedic period plough cultivation was in existence in India. There is also a hymn in Rigveda on plough and ploughing. The Indus valley people specially of Mohenjodaro were probably the users of hoe. Chattopadhyay has stated “that settled agriculture with cultivation with hoe was prevalent among an advanced people of Pre-Vedic age in India”. Hoe cultivation is still in existence in outlying zones of Nepal, Assam and in some parts of eastern and central India. Even the uses of the digging stick are also found today among the Kharias of Chotanagpur, the Malers of Rajmahal hills, Bihar and the Garos of Assam, growing food plants.

Shifting cultivation or the shifting of one plot of land to another after two or three successive growing of crops by the cultivators is prevalent among some of the tribal peoples of India in many forest areas. This practice is called jhum cultivation in Assam. The Chakmas of Chittagong hills of Bangladesh also follow this practice. The implements used for this vary in different areas and also among the different groups of people. The Chakmas use a dao to cut trees and also to make holes in the soil for planting seeds. The Abors of NEFA use dao and also digging stick. The Garos of Garo hills use a sharp pointed digging stick. But the Nagas and the Khasis of Naga and Khasi hills make use of a hoe. Though some have also settled agriculture. The Angami Nagas have terraced cultivation along with jhuming. But the Mikirs and some tribal peoples of Manipur specially the Purum Kukis have been using the plough for cultivation for a long time.

The Santals practised shifting cultivation in former times and they used to call it Dahi. Plough was however used by them for this purpose. The Malers also practised this type of cultivation with plough but they use a digging stick even now. The Korkus of Melghat, the Baigas and the Gonds of Madhya Pradesh and in Orissa and Andhra Pradesh and Hyderabad the Bondos and the Reddis practised shifting cultivation calling it
bendar, bewar and Podu respectively. But the Reddis still use hoe and digging stick for this. Settled agriculture with terraced irrigation however is practised by the Saoras. In the south the Paliyans, the Ulladans and some tribal peoples of Travancore practise shifting cultivation even now. In Nepal the Newars had this type of cultivation in the irrigated terrace field with hoe only.

For cultivation hoes used are developed typologically mainly from more simple implements like the wooden hoe used by the Red Kaffirs of N.W.F.P. known as dwash. The Angami parabolic shaped hoe blade seems to have developed from the bamboo scraper by way of an iron blade scraper.

The ploughs used for the present system of cultivation also vary in type. The ordinary plough consists of (1) the handle, (2) the body with shoe and share and (3) the beam. From the construction point of view the plough has been developed from the hoe. The prolonged handle sets at an acute angle to the body forms the beam. According to Montandon and Nopsca the plough can be considered a spade with a beam inserted at the part at an acute angle. There is another type of plough known as quadrilateral plough common in China, Malay and Northern Europe. In India it is not known. The plough used in Bengal popularly known as Bengal plough is of a bent type in which a beam is inserted. The iron share known as jai is narrow or broad depending on the nature of soil where it is used. The Santals also use this type of plough. The Oraons of Chotanagpur use a type of plough which has both body and shoe like a straight garden spade locally called Khonta. The beam enters it at an acute angle. In the Deccan area and even in further south for ploughing a special implement known locally as Wakhari is used. It has a heavy body from which two shoes just out, on which a broad iron blade is fitted. This is called a hoe blade. In the heavy body the two beams converging are fixed. Between the blade and the body there is a gap or space behind the blade. The gap or the space is meant for the turning up of the earth by the blade to fall and the clods of earth are broken by the heavy body.

B : SMC—4
AGRICULTURE

With the Neolithic epoch and cultural phase we practically begin the modern age of agriculture. Man no longer lived by hunting and fishing, and food growing was invented (perhaps by woman) in some Old World centre, and possibly independently in the New World centre of Mexico and Peru. The plants cultivated in the Old World were wheat, barley, millet, rye in the Western zone and rice in the South Eastern zone. In the New World maize and potatoes were the chief staple food. In the Oceanic area we get the crude cultivation of arum (*taro*) the knowledge of which was probably derived from Eastern India.

Studying the mummies of ancient Egypt of Predynastic period, it has been ascertained from their intestinal contents that they ate a type of cultivated barley or wheat. The barley was of six rowed type and possibly obtained from Syria according to Peake. In the Neolithic lake dwellings of Switzerland we get traces of both wheat and barley. Rice was cultivated very early in some regions in East India, Malaysia and China.

The techniques for cultivation of soil are numerous. The simplest agricultural implement is the digging stick as found its use among the Malpaharias of Santal Parganas and the Garos of Assam, etc. In Australia its use represents a transition between gathering and cultivation. In Africa and America the digging stick breaks the earth preparatory to planting and is thus a kind of hoe. Hoe represents a vast improvement. It is essentially an Old World tool.

One result of the domestication of animals seems to have been to bring men prominently into the field of agricultural activity.

Though a food supply is indispensable it is quite natural to get along without a shelter. So clothing is also a necessary adjunct to the lives of men, particularly for the protection of the body. Clothing can be sewn and fitted to the contours of the body in which case it is tailored or it may consist of
materials loosely draped or thrown over the human frame in the form of shirts, trousers, etc.

In the evolution of material culture of man the food gathering stage precedes the food producing one. In the food gathering stage man used to live on roots and fruits gathered from the jungles. Hunting and fishing also form other means of securing food in this stage. The most primitive form of implement men used in digging up roots and tubers for their food, was a digging stick which was at first prepared from a more or less straight branch of a tree generally pointed at one end.

Figs. 31-37. (1) Mal Paharia simple digging stick; (2) Bushmen digging stick; (3) Kharia composite digging stick; (4) Irish planting stick; (5) Garden spade; (6) Livan; (7) Khonta.

The simplest type of tool for digging and turning up soil is a pointed stake, the end sometimes hardened by fire, the process being called tempering. The implement can be further modified
by putting a horn-sheath at the working end to strengthen the tip and a ring stone at the butt end to increase the weight of the thrust as is found used among the Bushmen of South Africa. In the Kharia specimen (of Chotanagpur) the working end is fitted with an iron point which makes the tool more effective.

Figs. 38-40. (1) Red Kafflas, wooden hoe; (2) Oraon hoe (blade); (3) Khasi hoe.

The Irish planting stick is another variation of the digging stick suitable for soft soil. The foot rest helps to add additional weight to the thrust. The *khonta* is a more complex form evolved from the digging stick. Here the working end is a broad
and flat iron blade, the cutting edge of which is at right angle to the working plane. The broad blade enables to turn up larger amount of earth at a time. It is now a spade and is used by the Bunas of Bengal. In the garden spade proper what is known as khurpi, the blade is almost the same as in khonta, but the handle is semicircular and small. For this technique it can be worked for weeding and scraping more usefully than for digging and turning up of soil. In the Baluchi-yum, it assumes an almost flat parabolic form and works like a spade. The foot rest increases the weight of the thrust there, by rendering it useful for hard soil. It is called as livan.

Probably along with the digging stick there came into existence another type of implement known as pick, which has

Figs. 41-43. (4) Bamboo scraper; (5) Iron scraper; (6) Pick and mattock.

many advantages over the former in breaking up the soil. This unlike the digging stick is evolved out of the forked branch of
a tree used as such in early times. Here unlike the digging stick the point and the haft are an acute angle with each other. This implement later on may have developed into a hoe by the widening of the point into a blade. The simplest hoe can be described as a forked branch of a tree with its working end sharpened into a blade. This is used by the Red Kaffirs of N. W. F. P. This adaptation makes the tool more efficient in breaking up the soil. But if the working end is replaced by an iron blade it becomes more useful. To give better results, the breadth of the blade increases at right angle to the plane of action and the tool assumes more and more complex. This can be illustrated from the specimens used by the Oraons, the Santals and the Khasiis. But the evolution of hoe may also be traced in Assam from a bamboo scraper which is still in use among the modern primitive tribes of Naga Hills, Assam. The simplest type is a small bamboo slip bent and tied together. The second series is almost similar to the former only the scraping region is replaced by a thin curved iron blade i.e., the working end is at an acute angle with the axis of the handle. In the third series the two ends of the scraper which served as the handle now fused together to form a single tang and the tang is either tied to curved pick like handle. The Angami Nagas use it. This shows that when iron scraper is further modified it evolves into a hoe. The intermediate form in between iron scraper and Angami Naga hoe has been illustrated by Balfour. The pick and the mattock are the modifications of the hack and the hoe, suitable for very hard soil.

The most developed type of implement for tilling the soil is the plough. It is a more complex and advanced tool for turning up the soil. It is an animal drawn implement producing continuous furrows on land. Broadly two types of plough are recognised—(i) simple curved plough as exemplified by the Indian plough. Types of it are shown by the Bengal plough and the Oraon one; (ii) The quadrilateral plough is well illustrated by the specimen from Malay states and the European type.

In all the ploughs, the breadth and the thickness of the share depend on the nature of the soil. It is obvious that in a hilly
and hard soil, the share would be thicker and stouter than that used in softer soil.

In Bengal the iron share and the plough are shaped by the village blacksmith and carpenter, but in tribal areas the iron share is made by the village blacksmith and the rest portion is done sometimes by the owner of the plough himself.

After ploughing the field is harrowed in order to break down the big clods of earth that were again turned up during ploughing and thereby the field is levelled. In Bengal this is generally done by means of simple bamboo ladder or by means of a flat rectangular wooden plank yoked to a pair of oxen to drag it, while the ploughman stands on it to give sufficient pressure for breaking the big clods of earth. But the harrow used by the Korkus which we have observed and examined in the Ethnographic Museum of the Department of Anthropology, Calcutta University, is not used merely for such purposes, it is also used for destroying the weeds that grow in the field.

After preparing the soil comes sowing of seeds. The most common method of sowing is by means of broadcasting when the farmer simply scatters seeds. The other method of sowing is by means of special implement devised for the purpose and is known as seed-funnel or seed-drill. The simplest type of seed-funnel consists of funnel with a single hole provided with a single tube generally made of bamboo. The nalka used by the peasants of Meerut is a hollowed bamboo tube with split-up bamboo funnel stitched with leather and the Korku type is also a bamboo tube with wooden funnel. At the time of use the seed-funnel is tied to the handle of a plough where it joins the body and sometimes the tube is fitted with the aperture on the shoe of the plough and then tied to the handle. When the plough furrows the soil, the ploughman from time to time pours seeds or grains into the funnel. Sometimes instead of one hole, the funnel is provided at its base with two or more holes to each of which a long tube is fitted and in this case a plough with two or more shares fitted on so many shoes, is employed. Each shoe is provided with a hole for fitting the tubes. When the plough furrows the soil the ploughman from
time to time pours seeds or grains into the funnel which reach the furrowed soil simultaneously by its tubes.

Simply tilling the soil and sowing seeds are not enough for the production of grains. Reaping and harvesting are also necessary after the plants are matured. The scythe and the sickle are the two important reaping implements.

After harvest, the grains are removed from the plant either by treading the grains or by directly threshing the plant or by beating the corns by a stick known as flail.

Next comes the husking of grains where a mortar and a pestle are required. In the beginning a natural surface of a rock was used as the mortar and the pestle, was a piece of stone. Constant use developed a hollow and gave an idea of the next stage where the mortar was scooped out in a stone or later in a block of wood or a portion of a trunk of a tree and the pestle was a straight branch of a tree prepared for the purpose. The simplest type of husking implement is either the Santal or the Korku mortar and pestle (*ukhul*). The pestle is the chief pounding tool and the mortar works as a container of grains. This hand operated device of husking is more effectively transferred to the husking lever as can be illustrated from the specimen known as *dhenki* used by the Bunias of Bengal. Here it is operated by foot and the pestle is not directly held by the operator. The principle of lever action as applied in the construction of the implement enhances largely its efficacy. The Angami *medu* stands intermediate between the husking lever and the elementary type of mortar and pestle. But it should be noted that there is necessarily no genetic relation between the *medu* and the husking lever. A similar type of tool as the Angami *medu*, is used as a ceremonial hammer in the far East islands. Here also it functions as a pounder of grains.

Among the Lodhas the *ukhul* is in vogue specially in the jungle areas of Midnapur, West Bengal; whereas in the police station of Narayangarh of the same district only pestle is used for husking purposes. Here pestle is a polished wooden piece, five to six feet in length and three to four inches in diameter. Working end is provided with a ferrule. Courtyard or floor of
the house serves the purpose of mortar-bowl. This is due to
less quantity of paddy gathered by the poor Lodhas who have
a tradition of food gathering.

Lastly the husks and the food grains are separated from
each other by means of a winnowing fan known as *kulo* in
Bengal. The most common method is that a man holding a
basket of husked paddy high up allows them to fall on a mat
below while the other man with a winnowing fan, fans out the
husks as the grains fall. The other method is by taking some
food grains on the winnowing fan and tossing off the husks.
ORIGIN OF PLOUGH

Introduction

The genesis of plough is of great importance as on it hangs the problem of the origin of Indian civilisation and possibly all the basic aspects of the old world culture with its cattle-cereal-wheel plough complex as is put by Wissler. Before the discovery of the Indus Valley cultures, Hahn notes the whole gamut of invention to Babylon. Tylor draws the attention of the legend of Sita born of the furrowed soil. She is the furrow personified. The geographico-cultural aspects delineate the different phases of plough from the most primitive to the recent evolved type.

The Phases of Invention

It is found that the simple digging stick is still in existence in India among the primitive tribes like the Mal Paharias of Bihar, the Garos of Assam, the Kurumbas of south India. Similarly the two painted wooden staffs are in use among the Bodos of north-east India. Another phase of invention that led to plough is connected with the history of hoe. In Assam hoe has some phases from the twined bamboo scraper to iron hoe. Prior to iron hoe, stone in the form of shouldered celts or spade celts are the typical neoliths of Assam and Santal Parganas. The Egyptian plough had its origin in a hoe drawn through the earth. The lunette-edged neolithic and copper pieces were used as hoes during the early copper age. Even in India, a number of lunette-edged celts which were used as hoes are found in Gungeria in Madhya Pradesh.

There may also be a third line of development in the genesis of plough. Pitt-Rivers has shown the development of simple club, mace, boomerang and Indian plough (Leangle) as divergent ends of the different phases beginning from club. This connects plough genetically with a weapon and its curved nature makes it a closer relation with boomerang. In Indian epics, the culture hero of the plough is shown as the culture
hero of the wheel. In Gujerat specially at Dwaraka their scenes of activities are found and boomerang is still in use there. The plough culture Valarama is spoken of here as Halayudh with plough as his weapon. In the traditional Mahavarata war, the wheel-culture hero Lord Krishna fought in the early Koli period. But the Indus Valley culture reveals that wheel and plough were in full use along with cattle in north-western India.

It might be that the agricultural implements, developed from the digging sticks and bent sticks on the one hand, hoes and spades on the other, were evolved divergently according to the functional needs of the people. Subsequently they were somehow hybridised into plough.

Ethnological Origin

From the ethnographic and cultural points of views, Hahn has said that the use of plough marks a great break in the long tradition of work with hoe. This has fixed the date of this relatively rapid invention over a long range of territory extending from Ireland to India and China, and from Norway to Morocco. Thus the victory of agriculture over space in the old world is the possible result of two simultaneous inventions of human intelligence, viz., (1) the form suited for the task of breaking up the soil, and (2) the use of domestic animals in agriculture.

A number of cultural phenomena appear at this moment of proto-history, carrying with it the ethnic surroundings to which they are connected and out of which they take their birth. But the pre-historians have thought that during this period of the mutual cohesion of these cultural traits, the plough is born.

Paul Leser in his monograph "Entstehung und Verbreitung des Pfluges" (Origin and Diffusion of the Plough) has avoided in admitting the whole idea of Hahn on the birth of plough. But he admits the merit of the work, the essential aspect of which is "to have recognised the historical significance of the agronomic revolution caused by the plough". He points out his disagreement with the views of Hahn. Thus he writes—"Hahn thinks it necessary to explain the origin of the plough
by ritual representations (Phallic cult); I find nothing but agricultural implements; Hahn established the filiation of the hoe to the plough, while I suppose that it is the spade which has given birth to the plough; Hahn throws back again to the traction of the plough on the chariot, while I hold, on the other hand, that the mutual traction preceded the yoking of animals for work, and I believe that the traction of the wattle or of the trailor is far more ancient than that of the chariot; lastly, I do not believe that the first plough has been accompanied with contrivances for simultaneous seedlings”.

Classification

Thus we find the ideas of the two authors side by side on the ethnological origin of plough. These two divergent opinions, however, give a complicated picture of the origin of this cradle

Figs. 44-46. (1-2) Hoe to Plough; (3) Spade (blade) to Quadrilateral Plough
of agricultural art. So let us apply scientific procedure to arrive at the conclusive point by the facts established on direct observations, focusing attention to existing forms of plough in the course of the centuries and also the distribution of these forms in different countries. This would enable us to group and classify the forms, find out the common character and ethnic origin and lastly to establish their mutual relation and relative antiquity.

The quadrilateral type is widely distributed in Germany, Scandinavia (scanty occurrence). England, Belgium, North France. Bohemia, Italy, Poland, South Russia, Caucasus, Armenia, Azerbaijan, Persia and in Eastern Asia upto Shanghai, Shantung, Korea, Japan, Philippines, Java and Malaya. The European territory and its extension appear to be separated from that of the extreme east by the region where the curved or the krumel type predominates, Leser attributes that another popular and more simplified type of plough is predominant in the countries of the Mediterranean region and Rhineland, and is of Roman origin. The characteristic feature is the curved form of the beam and is named as the krumel type (Huns plough). It has another variety known under the name of Etruscan type.

The Krumel type has been predominant since the Greco-Roman period all along the Mediterranean region after having its sway in Babylonia and among the Etruscans. At present this type is found in Italy, southern Alps, Carinthia, south central France, Spain, Morocco, Algeria, Tunis, Egypt, Abyssinia, Gaul-land, Iraq, Kurdistan, western Trans-Caucasia, Turkestan, the Himalayan foothills in north-western India, southern China, Japan and Indonesia.

According to Leser the two types of plough (quadrilateral and krumel) have neither any origin nor any relation of parentage with each other. For a long time it was believed that the krumel type is of Indo-European origin, but the presence of this type in Babylonia and Etruria proves its pre-Aryan origin; and the striking analogy of the form of the Etruscan plough with that of Imeretia indicates clearly a Caucasian parentage.
The quadrilateral type is of uncertain ethnical origin. Some attribute it to the Germans, Gauls and Rhetian. The absence of this type in the south of France is against its Gaulish paternity, but its scanty occurrence in Scandinavia is in contradiction with the idea of German origin.

Leser believes in the descent of plough from spade and he indicates the prototype of several spades worked by hand with two side strings which he has found in South Arabia, Armenia, the Himalayan foothills, the Hindukush region and Korea. He believes in monogenetic theory and he always discards the idea of multiplicity of places in the first origin of plough. About the early appearance of plough, Leser definitely asserts its existence in 3000 B.C. in Egypt and Babylonia. This we also find in the Indus Valley areas.

The principle of fundamental classification between the quadrilateral and the krumel type of plough is a common object achieved (i.e. tilling the soil) with the diversity of form. But about the antiquity between the two types it can be said that from all evidences the krumel type is a much more primitive system.

The evolution of the Indian plough of the usual variety may be traced from the hoe; the haft is turned into a beam, the blade into a plough share fitted to a shoe and the main body of the hoe projects upward to form the body and the handle of the plough. Tylor has also suggested such a stage of development from the hoe to the plough. On the other end of the beam an arrangement is made to enact the plough by cattle and this
additional device in known as the yoke. In some areas where spade was used prior to the plough, the crooked spade might have evolved into a plough of the above type.

The quadrilateral plough is most probably developed out of a spade. Here a long horizontal beam is fixed more or less parallel to the half (i.e. the shoe and the body of the plough) by vertical rods rising from the shoe and the rear end of the body (the half of the spade). The blade is the plough share. This type of plough is distributed over Malaya, Indo-China, southern China and to other places of south-east Asia where the alluvium is soft and fertile, requiring less penetration of the soil.

The Korku plough and clod crusher perform the combined function of turning up the soil and breaking up the clods. It is probably an adaptation to a broad bladed hoe fitted to a long body from which the beam projects out at an acute angle.

Besides these, a third type of plough, can also be recognised. It occupies a mid-way between the Indian and the quadrilateral ploughs. Here the beam fits directly into the half of the spade i.e. the body of the plough making an acute angle with it. It is further supported by a vertical rod rising from the middle of the body. Leser has suggested that this type is directly derived from a hoe. But Montadon following Nopsca holds that it is evolved from the spade.
FIRE-MAKING

The use of fire is almost as old as the human life. We have evidences of the use of fire in early palaeolithic period. Man’s first acquaintance with fire was possibly associated with conflagrations. These are produced by natural events such as the eruption of a stream of lava into a forest, the ignition of a dry tree by lightening the stroke of and by friction of trees in the forest by storm or high winds. The use of fire by man came later possibly against the attacks of the animals at night. In early days of mankind fire was used mainly for:

(i) In cold areas for warming the body—a major necessity for survival.

(ii) Food made edible by cooking,

(iii) Burning of dried up grasses and leaves to keep off herds of wild animals.

Thus we feel the use of fire mainly for survival, to which it can be that a fire a man must have not only for comfort but also for his survival. Besides these, the use of fire enabled man to develop his crafts. In sacred and ceremonial occasions fire is used and also worshipped. Even in the life of an individual from birth to death fire is a necessary adjunct. So Lowie has justly remarked, ‘Probably no single feature of material life so definitely lifted man above the animal plane as the use of fire.’ Chapple and Coon have said that ‘fire is necessary if human civilisation is to attain any degree of complexity’, and Walter has attributed ‘fire as an agent of human culture.’

There are different methods of producing fire prevalent among the different groups of man. They are:

(i) **Fire-drill.** Two wooden sticks—one vertically on the other horizontally twirl which produce spark. This spark coming in contact with dried up grasses and leaves etc., produce fire. This type is a common one with man. The Greeks, the Romans and the Egyptians used this in dim antiquity. The Brahmin priests in India kindle their fire by this method. In modern times
the Veddas, the Santals, the Eskimos, the Papuans and the African tribes and the Californian Indians have this method of fire making.

(ii) **Bow-drill.** An improvement of the former one that saves the blisters on the palm. Here one twists the string of a bow around the wooden stick instead of twirling the wooden stick directly with the palms. The wooden stick is then rotated by the movement of the bow. The Eskimos, the North Siberians, the Yukagirs use it for producing fire.

(iii) **Pump-drill.** In Madagascar the implement with a sharp point is used to drill holes. Among the Chukchis, the Iroquois, the Bhils, this type is well known. This is an improved type on the bow-drill. A perforated wooden fly-wheel is set on the lower part of the stick and a cross bar is tied by each end to the top above the disc. One twirls the stick so as to wind up the strings from which the bar hangs. This raises the bar. He unwinds the strings by pressing down the handle. Thus the stick revolves and it continues. This is the pump-drill. The Melanesians and the Polynesians use it even now.

(iv) **Sawing.** This method is the characteristic of Malay. Fire is produced by one piece of wood across another by drawing back and forth over it. In Malay bamboo is used for wooden piece. Sawing method is found in Australia, Philippine Islands, Burma and India. The Nagas use it not only for making fire but also for taking omens.

(v) **Ploughing.** One pushes a pointed stick back and forth on another flat piece to produce a groove. This process is continued till friction generates heat to smoke and finally to spark. This method is employed by the Polynesians, the Melanesians, the Papuans and the African Negroes.

(vi) **Percussion or strike-a-light.** It was one of the earliest methods of producing fire. Flint and stone or flint and
iron continuously striking together produce spark. The Santals use this and call it *chokmoki*. This is still in use in the west—Russia, Belgium, Holland and England, and in the east—Borneo, India and Tibet.

(vii) *Compression of air by fire-piston.* Heat gives out when a gas is compressed. A fire-piston consists of a hollow metallic cylinder, closed at one end and opened at the other to have a closely fitted piston. The piston has a depression at the lower end to receive a piece of tinder. By forcing the piston to the bottom of the cylinder air is compressed resulting in the generation of heat to ignite tinder. The Kachins and the Shans of Burma use this, and in Borneo, Malay and Java this method is also found.

(viii) *Lenses.* Focussing sun’s rays on dried up objects like leaves etc., by the lenses, fire is produced. This is very common in England.

(ix) *Modern Matches.* Invention of the early 19th century—wooden splits coated with sulphur and potassium chlorate ignite when dipped in sulphuric acid. Lastly phosphorus came to light as a very suitable reagent for matches. This has entered into the hands of the people who live deep into the forest and also far away from the so called civilised world.
COOKING

Cooking is known today even to the hunting or food gathering or collecting groups of people like the Andamanese, the Birhors, the Kharias, the Chenchus and others. But there are certain tribes who are quite ignorant of cookeries.

Man utilised raw materials as his food, then roasting, steaming and finally boiling came with fire and pots.

Food is taken in four forms. They are:—

(i) Raw,
(ii) Roasting,
(iii) Steaming,
(iv) Boiling.

The Onas have no vessel so they are unable to boil their food. They hang guanaco meat slices on fire by a stick and turn this way and that on fire till it is broiled. Fish and rats are gutted and then baked in hot ashes. Birds having their feathers plucked, are also similarly baked. The Australians had similar devices. The Nicobarese even now bake the meat of pigs by throwing fire on them. The Bunas of Bengal skin off the pig and porcupine by fire. The preparation of the domesticated pig for food among the Bunas is rather amusing. Immediately before killing the animal it is made to swallow a quantity of unboiled rice and some spices. After killing the animal they make a fire and burn it, to boil meat as well as the contents of the stomach. Then thrusting a knife into the abdomen and opening the stomach, they take out the rice and spices which are then considerably cooked. The meat is then dressed and the rice is taken with meat. Among the Lodhas of West Bengal steaming of meat is done when the slices of meat of fowl or goat are packed with a bark of sal tree, later tied by means of creepers and placed in fire.

In the west of Australia the natives usually wrap a fish in a bark and bake in heated sand covered with hot ashes. The Nagas put the meat in the hollow of a green bamboo rod and bake it in fire. Even the modern people specially in Bengal,
bake fish covering in a plantain leaf. Children are found to put the nuts of the jackfruit in the hot ashes for baking for which an earthen oven is used. Earthen ovens are distinctive of Oceania. In early days cooking was done on the oven and even this oven survives till the introduction of metallic vessels.

The Polynesians and the New Zealanders were ignorant of pottery. A shallow pit was dug by them and it was lined with stones. They also covered the top with a stone. A fire is given inside with some dried up leaves and when the fire comes down the green vegetables are put and the heat by steaming produces the food cooked. The Samoans had this method but they did not cover the top for steaming.

It is not possible to wrap up a liquid food for boiling. The Polynesians put wooden bowls and heated stones are dropped by them in these bowls. Stone boiling was an important factor among the North Americans and the people of Kamchatka. Water tight basket and birch bark vessels were used by the Californian and the Canadian tribes for cooking. Modern Basques and the Yukoslavians sometimes stone-boil milk in wooden and bark pots respectively.
HABITATIONS

It is difficult yet to have a clear idea of an evolutionary series or of the invention of the particular types of habitations and their distributions. Ratzel attempts a series. There might be a geographical study of the different types extant.

In studying the history of the development of habitation which later on merges practically in structural engineering, we have to note first that the structure of any group of people is generally in a line with their other elements of material culture. Thus invention plays an important part. Environment also is of vital importance,—an ice house can be built only in Arctic zone or grass thatching where similar grass is available. Distribution also plays a great part for imitations of more and more durable structures so far as possible, imitations would always bring about better structures.

The crudest habitation would be rock-shelters, etc., which afforded protections to man perhaps since mid-Palaeolithic glacial times. Even today the Veddas of Ceylon retire to the caves in the rainy season.

Protection against wind by means of wind screens or temporary shelters would also a primitive type. The Andamanese and the Tierra-del-Fuegians had only this crude sort of one wall habitation.

The subsequent story of the development of huts might be read perhaps in gradual detachment of parts from an original one structure hut, thus in the Bushman bee-hive hut. Plinth, roof, wall etc., are all one made up of tall bundles of grass.

Next there would be types in which the wall and the roof though distinguishable are firmly fixed together. In this way we may look upon the rectangular hut type with a distinct plinth, four separate walls and two or four levels of thatches as the most completely possible developed hut.

There would be however different types developing in different directions from which hybrid forms would come into existence. Thus the stone structures of Neolithic times might
have developed in imitations of rock-shelters or conical roofed buildings from one pole skin tent structure. Similarly dwellings on tree might have been a legacy of very early man considering the apes to have high nests on trees. In Madhya Bharat the rectangular hut on tree is a culture type of old nest tradition or protection against wild animals.

The lake dwellings were built towards the end of the Neolithic times and continued till the end of the Bronze age. They are similar to the pile dwellings of Borneo. Ten thousand piles were built in a single area for the houses. The Crannogs of Ireland are similar. In Italy there were Terramara settlements on dry lands of a similar type.

The lake dwellings fall into three classes—the most important are those supported on piles. The villages consisted are of a series of houses along the lake shore which sometimes are big ‘Bachelor House’ like structure in the middle. The second type is the stacked platform dwelling. There were wooden platform pavements on pits which have been overlaid by subsequent piles of logs. According to Hsierli this began in long rafts afloat on the edge of the lake and kept in place of vertical pipes in the
corner. In the third type the logs of houses and paving into the streets were admittedly laid on piles.

By the term house we mean all types of human structures ranging from the humblest huts to the elaborate city mansions. A house serves mainly three purposes:—

(i) Dwelling,
(ii) Working,
(iii) Storing.

Among the primitive groups of people the dwelling huts are the main but in advanced groups the nature and types differ such as factories, stores, etc. The shape and form, colour, building materials, space, functions, etc., are the distinguishing factors for the house types.

Main types of huts are in existence among the primitive groups of people:—

(i) Wind break—Sticks are set obliquely in a semicircle and connected by the skins of animal (guanaco), leaves and barks. The Onas and the Veddas have this type. It is roofless. Sometimes lean-to type of hut is temporarily

![Fig 48. Wind Break type.](image)

constructed by the semi-nomadic Andamanese and the Kadirs. Bamboo poles or branches of tree are placed and leaves are kept on them slightly in a slanting position.

(ii) A conical hut and a dome—In this type walls and roof cannot be distinguished. The representative form is found among the Laps, the Eskimos and the Kharias. Bee-hive type is also included in it. The huts of the Zulus, the
Hottentots, the Birhors (Kumbha) and the Koras of Midnapur belong to this type.

(iii) Cylindrical frame topped by a dome—known as Mongol tent. The Mongols cover it with felt, the Siberians with reindeer skin and the Shilluk with clay materials.

(iv) Rectangular form with flat roof—The Hopis build flat topped oblong hut.

(v) Rectangular form with a gable—In Oceania and Indonesia this type is mostly prevalent. The Maoris also use this type. In India among the Chirus of Manipur and the Hos of Chotanagpur this type is found.

Besides these, tree huts are also in existence among the Garos of Assam and the Korwas of Madhya Bharat.

A house forms an important element in the cultural life of man. Settlement pattern varies with environment and human activities. In every case both these factors are involved, the difference being on a matter of emphasis. On the whole patterns appear to be based on human activities with striking forms of the natural environment producing specialised variations. These are strikingly noticed among the groups of people who practise both hunting and farming combined together.

ECONOMIC INFLUENCE—A hunter cannot have a fixed abode for his game as he must have to follow his game from one place to another, so also a herder is bound to wander with his stock.
Hence buffalo hunting South Siberian nomads live in tents. This is also noticed among the Todas, who live in tents. The Kaoras of Bengal live under big trees for rearing their pigs in nearby fields. A people who practises both hunting and farming leads a double life. When the Omahas of Nebraska hunted buffalo they lived in tents but they had fixed houses when they had to look after their maize in the field. Seasonal arrangements are also common. Some of the fishing castes like the Malos of Bengal usually live in fixed huts throughout the year but during rains they move in boats for their catches.

In pasture and grassland areas the distribution of houses or farms forms a scattered or dispersed pattern.

A village pattern is a series of large villages of the nuclear type. The shapes depend on the physical setting and also of the time factor. They are mainly as follows:—

(i) **Compact type.** Develops round a spring or a well.

(ii) **Ring fence type.** In forest areas around clearings in the forests originally used for cattle grazing.

(iii) **Linear type.** Restriction of development due to the physical setting like the river embankments and narrow valleys.

(iv) **Rectangular type.** For intensive cultivation.

Topography, flood, water supply, defence, political, social and ethnic factors are the causes for the modifications of the village pattern. Besides these, the patterns of habitations, are influenced by economic factors, such as—

(i) **Mount valley pattern.** Narrow zones of villages broad towards the lower part of the valley narrowing towards head.

(ii) **Mining pattern.** Long lines in the pit heads.

(iii) **Mill and factory pattern.** A dense mass of huts with a radiating arm.

(iv) **Fishing pattern.** Usually on the water coasts.

**GEOGRAPHICAL INFLUENCE.** First of all geography affects the materials for housing. In Kashmir, Burma and in Norw
wooden houses are made; in South Europe and Spain—the material is stone but in Bengal mud, straw and bamboo splits are used. The Southern Onas build huts while the Northern group has only wind breaks; as in the north there is no beech of forest. The Egyptians are not superior to the Babylonians for their ample use of stone materials. They had enough stones in their possessions while in Babylon they are rare, so bricks are used by them.

The second point for consideration under geographical influence is the reasonable adaptation in climatic condition. One adjustment is against flood or damp ground. In Neolithic times we have the evidences of lake dwellings, in modern Venice we also find such things. In Bangladesh, villages are made on mounds of earth particularly in water logged (bil) area. In Chottanagpur area no window is provided in the huts due to the extreme heat. The Eskimos prepare snow huts known as Igloo. In England villages have houses with slanting and steep roof due to snow fall.

FUNCTIONS—The house technique is applied to various purposes. A simple structure has distinct bed room, kitchen and cattled shed. The Maoris do not eat in their bed room, they have special cooking place. The tribal people of Chottanagpur have different huts or place for cooking, bed room as well as for cattle sheds. Besides bed room, the function of the huts of the primitive groups of people may be taken into consideration, as follows:—
HABITATIONS

(i) Kitchen—Maoris.
(ii) Sty or cattle shed—Oraons.
(iii) Council House—Samoans, Garos.
(iv) Place for worship—Hawaians, Hos.
(v) Ceremonial (Dancing Hall)—Eskimos.

Social and religious customs—In South India temples are near tanks associated with village. In Madras the higher castes and lower castes live in separate villages. In Bengal-villages all castes live in one village but there are demarcation lines such as Brahmin Para, Jele Para, Tanti Para etc.

Environment influences the pattern of habitation. Habitation is the result of complex geographical factor, water supply and other vital necessities of human life. Thus human habitation depends on natural environment, tradition, social and economic conditions and availability of materials.

In the ever evolving deltaic Bangladesh we find some noticeable features with regard to the reclamation of the newly created land called the char. This is due to three factors:

(i) Isolated patches of land are formed as a result of tide every year to the lands of Bangladesh by the deposition of silt.
(ii) The meandering courses of the river form the ox-bow shape, which ultimately turned into land. This land often becomes the subject matter of disputes among the people living nearby for possession.
(iii) At the mouth of the river low lands are formed by the deposition of silt. This leads to the same problem, resulting in the formation of ever evolving villages.
The people of this area (Bangladesh) build their houses by the side of their agricultural lands. In the villages they have no good roads, simply there are pathways through the fields which link up one village with the other. This shows the structure of a scattered village pattern known under the term of dispersed type, differing from the West Bengal pattern which is a compact one. In West Bengal the dominating problem is the shortage of agricultural land, which influences the pattern of village. The people here have to leave space for agriculture minimising the use of land for their house. This leads to the development of an agglomerated pattern of village. An example of agglomeration of village pattern can also be cited from the Naga hills.

In Orissa the villages grow up in a linear fashion on both sides of an open space more or less resembling an English village. Here the open space is utilised for the road. This is also noticed among the Hos of Kolhan and Seraikella.

Bangladesh villages are clustered round groves of trees and shrubs, which are lacking in different areas of West Bengal.

Fig. 52. Eight-sloped roof of West Bengal.

Bangladesh villages are annually inundated so embankments and raised mounds of earth are done to protect the villages from flood. In some cases houses are raised on bamboo poles
during rains. In West Bengal dams and irrigation channels are made—leading to compact type of hut.

In Bangladesh the people often raise their plinth of the hut much high above the ground in order to avoid dampness. They use bamboo or reed frame work sometimes covered with clay. They have corrugated tin roofs and thatched slanting roofs in the two, four or eight slopes known locally as do-chala, char-chala or at-chala. Sometimes three or five sloped roofs as an extension on the verandah of the hut are done known as te-chala or panch-chala.

In West Bengal the hut is constructed on a low plinth. They use clay mixed with husks of paddy for the walls. They have round thatched roof for their huts. The huts are often two storied occasionally with four roofs known as char-chala. For the roofs they use in some places tiles locally known as khapra.

Thus we find house pattern differs from place to place according to the climatic condition, occupation of the people, social tradition and the economic resourcefulness.
PERSONAL ADORNMENTS

Man does not go blindly into the danger which comes from the nature or the animals or other men. The faculty of providing against it has developed in him. He knows how to adapt the materials in his possessions to make them serve to preserve his life. He has tried more than one method of survival. But the law of organic development in the animal kingdom, in the life of an individual man consists in seeking after food, then feeling and lastly thinking. The desire to look well by decoration is not a special feature of man alone but many other animals on feeling show their same desire specially during their gestation period. This is particularly noticed among the birds. Man is intelligent and superior to all other animals that is why he uses many artifices to look well. Primitive man was first nude. He thought of painting and tattooing the part of the body which could be lent to ornamentation. After that scarifications, mutilations and deformations came in the mind of man as a modification to shape. With the gradual progress, he began to clothe himself for the decorative impulse, then came in sense of modesty or self-feeling and also protection against weather and evil eye.

Painting. It is now common to almost all the primitive tribes. During festivals the Palayans and the Purayans of South India paint their faces with various colours and dress themselves in various costumes to dance before the deity. At a feast the Santals are fond of displaying all colours of a rainbow.

During the prehistoric period the custom of painting the body was known. Red ochre was the chief article for painting. Ludwig Stein remarks—"The History of cosmetics, dated from the days of Biblical antiquity and could be traced back to the man of the ice age." The palaeolithic man was not satisfied merely with painting the body but also tattooing was done by fine flint knives.

The motives of painting are as follows:—
(i) Protection against mosquitoes and other insects;
(ii) Adornment for sexual attraction;
(iii) Frightening the enemies;
(iv) Mourning.

_Tattooing._ It is of Polynesian origin and the word tattoo is derived from _ta_- to strike. Next to painting the practice of tattooing is also wide spread all over the world both among the primitive and the modern people. Tattooing is still in practice in Scotland. In the third or fourth century A.D. they were known as ‘Picts’ i.e. pictured body. In historic times particularly at the time of Asoke there is evidence of the practice of tattooing on bas reliefs. Every visible part of the body was subjected to it except the eye balls, the prominent part being the forehead, nose, the breast and neck, the arms and palms of the hands. The Bunas of Bengal call this practice as _woolki_ and the wearing of _woolki_ is known as _woolkipora_. It is done artistically often on the designs of creepers, flowers, coronets, serpents, etc. No doubt the presence of the practice of tattooing amongst the womenfolk alone speaks volumes in favour of the idea of enhancing personal grace and beauty. But the system carries with it some impression that it infused in the body a protective power against all sorts of evil influence practised by lustful men to seduce by means of occultism or magic.

In days long gone by the instrument used for tattooing by the Bunas was either some jungle thorns or porcupine quills. But in recent times needles have replaced them. Human milk pinned into the subcutaneous region by the needles completes the whole process of tattooing and the sore when healed up leaves permanently a bluish tinge on skin. No dye is used for this purpose.

Polynesian tattooing evolves mutual attraction of the sexes. It is also done to inspire fear in the minds of the enemy. The Maoris of New Zealand tattoo their face to give a look to inspire fear. The Abors use it as a mark of dignity and without it no youth is allowed to marry. The Gond women tattoo their body for decorative purpose. Among the Todas the practice
of tattooing is very common and mostly confined to the women when they are the mothers of one or two children.

Some significant marks are as follows:
(i) A dot on the fore head—Symbol of Lakshmi, the goddess of wealth;
(ii) A figure of peacock—Royalty;
(iii) Sita—chastity;
(iv) Fish—Fertility and good luck;
(v) Comb—Happy married life.

*Scarification.* It is closely associated with tattooing and is done mainly in the dark skinned people. Just as tattooing has spread among the fairer peoples, so has scarification found its way among the dark skinned. Westermarck has said—'Warriors make scars on their bodies to record the number of enemies they have slain in battle.' Scaring the body is done among the natives of North Queensland by cuttings with a sharp flint. A deep wound is made into the flesh and the blood that oozes out is allowed to coagulate. After a time the wound is rubbed with fat and charcoal and bits of pigwood plant. Thus scars are made when the wound is healed up.

In Fiji and Samoa it is meant for ornamentation. The Australians use it for adornment and the South American Indians, to get rid of evil spirits. Scarification is practised for the purpose of:
(i) Tribal mark;
(ii) Remedy for illness;
(iii) Prophylactic charms;
(iv) Record of number of enemies slain;
(v) Mourning tokens;

*Mutilation and deformation.* In the earliest stage of human development, man had no idea of modifying his body for adornment. The Kadiens chip almost all of their incisor teeth in the form of sharp pointed ones. The Australians pull out some of their incisor teeth. The Australians and the Melanesians pierce the septum of the nose. Piercing of the septum of the nose and of the ear lobes are very common among almost all
the primitive tribes of India. These are not also uncommon among the higher castes of India and other countries. Some people disfigure their lips being prompted by the sense of aesthetic beauty. Even some are found to pierce their chins. Instances of cranial deformations are met with among some of the South Indian castes. The classical example of cranial deformation is noticed among the Aymaras of South America. Even in modern times the Chinese women are found to encase their feet in the formative period of their life in wooden shoe frame. Circumcision is also a kind of mutilation. It is found to be practised by the Muhammedans. Abyssinians, Jews, East and West African tribes, Kaffirs Australians and others for the attainment of manhood. There are various theories about the practice of circumcision. The Muhammedans regard it as cleansing and by this a boy becomes clean and is allowed to do religious rites and also to enter the mosque. The second one is said by Ploss Renze—is this that it ‘makes the boy a man by giving him the appearance of sexual maturity, and by making him capable of procreation’. The primitives regard it as a means of sexual attraction. Excision is practised by the Sudanese women and even in Pakistan by some Muhammedan women of Sind.

Clothing. Man is not born with his house on his back like the tortoise or the snail. He cannot cover his body with the woolly fur like the sheep or the bear. Even he has no thick hide like the elephant or the rhinoceros. In his early days his skin was not a proof against the bites of the insects and animals or sharp thorns or even the bruising of the hard surfaces of the stone. Hence was born the necessity of clothing. Bernard says ‘It is a mistake to think that the feeling of modesty is the origin of clothing. On the contrary it is probable that clothing is the cause of shame’. The primitive men have no idea of decency or indecency. A Negro king considers himself adequately dressed in a pair of boots, top hat and a red jacket.

Clothing seems to have originated out of the decorative impulse. Man’s adoption of clothing comes from three causes:

(i) Protection;

B: SMC—6
(ii) Self-feeling or modesty;
(iii) Ornamentation i.e. improving personal appearance.

Protection against climatic condition is a true motive for the use of clothing. But sometimes it is seen in cold climate that the people are without proper dress. In some parts of Australia and Tasmania the natives use shells and fur strings. The Ona hunts his game guanaco in the snow without any garment.

The Kirghiz of Turkestan have winter dress of sheep skin. The Eskimos use leather coats in summer and fur in winter. The Abors and the Nagas of the extreme North East region use fur blankets.

In the tropical region man has to devise suitable protection against the sun. The people of the upper Nile use helmets plaited with human hair and topped with ostrich feathers as a sun protector. In the monsoon ridden and moist laden climate particularly in lower deltaic Bengal the sons of the soil i.e. the peasantry group use hat made of palm, cocoanut or hogla leaves to protect against sun as well as rain while working in the field. Besides the climatic conditions, the man has to protect his body from the attacks of insects. In the tropics he has to wear sheaths to keep insects off. One uses combs mainly for decoration but combs are also used to crop out vermin. In North Eastern India the tribal people like the Khasis, the Nagas and the Kukis carry burdens by a pack-strap over the head to prevent chafing their foreheads. Foot gear serves as a protection during travelling. To walk over the snow the natives of North America, North Japan and East Siberia put on snow shoes. The people of Kashmir use straw shoes and boots to climb snow capped mountain. Sometimes it is noticed that the tribal people of Chotanagpar cover the sole of their feet with leather against the boulders and gravels, some use bark of betel nut tree against the hard soil for walking.

The most early form of clothing was to cover the body against exposure, the original idea of which was adornment and not concealment. At the next stage it is believed that concealment should be done to protect from the evil eye.
‘Waitz, Schurz and Letourneau propounded the theory that the jealousy of the primitive man was the primary ground of clothing and was indirectly the cause of the sense of shame.’ In Brazil an Indian woman is at full ease without a cloth as stated by Nordenskiold. A Shilluk woman wears a leather apron, but the man goes on naked. In India the Juangs use coat made of creepers and also leaf girdle, the Garos and the Todas use bark cloth. The use of bark cloth is not a new thing today. We have the evidences of the use of balkal meaning bark cloth in ancient India. In old legends of the west we have also the reference of the use of lion’s skin used by Hercules. In some groups of people the married women are clothed while the unmarried go on naked. A married woman is the property of the husband, to whom clothing serves as a protection against the evil eye on his property. Thus the idea of self-feeling or modesty came into existence in the mind of the primitive people.

It is very difficult to say actually where clothing ends and ornamentation begins as stated by Ratzel. But it is believed that clothing is evolved out of ornamentation. Various types of materials like grass, straw, bark, hemp, paper, mulberry, leather, cotton, linen, etc., were and even are used for clothing which gradually grew into different styles for the dress in man. Girdle—the earliest one is a piece of string made of grass or fibre worn neither light nor loose. The Juangs, the Savaras and the Korwas use leafy garments particularly as a girdle. This leafy girdle is also used by the Maoris, the Zulus and the Bambutes. Next to this comes the loin cloth worn by the Polynesians, the natives of Borneo and some of the tribal people of Chotanagpur and Assam. One of the simplest and earliest is the masculine ‘gee-string’ as stated by Lowie. The Melanesian use bark, the Santals, the Oraons, the Nagas, the Kukis and others use cotton material. In China the chief textile material was hemp, the Polynesians used paper-mulberry and the East African tribes, the figtree bark. Lastly came the use of cotton—in India it was as early as 2700 B.C. and then it spread to Africa and other places. But the ancient seats of
civilisation like Babylon and Egypt had then flax instead of cotton. Rome and Greece had the draping of the body. With more complex cultures men use various types of garments for the different parts of the body to have a complete dress. Dress thus can be of simple or ordinary use,—occupational, ceremonial, religious. Wedding dress among all the groups of people is rather costly and intensified by personality. 'The bridal pair assume super humanity and are treated as royal persons. Magnificence is the characteristic of the wedding garments throughout the world. White colour is the expression of virginity. Red is often an adaptation to the circumstances of expansion.' The Hindus do always prefer red or yellow colour or both, which is believed to drive out the demons. The Kom Kukis of Manipur use yellow colour for their dress specially on ceremonial occasions as they believe in the sacredness of the yellow colour.

Ornament. Man's love for dress is the taste for ornament. It is probably as old as 15000 years. Some people are scantily dressed or even nude, have animal teeth and shells for necklace. They have sometimes the elementary craze for colour; for the red, the green, the yellow, etc., leaves and flowers for their personal decorations. The Melanesians like mother of pearl ornaments for the forehead. The Australians wore forehead bands with kangaroo teeth and with these teeth in string they used as necklace. The tribal people of Chotanagpur use glass and stone beads, cowries and various kinds of seeds. The Korkus of Madhya Bharat are even today in favour of using grass for bangles and ear rings. Thus we find that the first man was content with shells, teeth, cowries, bones, stones and grasses as his objects for ornaments. Then with the discovery of metals and also with the progress of civilisation the art of decoration in the form of ornaments came. The metals used are copper, bronze, brass, silver and gold.

Living in the lap of nature the primitive people have had to fight against the very nature for their existence. They were really afraid of the elements of nature. The innate fear-complex that they had was probably the origin of their personal adorn-
ment. The tiger is powerful. The cause of tiger's strength must be in the claws and the teeth. So when a tiger is killed the claws and teeth are worn. The swiftness of the deer is in its hoof, so the hoof of the slain deer has to be preserved and worn as a sort of medicine to have swiftness of movement.

It is said that in early days an ordinary married Hindu woman would not have come out before the public without wearing the following ornaments—nosegay, earring necklace, bracelet, armlet, finger and toe rings and anklet. It is believed that the use of these ornaments was prophylactic before they became ornamental.

The desire to decorate the body is immense specially with womenfolk. From the very childhood the mothers exhibit great eagerness to make their children fit to put on ornaments. Instances are too frequent to describe it almost as a custom that the female children's nasal septums are bored through as early as they are one or two months old and a fine neem twig is put in to prevent the closing of the puncture. Nose-gays (nolak) are found to be hanging from the nose of the female children when they have just a hard vertebra to keep them erect in sitting and do scrambling. The lobes of the ear are often bored when the child grows a little more. The instruments generally used for these purpose were porcupine quills, thorns, pointed bamboo splits and now they are pins and needles. Left alare of the nose is bored through to have a nauth which is made of brass studded with coloured glass specks. Some wear tip on the forehead, of green shells of kanchpoka which glitters like the variegated neck of a peacock. Women usually put on round their necks, necklaces of grass, beads, cowries, etc. Two conch shell bracelets (sankha) are worn by the Hindu women on each wrist to distinguish a woman from the unmarried. Metallic bangles are also worn. The Abors wear a brass wristlet with spikes for defensive and offensive purposes as well as for ornamentation. Finger and the toe rings are cherished by some, besides anklets are very common among the Hos, the Mundas, the Oraons, the Santals and others. Decorated bamboo and wooden combs with figures
are not uncommon among the tribal people of Chotanagpur and Assam. These are now being replaced by coloured plastic combs. The use of silver and gold ornaments today among the primitive people of India shows that they are very modern and most probably it is due to the contact with military of the last great war.

The women folk of the primitive people (both India and outside) afforded with small means to satisfy their great lust for decoration find only a few antiquated pattern of cheap metals, but nature itself favours them with the charming beautiful look, the spontaneous outcome of vigour and health of full life, grown 'in sun and showers'. Thus the functions of ornaments are threefold:—

(i) As a prophylactic against the evil spirits;
(ii) To improve personal appearance:
(iii) To attract opposite sexes.
POTTERY

Pottery was almost unknown to the hunters of the reindeer epoch except perhaps in Belgium which are supposed to belong to the age of mammoth. It, however, begins to abound from the Neolithic times.

Pottery making is a complicated process requiring great selection in the material and choice of the proper mixture of a carbon material for the pot to be able to take fire without cracking. Hand made pottery is done by moulding, modelling and building, often it was begun within a basket from the bottom and coiled round and round. Later on with the help of a wooden paddle and an anvil it was beaten to shape. After the introduction of the wheel the pots are smoothed by being placed on a wheel turned either by the hands or the feet.

Pottery occurs very early in the Neolithic age. It is not universal. There are some regions like Polynesia where the earlier vessels or gourd cups only are in use. Hand made pottery is found in America and parts of Africa as in other parts of the world, but wheel made pottery is absent in the new world and parts of primitive Africa. From a distribution of different types of hand made and wheel made pottery, Gifford is of opinion that the centres of the dispersal might have been somewhere in the old world where the wheel was invented.

The wheel is not found in the new world (Pre-French America). Early wheel vehicles have been found specially in terracotta models from Crete, Egypt, Mesopotamia and the Indus valley sites of 3000 B.C. The wheel was possibly associated at first with the cattle culture. The wheels were made of solid rolling blocks of wood being later on replaced by solid wheels, which gave place to wheels with spokes. Somewhere between the Nile and the Indus valley the wheel was possibly invented and applied to pottery, spinning and traffic.

Pottery can be classified into various groups according to forms, types and decorations. In Europe specially two main groups of Neolithic pottery are found:
(i) *Schnurkaramik* or Pottery with string or chord imprints;
(ii) *Bandkaramik*—that with banded decoration.

The former is widely distributed over central and western Europe and the latter is found in the greater parts of Europe except in British Isles.

Regarding the priority of the two types opinions differ. Some authors are of opinion that the stringed pottery is earlier than the banded one, the latter being attributed to the close of the Bronze age. According to others the banded pottery is associated with short perforated celts with a rectangular pole while stringed pottery is with long and slender perforated celts with both ends sharpened.

Pottery may again be classified according to form and style as—

(i) Calyciform, (ii) round bottomed, and (iii) flat bottomed. Besides these, there are vases with perforated protruberance for facilitating suspension, house urns, with bat shaped legs and with female figurines both clothed and nude.

Besides Europe, pottery and terracotta figurines were discovered from China, Persia, Mesopotamia, Sind, Nal and Baluchistan.

Fleure attempted to indicate the position in order of sequence of Nal pottery and those from Sind and Baluchistan. He pointed out that Nal pottery is different from Mohenjodaro. Mohenjodaro pottery, he thinks in the beginning it was painted, then the art of painting became obsolete and in Post-Mohenjodaro times graver wares were decorated with incised pattern. Peake suggested that Mohenjodaro pottery had similarity with those discovered at Russian Turkistan.

So far as at present known, the painted pottery style of N. W. India gave way to greyish wares in course of time. In China also the painted pottery gave way to dark wares. The painted pottery style of the earliest type and that of Nal seem to be derivable from Russia, Mesopotamia, that of Mohenjodaro from great steppe but all these are very tentative.
BASKETRY

Textile art is older than mankind. Spiders and caterpillars drew out fine threads so also birds wove nets long before man's appearance on the earth. The most significant of all in tropical areas specially trees and plants fabricated cloth, which men have worn from the time immemorial. Possibly the first women were weavers of a crude kind and that the textile art has been with mankind always in one or other form. The textile art may be considered under—yarn, thread, braid, weaving, looping, netting and embroidery. All these show that the primitive men were not idle in the development of fibres. Bark cloth can be seen used by the Polynesians, South Americans, Africans and also by the Garos and the Todas in India.

Spinning is a part in string-making. It has a great importance in the preparation of yarn for weaving. The spindle is an old appliance which has its existence even today and there is no remarkable variation in its form and construction. Spinning is generally but not always a work of the women. In Assam and Manipur according to social conventional practices a girl must learn weaving if she wants to marry. So there every house or even a family must have a loom. Spinning work is carried on when the operator is usually sitting but sometimes standing or even walking the operation is carried on.

By the term basketry is meant all kinds of woven vessels in which materials are not spun. But there are flat textiles made up precisely after the same fashions as basketry generally termed matting. Basketry and matting together form a most important part of primitive invention.

Basketry is practised by all people—the primitive and the civilised. The materials used in the manufacture of basketry vary widely in different parts of the world. The most common materials are bamboo and cane slips. These are the most important and frequent in Assam and Bengal. Flexible stems, roots and leaves of plants are also used for this purpose. The
use of some grass materials such as dry paddy straw used by the Hos and other Chotanagpur tribes to prepare the coiled bandi basket of huge size to store food grains, are also not rare. Baskets are used for various purposes all over the world. They are used mainly for carrying goods, storing grains, and keeping valuables such as are used by the Kukis of Assam and the Hos of Seraikella. They keep their ornaments and valuable clothings in these baskets now-a-days with lock and key arrangement.

The techniques employed in basketry are of the following types:—

(i) Plaited or woven work.
(ii) Wicker work.
(iii) Coiled work.

Plaited or woven basketry consists essentially of two sets of elements crossing each other, called warp and weft. The chief patterns of the plaited basketry are:—

(i) Check. In which the warp and the weft pass over and under each other simply like the woven cloth.

(ii) Twilled. In which the wefts are passed over and under two or more warps, at a time, producing diagonal lines or bands across the basket.

(iii) Twined. In which two or more wefts pass alternately in front and behind each of the warp crossing them obliquely.

![Figs. 53-55. Basketry. (1) Check. (2) Twilled. (3) Wrapped.](image)

The Santal toradang or gungi of seoa grass is a variety of twined basketry where the warp and weft are the one and the same element. Each element for some distance is the warp and then the bend becomes the weft and passes below or above
(as turn may be) the next two elements crossing and twining them obliquely. Then it rises up becoming the warp of the next higher level and so on.

(iv) *Wrapped*. In which the flexible weft takes a circular bend right round each warp in passing.

(v) *Hexagonal*. In which three wefts are worked in three directions instead of being horizontal or vertical. There is no warp. Hexagonal work can be classified into two categories:—

(a) *Open hexagonal*. Here the wefts form in open hexagonal work.

(b) *Closed hexagonal*. Here the wefts make in closed six-pointed stars.

*Wicker work*. In which the warp is not pliable while the weft is pliable and is passed alternately over and under (in front and behind) the warp rod.

Check, twilled, twined, wrapped strokes may be used. The main difference between the plaited work and the wicker
work lies in the nature of the element—the warp being of lesser rigidity.

In lattice twined and lattice wrapped weaving there are several vertical non-pliable warps crossed by non-pliable horizontal warps at right angles. These are twined or wrapped as the case may be, by the flexible weft.

Coiled basketry. In this technique the work is not linked with the weaving but sewing and is usually done with a pointed implement which marks in a hole in the core i.e. the warp element through which the flexible weft can pass. The technique consists in sewing together in a flat or ascending coil or a spiral foundation. Grasses, canes, fibres, leafslips etc., materials are used for the foundation coil.

There are various types of coiled basketry:

(i) Simple oversewn. It may also be called Indian coil. Here each stitch passes over the new portion of foundation coil and pierces a portion of the coil below.

There are two varieties:

(a) Furcate. The new stitch splits the stitch in the preceding coil, a forked effect is produced giving a superficial form of chain stitch or crochet. The stitches usually lie closely side by side.

(b) Bee-skep. Here the stitches are placed widely apart, connecting the coils at intervals, each stitch passing just behind and appearing to emerge from the stitch in the coil below.

(ii) Figure of Eight. Here the stitches pass behind, up and over and down in front in the new coil, then behind, down and
out under the preceding coil. The surface shows the same effect as simple oversewn coiling, but each stitch usually encloses two coils in a figure of eight. It is also known as Navaho technique after the name of Navaho Indians.

(iii) Lazy squaw. In this the stitches pass in front and over the new coil, winding right round it once, twice or more times as desired, then it passes behind and down under the preceding coil and right up over the new coil, making the characteristic long stitch. The conspicuous feature of lazy squaw is the long stitch passing over two coils at once.

![Images of baskets and coiling techniques]

Figs. 63-65. (11) Figure of eight. (12) Lazy squaw. (13) Crossed figure of eight.

(iv) Crossed figure of Eight. It is otherwise called knot stitch. The stitch passes in front, up and over the new coil and behind, down and under the preceding coil as in the long stitch of lazy squaw, but sewing is brought out between the two coils, to the right of the last long stitch, which it crosses, giving the appearance of a row of knots between the successive coils.

(v) Cycloid. It is worked with a single element having no foundation, the coils usually of cane being coiled or looked to each other. This type is the characteristic of Malay.

(vi) Bengal coiled basketry. It is different from ordinary coiled basketry. Here the technique is allied to carpentry. These baskets are made of cane. In this there is a flexible weft element for sewing but warp or the cane core is simply coiled and is kept in position by pins. In the beginning the cane is slightly thinned after being soaked in water for a
day and a night, by a knife, to make more flexible for bending. The pins are made of bamboo strips and are trans-fixed on the cane core along the plane of the coil slightly oblique away from the direction of the coil. At the end the tip of the coil is thinned off and is inserted into the rim of the basket. When the coiling is completed the basket is further strengthened by binding with several radial strips of cane.

Figs. 66-68. (14) Cycloid, (15) Bengal basketry-jhuri. (16) Bengal basketry-dhama.
WEAVING

Weaving is a complex process and began with mats before the discovery of cotton and linen fibres. The simple tension loom, one part wound round the waist and the other fixed to a pole, is very widely distributed in the Pacific, and is still the common type in primitive Assam. Weaving was gradually perfected through several steps, e.g., addition of the heddle and the alternate raising of either part of the warp and the use of the treadle. It appears to have come into use in India very early. The modern mill has merely replaced man’s power by steam or electric energy, but there has been no real or substantial change of the different parts of the simple treadle loom.

In weaving, two series of pliable elements are interlaced at right angles to form a fabric thick according to the materials and the method. The elements are generally of spun thread or yarn and sometimes of their strips of unspun fibre are used.

Cloth is generally made of soft and pliant material in such a fashion that one series of elements is kept extended by artificial means and the other series is interwoven with it. There are two series—the extended series is relatively passive in the operational work, is known as the warp while the second series is active and woven or intertwined into it, is called the weft or woof.

The common form of textile weaving, is a plain or check pattern. In this pattern the weft element passes alternately over and under each warp element. This pattern is woven either by a single heddle tension loom or by a loom of with two heddles. Varieties of this pattern is made by making the weft pass alternately over and under an equal number of warp threads. A greater number of heddles is required to make the twill pattern. More elaborate forms are made by introducing into the texture of the fabric specially the weft threads, which form the uploops. When cut, these loops form a pile. The fabric so made includes pile carpets, push and
velvet. Sometimes a pile is inserted in the finished textile by a hand with a needle and this pattern is almost like that of an embroidery. An embroidery is a pattern with sewn thread on the finished textile. So an embroidery is the decoration of surfaces of the textile with needle work.

Weaving is a type of craft and this has been in practice since the very early days up to the modern times by a group of people known as weavers. In Bengal the weavers are designated as Tanti—a caste. But there is another group of people who practise this weaving art is known under the name of Jola community. They do not make cloth but they make varieties of napkins known in Bengal as Gamcha. This craft of both the groups of people is inherited from one generation to the other and they learn this by way of imitation and association.
TRANSPORT

When the gleaming cars whiz high ways, when the railways carry with neck-breaking speed the trains to their destination, a feeling of high achievement often inflates the ego of the modern traveller—one is going to places. The vehicles of travel and their speed would, even a century ago, have seemed fantastic, the use and construction of roads which bring the greater distances of the globe close together—belong to the achievement of man. When a path was cleared through forests, mountains and other obstacles, precious time could be won. The places where water and food abounded could be reached more quickly and the travellers were protected on their journeys to their trading places. The danger of being lost in the wilderness was considerably reduced when directions were confidently marked by road, and new areas explored and neighbours could be visited. The great migrations of men and transmission of cultural elements were facilitated by roads. Roads are of great signs of peace or war, the bonds between men and ideas since the dawn of time. Along these all important arteries the traffic between men and men, between villages and towns pulsed in the golden times as it does today. The story of great roads is the story of history itself.

In Europe the Danubian culture of prehistoric times sprang up along the banks of the proud river and become the centre of cultural exchange through the millenniums.

Africa—the dark continent was and is even today lined by a net-work of trails from the Mediterranean to the interior. The caravans have moved from the lake Chad to the north coast, from the Nile and Niger through Sudan where centres of trade attracted the merchants.

In Asia minor the road from Bagdad to Basra is of immortal memory since the tales of Arabian Nights. In America the great trading expedition of the Mayas moved every year over long distances. Early and primitive trails are not so spectacular
but they are equally old. The great rivers of the world are important determinants in the migrations of men and their goods. The great rivers of India—the Indus, the Ganges and the Brahmaputra afford the early centres of Indian civilisation. The connection of the water roads by canals is one of the primitive irrigational achievements of early man. The Emperor Yang-ti was famous for the construction of the glorious Emperor canal.

When waterways connect countries and men, they are often apt to hinder travellers who must cross them to reach their destination. To overcome this drawback and to extend roads even over intersecting waters man devised means known as bridge. Primitive men have made many devices of getting over rivers and abysses, devices which vary from the simplest to structures of great technical complication and stability. In the Himalayas primitive herdsmen have hollowed out holes in which travellers insert bamboo rungs to climb either upwards or downwards. Bamboo splits, canes and creepers are used to bridge an abyss. The simplest wooden bridge is naturally the felled trunk of a tree laid across a small brook, but when rivers are road big timber structures are erected with complicated spans balancing over forks and poles. Thus men travel over land and water, over trail and bridge to carry them along with their goods to the places of destination. When it comes to the carrying of loads, there is no man in this world who does not know some of the devices to make burden easier to handle. Head loads may be supported by wooden rings or by stuffed pads and the weight of the burden carried on the back may be conveniently distributed over the entire body by the carrying strap, the head band or tump-line. This carrying aid is specially typical of Asia and of the North and South American Indian tribes. The carrying basket used by the Khasis and the neighbouring tribes of Assam, is of great importance. In the hills as the people are to climb up in a stooping posture, the centre of gravity rests not vertically downwards. So the people face a great difficulty in carrying goods on the head. They feel it convenient to carry the load on the back. The curva-
ture of the strap of the basket is placed around the forehead and the basket hangs at the back. This type of carrying basket is also used by the labourers employed for the collection of tea leaves from the gardens. Burdens on the back are not necessarily lifeless—the Asiatic and the North American manner of carrying babies on the mother's back is comfortable for both. The primitive tribes of India particularly of Chotanagpur and Assam have also this device for carrying babies. The simplest hand luggage is the carrying net known to many men, specially in America. Today hand bags of cotton, jute, even plastic are in use by both the modern and primitive people of India for carrying goods in place of cane and bamboo split-baskets. Leather bags are its equivalent in Africa and Asia. The Dafias of North East India have similar bags made of cane slips, known locally as nera. The carrying beam or coolie yoke is of very ancient origin. The Birhors of Chotanagpur still use carrying sling (shika) made of bark fibres.

Man being an animate, was surely endowed with the capacity of locomotion from his very infant days i.e. he travels from one place to another on foot. Travelling on foot was the earliest method though this practice is even now found in many parts of the world where vehicles of any kind cannot reach. However, gradually, with the development of intelligence, some more devices were adopted by man for his travelling. Besides foot, man could travel faster by stilt—support of bamboo with a rest for foot. This is known in Bengali as ran-pa. Ran-pa was largely used in ancient Bengal. It is nothing but two separate long poles of bamboo of about 8' to 10' with a bifurcating branch at a height of 3' or 4' for each pole used as a foot rest. By this bigger steps can be taken. Sledges fitted with runners are used by the Eskimos particular for the ice-land. A loaded sledge constitutes a weight which is very difficult to move by one man. Since the beginning of time man had learnt to ease his burden by making use of the pulling power of his earliest domesticated animal—the dog. The Laps employ dogs for their sledges. Other animals—hares, elephants, bullocks, camels in the desert, reindeer in cold country are utilised by
man for his travelling giving him relief from physical exertion. Harnesses for horse are found in the *Band ceramic* period. The Manipur trailer known as *kangpote* is pulled by a buffalo. The Kukis of Manipur usually employ it for carrying paddy from the field and also for collecting fuels from the jungles over uneven or hilly areas. The practice of riding animals is of more recent date than their use for packing. But the real comfort and speed was only achieved by the invention of the wheel in the field of transport. The first archaeological evidences of the wheel date back to the Mesopotamian cultures. The use of bamboo poles for removing heavy articles gave rise, in the mind of the primitive man, the idea of wheel. Most probably the circular movement of the bamboo pieces and wood helped man in the formation of wheel. Wheel is nothing but a contrivance in which the axle remains fixed. The development of wheel cart is another achievement of transport. At first man used to pull the cart but later on animal power was harnessed in pulling the cart. There are different types of carts as well as the wheel. At first the wheel was made from a plank of large dimension. Then man began to make it from three pieces of wood (middle plank from one piece and the side parts from other planks). Then he began to loosen the weight by scooping out some portions of the wheel. In this way the development of spoked wheel came into existence. One wheel push cart or wheel barrow in China fitted with a sail is among the oldest vehicles—the two wheeled and later on four wheeled carts made their appearances. The wheels were at first made of solid blocks of wood as are found even today among the Santals of Santal Parganas. The carts of Indore and Burma tell their use also. Block-wheeled carts later on were scooped out in the middle and gradually developed the idea of spoke-wheel. Thus it can be said that the wheel is the basis of modern human civilisation. The airships flying in the air, ships and steamers plying on water, the dynamos or the machines in the factories or workshops and the cranes lifting heavy weights—all have wheels as an essential part of the machine. Beginning from a Parambulator up to a Rolls Royce
—from a bi-wheeled cycle to a tri-wheeled rickshaw—all go to prove the services rendered by the wheel.

While paths cleared the jungles for the movement of man and bridges spanned the abyss and the river, human ingenuity did not stop at the water-ways. Wherever the water ways of nature indicated a direction desirable to follow, man floated on them in boat. Before the use of any appliance, man used to cross pools and streams by swimming. The simple trunk floating down a water-way furnished the earliest and oldest means of travelling on water. The raft came into the scene—two or three pieces of wooden logs are tied together and are used by man. The Nuliya catamaran is made of three pieces of long, narrow and thick wooden logs tied together by fibre string and the raft looks almost like a boat. Rafts made of sola or plantain trees are even used now-a days in different parts of Bengal. But the sola raft or the raft made of bundles of sola (Aeschy nomene) is usually used in the marshy land and wide shallow pools mainly in North Bengal. The raft is made of two horn-shaped bundles of sola tied together by ropes of jute fibre and palm stem. It is very light in weight and can be carried by one man easily. It is propelled by a paddle and sometimes by both hands in lieu of a paddle. Bamboo rafts are also in use in rivers. But the sola raft is usually used in marshy places. The gourd raft is used on the river Jumuna near DehraDun. The raft consists of two rectangular bamboo frames. The frames are tied parallel to each other and covered with a wide meshes rope net. Sun dried number of hollow gourds are placed inside the meshes. Like the sola raft it is also light and easy to carry. It is propelled by both hands. In East Bengal (now Bangladesh) specially in the district of Dacca during rains fire-baked earthen tubs known as gamla can still be seen along the water-ways. Coracle is a kind of bamboo basket woven in open hexagonal technique, used on water as means of transport. A piece of leather stitched on the outer side of the basket in such a way so that water cannot percolate. Coracle is used in hilly streams where there are subterranean rocks and strong currents. Coracle is found to
be in use by the people of N. W. F. P. and in the rivers of Godabari and Krishna of South India. From the floating pieces of timber the simple dug-out developed. A dug-out is nothing but the trunk of a palmyra tree, a portion of which is longitudinally removed. Then the pith of the portion with greater girth, is scooped out to form the canoe having a closed end and also an open end. At the time of use, the open end is often closed by putting a layer of grass and mud across it. The dug-out used in Bengal villages particularly during rains in canals, *bils* or marshy places, is known as *donga*. Its world wide distribution makes it a universal type of early transport on water. About the most famous vessels built by primitive man are the canoes with special characters, the simple or double outrigger—as are found among the Andamanese. Canoes are dug-outs where the structure is by the addition of a few more planks of wood. Such a canoe is known as simple canoe. But the most novel device has been adopted by some tribes in the out-rigger canoes. Out-riggers are nothing but a balancing pole. A pole is laid down into water at a distance from the boat and connected with boat proper. Sometimes two out-riggers known as double out-riggers are found whose function is to balance the whole system. This represents the highest technical achievements in primitive boat-building.

Built boats are built up on both sides of a keel which is the central piece. Three planks are added on both sides and thus the thing is given a shape with a stern and a prow. The Nuliya built boat is a typical one. Besides these types, the fishermen of Bengal use two types of boats—*jaile dingi* and *bachari*. *Jaile dingi* is a small boat with a hollow inside and the hollowness is covered by small strips of bamboo. No cover is provided for the shade of the boat either from the sun or the rains. Generally one man plies this boat. The second type of boat, the *bachari* is a big boat made on the same principle. The edges of the boat from the bamboo strips are a little bit higher than the former one. A small cover for the shade is provided at the side of the helm. Two men are required on the extreme ends of the boat for plying it. In the network of
rivers of East Bengal various types of boats are also in use for actual transport on water. The smallest boat usually plying by one man is known as *taburia*. It is almost of the *jaile dingi* shape and size but a cover what is known in Bengali as *chhai* and half barrel shaped, usually of bamboo splits or reeds, is given on it. The next type is *panshi*—it is plied by two persons, one at the helm and the other with an oar known as *baitha*, when the boat is rowed by three persons it is *dopatia* and by four persons—*tepatia*. In each case the oar men are two and three respectively with a helmsman. The cover is a large one. Sometimes on it men take their seats.

Oars, paddles and helms are the accessories for moving and stearing canoes, boats etc. Paddles are generally used in canoes, while oars and helms are generally used in boats. Paddles are generally rowed by both the hands and feet but oars and helms are tied by string to the rims of the both and are rowed by hands.

There are different ways of plying boats:—

(i) *Poling.* A boat is plied with bamboo poles. This is the earliest type of power for moving a boat.

(ii) *Paddling.* The paddle consists of a flat end with a handle. The flat end pushes water backward.

(iii) *By oars.* Oars are long wooden flat pieces, which are tied to the gunwale of the boat. When rowed, it is pulled towards the body of the man.

(iv) *Towing.* The head of the boat is tied with a string and it is pulled from the bank with the string. Sometimes animal power is used to pull the boat. In Germany horses were used for towing. In East Bengal men pull from the bank o the river specially against current during rains.

(v) *Sailing.* The wind action plays the part here. The sail which is fitted to a central pole of the boat is pushed by the wind.

(vi) *By steam (coal and oil).* the recent method. Here mechanical power is used to move the boat.

On land and water primitive men have thus found ways to travel and to move about making free use of all facilities
provided by nature. Today men consider themselves masters of the roads, the rivers and of the oceans when they board their modern time giants of transport, but they must also consider that, unlike men in the wilderness who build and direct their vehicles, they must not be individually masters of the ability to transport themselves and their possessions. Since the beginning of the Air Age the ancient roads of land and water have lost their significance to a considerable degree. Flying through the skies, men have found the miraculous magic carpet about which the early travellers of the jungle could only dream.
PREHISTORIC TRADE AND COMMERCE ROUTES

It is a great problem to trace the trade and commerce routes of the old stone age times about which we have neither any written record nor any literary tradition. We are to depend on the distribution of things not made out of local materials and to trace the source of the origin of material and find out its possible distribution route through a survey of all the sites excavated in the intermediate areas. It is also possible that trade and migration routes would often coincide being selected by man for his easiest convenience carried through the paths of the least difficulty.

In old stone age times i.e., in Palaeolithic period truly speaking there was no trade among the hunting groups of people as there was no surplus products available among them. But any method of preservation of food was known to them some means would be found to carry food from one group of people to another and this would break the monotony of the food supply and the available food resources of people. If the native Australians are taken to be a survival of a hunting mode of existence which was the only possible type of life in Palaeolithic period then it seems that palaeolithic men might have also evolved some methods of barter or exchange between neighbouring and contiguous peoples.

The exchange of food from one group of people to another within a limited area there would also be a great trade in rare products which would serve as a personal adornment. These would also be prized as more durable and efficacious in the use as weapons of offence or implements to shape other objects. The use of sea-shells would be very old in Palaeolithic period as is evidenced from the perforated shells with the skeleton in Combe Chapelle. "Perforated shells of Littorina Obtusa were extensively used as ornaments by the Aurignacians of some
30,000 years ago, specially on head dresses and other apparel as well as necklaces"\textsuperscript{1}.

We know of the dispersal of one type of prized flint known as the bees-wax flint. De Saint-Venant found "Pressigny flints far away from the centre of dispersal in Indre-at Loire to Brittany, North France, Belgium, Italy and Switzerland"\textsuperscript{2}.

The accounts of travels of early explorers in North America specially of Mackenzie reveal that the Eskimos in those tracts had regular depredatory raids on Chippewayan territory coming in search of good flint. Thus a rough and vague idea of the regular avenues of human communication can be had from the fact that the migrations of the Palaeolithic men came along the well-defined tracts. So long all the regions are thoroughly explored it is a difficult task to map out the routes. But the Neanderthals and the Cromagnons had some centres of dispersal and spread over the most parts of Europe in a regular fashion.

The Palaeolithic migration—routes in Europe are not clearly traceable but we could see from the distribution of Chellean and Acheullean as contrasted with Mousterian two channels—one the pre-Mousterian spreading through Central Europe gradually to France, and the other originating possibly from Kenya across the Mediterranean in Africa and going further East through Arabia to India. The distribution of the Neanderthal types in Galilee, Tabun and Skuhl, the Neanderthal character of the Rodesian and the findings of the Mousterian types of implements from Egypt, Arabia, Gobi desert and India show the possibility of there having been one or more culture centres and the spread therefrom along definite routes.

Morgan’s map of the Palaeolithic cultures with glaciated portions of the world shows that geographical factors played the important role. The glaciation would make a great change in Northern latitudes and higher altitudes where the routes would have been much further south. From MacCurdy's maps

\textsuperscript{1} MacCurdy, Human Origins, I, p. 157.
\textsuperscript{2} MacCurdy, Human Origins, II, p. 159.
of the distribution of the Chellean and Acheullean, Mousterian, and upper Palaeolithic cultures we find definite areas or zones where the distribution is dense and well-located. From the study of the distribution areas on the other side of the Mediterranean in North Africa and Asia Minor we find the occurrences in many cases. This shows that the centre of culture of the Palaeolithic period i.e. the channel of movement had fixed definite tracts when a large area is considered. If the ethnographic connections with the Bushman paintings and the cave art of Palaeolithic France and Spain have any basis it may be said of the dispersal of peoples in Southern Europe in connection with the cultures of Kenya and Cape Colony.

With the advent of the Neolithic period along with its domestication of animals and plants, agriculture and pottery grew the sense of property and surplus materials were available for exchange. The ornaments and implements of jade in the Neolithic areas of Europe can be explained only on the ground of its being an object of barter. Jade in Europe is "accounted for making a draft on Asia, but commerce is the logical explanation of its Neolithic dissemination". Evidence of prehistoric commerce is furnished by amber. Many amulets and ornaments and also symbolic hammers and axes of amber have been found using during the later part of the Neolithic period in Northern Europe. "The first Bronze age merchants who carried metal wares into the North brought back amber which thereafter became an important article of commerce throughout Europe".

The Neolithic men had much complex life and the need was always present of exchange of one kind of commodity for another. The sphere of exchange might have been usually a restricted one or it might have been wide spread. All the different objects of the Neolithic culture may have had a long history and separate centres of origin and dispersal. The domestication of animals and plants shows that the origin lay somewhere very far from the centres of culture in Europe where we find them at times almost side by side as in the early Lake Dwellings. So every object of the Neolithic period has a
different history and the routes by which they travelled are bound to throw some light on the prehistoric route. The cattle, the horse, the pig, wheat, barley, rye, linen had been domesticated and had been some objects of value. These were imported before they were locally raised from the foreign imported stock. So also the objects of matting and basketry must have preceded and persisted in times to be used as objects of every day use or clothing even prior to weaving proper. But these perishable objects would leave no vestiges archaeologically. So the history of prehistoric trade has to begin with the tale of precious stones and metals.

Elliot Smith studied the prehistoric boat designs from Scandinavia to the Pacific regions. Sea-borne traffic however slow and primitive it might have been did and could exist among the primitive peoples. A Neolithic invention might have upset the economic structure of a region and led to a considerable barter and trade and resulted in one group of people becoming rich with that wealth which would have been considered valuable no matter whether it was cowrie shell or some staple food. The complexity of the processes would have led to specialisation and careful guarding of the secrets for a good long time when it would be a trade monopoly of a particular primitive guild. Man was a great wandering animal and if there was a common cradle from which he had travelled to the furthest extremities even in early palaeolithic period with the sledge or the canoe and still more the wheeled vehicle he would have not only migrated once in a while but also continued his mobility to and fro and carried on barter and trade in a crude way. The picture drawn by Cleland of the Neolithic life is somewhat different. "The Neolithic peoples no longer wandered from place to place but had fixed places of abode with crude but not uncomfortable huts and villages. They were nearly or quite self-supporting; they made their own cloth, manufactured their own pottery, raised crops, and supplied their larders with meat from their flocks supplemented by what they could get by hunting. Under conditions such as these, there was little incentive for trade. Each village was self-sufficient itself. If
a village was situated in a region deficient in flint or rocks needed for stone hammers and axes, it might be necessary to go long distances for it, or to secure it by barter. Small quantities of amber the Lake dwellings of Switzerland must have been secured by trade from neighbouring tribes and there is evidence that tribes in Eastern Galicia gave flint to the people of the Baltic Coast for amber. Trade such as this was chiefly confined to the community or the cultural circle, and had little effect on the general culture of the time.\(^3\)

Navarro\(^4\) notes that there is no sufficient evidence about the transcontinental trade in amber prior to the Bronze age. He further adds that if Northern amber was finding its way to the Mediterranean before that epoch it must have come by the sea route. But a maritime route between the British Isles and the Iberian Peninsula was in existence in early times. The idea of megalithic tombs was probably brought into these islands from Spain by way of Brittany and the introduction of the flat axe might probably have come from the same direction. Due to the sporadic occurrence of natural amber on the East coast of England it seems that these islands were as old as late Neolithic period and a commercial communication existed possibly over the North Sea between England and Scandinavia. The possibility of occurrence of Northern amber in Iberian peninsula is not as strange as it might seem at a first glance. Amber occurs in Chalcolithic sites of South Portugal and South Eastern Spain.

Before the introduction of the Copper and Bronze ages in Europe there were cultural interrelationships through trade in the early Chalcolithic centres of Asia. Gordon Child has tried to trace the connections of the far-spread cultures in times of the early invention of metals and slightly prior to them. From ethnographic considerations it reveals that early palaeolithic culture across the Banda deep into Australia is very old.

\(^3\) Cleland, H. F. "Commerce and Trade routes in Prehistoric Europe" (Economic Geography, Vol. III, p. 233).

The Syrian coast and also shores of little Africa were all occupied by the fishermen in Upper Palaeolithic times. Such may well have ventured upon short coastal voyages. The hoe cultivators of the interior in the course of their expansion would impinge upon the maritime communities. Mutual accommodation might result in a new economy based upon fishing and cultivation. The coastal communities, their numbers augmented by the improved food-supply thus assured, would then participate in the work of propaganda and colonisation, by maritime routes.

Early voyagers were supplied with food stuffs. The sailors sent by Necho to round Africa took in their ships stocks of grains. They beached their ships during bad season and planted grains and also awaited the harvest before proceeding. On the Nile animals specially cattle were transported from Nubia to lower Egypt by boats. The transport of a horse on water is depicted on a Minoan seal. The propagation of a culture by sea-route including the transport of cereals and animals stands as an evidence of early means of navigation.

The earliest evidence of trade in prehistoric Egypt is to be found in Badarian culture—perhaps the oldest agriculturist. They used to live in planned villages and were skilled in polishing hard stone, basketry, weaving, pottery and the carving of wood, bone, and ivory. They were also acquainted with copper. They had some trade with marine shells from the Red Sea for necklaces and of malachite from Sinai for eye paint.

Foreign relations were more extensive in early predynastic Egypt. Besides copper and malachite from Sinai and gold from Nubia, obsidian from Western Asia, coniferous woods from Syria and emery from Naxos found their way to upper Egypt. To facilitate such interconnection the Egyptians had possibly evolved a serviceable boat made out of bundles of Papyrus lashed together. With trade might be connected the alphabeti—form signs that appeared scratched in the vases which signs are found in palaeolithic marks. During the Dynastic culture in Egypt we find trade relations were more wide spread.
Proof of protodynamic interrelation with North Syria is afforded by the French excavations at Byblos where flint knives, vases and other objects of Egyptian Provenance have been unearthed. The Red Sea shells, protodynamic graves and town sites indicate the regularity of trade in this direction. Gordon Childe has pointed out that during the Elamite or the early prediluvian culture of Susa I. Commercial relations were well established to bring obsidian from Armenia to Southern Babylonia and bitumen from Central Persia, Afghanistan and Beluchistan. In the later phase in Mesopotamia and Elam with the invention of writing and the harnessing of animal power trade relations were extended to the alluvial plain and goods were exchanged with Anatolia and Egypt. The wheeled vehicles seem purely of Mesopotamian, the Egyptians and the Babylonians bartered their manufactures for the gleanings of the Beduins and occasionally sent expeditions to procure copper from Sinai. The fabrics of Egypt were in use in Elam and the industrial objects of the Babylonians were being marketed on the Nile. Caravans were travelling across the desert in Euphrates and between the delta and Syria ships were sailing.

With the rise of Sumer as a factor in the interrelation in this region we find the coming in of distant Indus valley regions in the horizon of trade. Egypt and Sumer being advanced and civilised countries had external relations by direct or indirect barter system. The first prosperity of Sumer was linked up with Indian relationship specially with Sind. Thus the direct intercourse between Sumer and Sind is attested by the import into the former region by the Indian products specially the seals. A possible reflex of the traffic in India is the bitumen used at Mohenjodaro. Commercial relations between the two advanced civilisation have been proved—"The figurines from Mohenjodaro are certainly identical with the ethnic types from Sumer in features and dressing of the hair. The daggers from Harappa belong to the same treated family as the Sumerian but to a more primitive stage. The Indus and the Sumerian beakers have the same family likeness. The cylindrical vases of silver from Mohenjodaro invite comparison with the alabaster vessels
of the same shape from Ur and Sura. The Sumerian and Indus-toilet sets are in the principle identical, and each shows the same peculiar construction of the looped head. Artistic devices like the use of shell inlays connect the two regions strikingly. Motives like the trefoil and rosette, even religious themes such as monsters are common to both countries. It is fantastic to suggest that the wheel and carts had been independently invented in both lands." Thus commercial relationship with India explains the rapid concentration of wealth. Babylon all along has owed her prosperity to her position at junctions of the trade routes to India on one side and to Syria and the Mediterranean region on the other, with the maritime route to India and Abyssinia. Thus we find that the early period trade was extensive.

Beyond Caucasian passes and on the caravan routes that traverse Central Asia had similar trade goods. Old Sumerian type gold vessels were unearthed in North Persia. In Turkestan regions yielded figurines of model carts, wheel-made vases, copper daggers, stamp seals, etc., all suggestive of Western influence. It can be said here that the trade is quite significant to explain these phenomena.

Cleland has drawn seven prehistoric trade-routes of Europe. They are—

Route I—The sea was used in the Neolithic period and possibly the mariners reached from the Mediterranean to Great Britain, Ireland and the North of Denmark before the metals were known at about 3000 B. C. When iron came into use, land routes became less important and sea trade increased due to the widespread distribution of Iron Ore.

Route II—The Elbe route was the most important thoroughfare in prehistoric times. This route was first used about 1800 B. C. and continued till the beginning of the Christian era. The amber was then transported to the South and exchanged for the Bronze of Bohemia and the manufactured bronze weapons of Italy.
Route III—The Vistula-March route became important when the amber of East Prussia was rediscovered in the early Iron age and along it a small trade was carried about 700 B.C.

Route IV—The Vistula-Dniester route to the Black Sea was opened when the Greeks established on the Black Sea.

Route V—The Rhone-Rhine route became an important artery of the commercial activity specially after the establishment of the Greek colony at Marseilles and along this the arts and crafts of the South were carried to the North.

Route VI—A route of some importance which led into Italy passed along the upper Rhine, over the St. Bernard pass.

Route VII—The Danube valley has been populous since early Neolithic times. There have been continued movements of peoples and the trade routes have traversed along it. The salt of Hallstatt and the iron workings of the early Iron age give it prominence.

Trade and commerce are not unknown to the distant seas-scattered islands. The most intrepid sea-voyagers were probably the Polynesians who scarcely emerged out of a very complex Neolithic civilisation and yet had covered thousands of miles in open sea in outrigger canoes. Similar voyages to the Malayas and the carrying of their culture to the far off Madagascar is well known, and the cultural traits in Madagascar derived from the Malayas have been noted by Linton.

Caravan routes still carrying on some of the old time-worn trade routes. Some tracts of Northern Africa had been the primitive trade and barter by these Caravan routes. The Caravan routes from India to Asia minor are the same as that followed by Alexander the Great in his invasion in the fourth century B.C. So also the routes between China and Central Asia and Europe had existed since prehistoric times. The classical road between China and the West still survives in the
great name of Imperial highway. There were similar sea-routes from the sea coasts of Bengal and Orissa to Java and China coasts as known to us definitely from Fa Hien and Yuan Chwang's return travels or regular Arab-Indic trade between Africa, India and Arabian sea and the Persian gulf routes as we know from the Periplus.

Thus by different lines of enquiries we can get a full picture of the trade in prehistoric times prior to history. We have to trace the history of routes of navigation and even such studies as the culture dissemination from Central America to the distant parts of North and South America may lead us to new trails. We then get a picture of interchange of commodities in the hunting stage if possible but very likely in the nomadic stages and surely amongst the communities where agriculture has set in. The dynamic conditions which lead to the quickening of the activities and relations abroad at times and again mysteriously slackens them at a decadent period have got to be found out by a study of these. When the body is growing the circulatory channels become deepened and widespread. With the shrivelling of the organism again the channels become constricted. It is the index of the growth of a group and it is seen that even the most primitive material culture in a state of expansion would not start intertribal exchanges and might have its ramifications far-flung. Migrations may precede as well as succeed routes which have been casually opened up by a casual traveller returning with a valuable or a new commodity by exchange or primitive presentation system from abroad.

Trade was slower especially where the slower means of transport was existing in early times. But the Polynesians have shown what could be done by the early primitive sea-craft which was known as early as the Neolithic times. The different means of transport and the different primitive economic systems again made lot of difference to the trade. The object of common value whether a cowrie shell or a stone or a yellow metal supposed to have magical properties in early times or a whale teeth or even a cattle whenever found indicates trade conditions. Barter even
of excess food of one type for food of another type between communities might have been very much more in use than known in later times. Art products had an enormous value in settling intertribal relations in primitive communities and it is hardly known whether the Magdalenian batons de commande- ment did serve the same purpose as the Polynesian whale teeth and stood for bodily transfer of the prestige from one group of people to another.
CULTURE AND ITS ASSOCIATES

Culture is the sum total of human behaviour, verbal and non-verbal, and its products, material and non-material. It is very often referred to the life of a people as their culture. Culture is also used to convey various meanings. In a general way one uses culture to convey social charm and intellectual excellence. So Matthew Arnold has said of culture as 'sweetness and light'. Some use the term 'cultural elite' for the intellectual leaders of a society. The sociologists like MacIver and Sorokin have used the term culture for the moral, spiritual and intellectual attainments of man. According to David Bidney culture stands for the products of argofacts, artifacts, sociofacts and mentifacts, i.e., culture is the production of cultivation, industry, social organisation and language, religion, art, etc.

Sanskriti is a Sanskrit term for culture. The term Sanskriti is derived from Sanskar, meaning ritual performance. When one is born, he or she goes through various ritual performances as a result of which he or she is accepted into the various roles, like that of an adult or an old or in one word manhood in the course of his or her life. The state of collective life through which he or she has to go by the performances of various rituals—Sanskar is Sanskriti. So Sanskriti is a process of refinement from one stage of life to another.

The anthropologists have used the term culture in different ways. Tylor was the first anthropologist who defined "culture is that complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities acquired by man as a member of a society". Here he has given emphasis on social heritage and gift of society to an individual. I am inclined to say that heredity and learning from a group are the processes by which the behaviour of organism is determined. In man heredity contributes such behaviour of sucking and swallowing—being a biological process of transmission; while the behaviour like speaking a language and wearing a cloth is learned from others—a social process of transmission based on the capacity
of man to learn. Transmission of behaviour by learning is found among the animal world but the absence of speech among them, limits the amount of acquisition. Man alone has this acquisition.

Redfield defines culture as "an organised body of conventional understandings manifest in art and artifact, which is persisting through tradition, characterises a human group". Summing up both Tylor’s and Redfield’s views on culture it can be said that Tylor has emphasised on ‘capabilities acquired by man as a member of society’, while Redfield’s point stands for ‘persisting through tradition’. The important factor in this acquisition through tradition is the ability to learn from the group. But Lowie means culture as ‘the whole of social tradition’.

Malinowski has pointed out that social heritage consists of both material and also non-material parts. In short his saying is that culture is the total way of life and the instruments, mental, social and material, of which this way is made. So on the one hand one has social culture and on the other material culture. This view has been taken and modified by Biddney who has defined culture as the product of argofacts, artifacts, sociofacts and mentifacts. This means culture is the products of cultivation, industry, social organisation and language, religion, art, etc. Radcliffe-Brown like Malinowski has taken the instrumental, humanistic view of culture but he regards culture as cultivation, the process of handing down and acquiring traditions, as a result of which society exists.

Linton, Kluckhohn and Kroeber have said of culture on the plane of subjective nature of human understanding. According to Linton culture is an abstraction from the reality which is the actual human behaviour. He has used the term ‘social heredity’ for culture. Kluckhohn describes culture as a way of thinking, feeling and action, and Gillin and Gillin make it more clear that culture is not activity but its patterning. They note for a culture as “Each group, each society has a set of behaviour patterns which are more or less common to the members, which are passed down from generation to generation
and taught to children and which constantly liable to change. These common patterns we call culture. Benedict stresses on the patterns of culture and not its contents.

Kroeber has said that culture "would include speech, beliefs, customs, arts and technologies, ideals and rules. That, in short, is what we learn from other men, from our elders or the past, plus what we may add to it'".

"Culture is the socially transmitted system of idealized ways in knowledge, practice and belief along with the artifacts that knowledge and practice produce and maintain—as they change in time"—as has been defined by Green.

Bose speaks of culture "as crystallised phase of man's life activities. It includes certain forms of acquisition closely associated with particular objects and institutions; habitual attitudes of mind transferable from one person to another with the aid of mental images conveyed through speech-symbols".

Language is the vehicle by which culture is transmitted. Man can inhibit present, past and future by language i.e. he can build on what he has got from the past, and can also transmit present and additions to the future.

Records are made and preserved on stones, fire-baked clay and metals from the very early days of mankind. Culture can accumulate little by way of knowledge and technology. But culture becomes civilization only when written language comes into existence.

All cultures, primitive or modern whether of hunting, pastoral or agricultural pattern, contain the same types of economy, education, lands, folklores and songs, and institutions, in a sequence of organisational complexity. Cultural universality is also expressed in similarity in function. This is based on two factors:

1. Man being a biological species—his food, clothing, shelter, family life, etc., may all vary but they represent universal and basic needs.

2. Survival of man in all places and times—his economy, social control, education and political organisation and religious beliefs and practices, etc. Basic
points are universal but differences may be noted between a developed and an underdeveloped society.

From Tylor’s definition of culture it is evident that culture consists of commonly accepted and expected ideas, attitudes, values and habits of individuals which they learn in connection with social living. For the individual in his early years of life, culture is an aid to learning, to get on more effectively in the world. Each new generation is learned how to adjust to the physical and social world mainly from their progenitors. Gradually this new generation passes on to the next generation what it has learned from the previous one and what it has added to the cultural whole. Young and Mack have used three words—‘Shared learned behaviour’ for culture. Behaviour includes thinking, feeling and action. So any behaviour is part of a culture only when it is shared by the most members of a group. If only one person uses a necktie among the Santals of Santal Parganas, then this behaviour is not a part of Santal culture. Most of the Bengalis arrange their hair with a comb when they go out of their homes; this behaviour is then shared. This is a part of Bengali culture. By learned behaviour one means more than attitudes and ways of acting which are formally and consciously taught. Any behaviour which is socially acquired, which comes to one through participation in a human group, is learned. Of course certain behaviour is determined by inheritance. Such behaviour is not cultural. Hunger for food is not culturally learned, but thought of fried rice or sweets as satisfying or of bitter vegetables as repulsive, is acquired and is a part of culture.

It is a difficult problem to note the importance of culture as a determinant of human behaviour. One is more likely to over-emphasise the effects of heredity or the physical environment than he is to recognise how a large proportion of his behaviour is composed of shared ways of doing things learned in a social environment. Every man likes to think of himself as a quite unusual individual. Still he needs to look about others at the kinds of food eaten, types of clothing worn, the forms of greeting used and many other components of culture with respect
to uniqueness. The differences which one notes are small ones and within the ways of behaving expected and accepted in his society. The tastes in clothing and the most of the behaviours are shared and learned. They are in large part of culture.

In short it can be said that culture is a precipitate of human society. It is shared and learned behaviour. Man is the only animal that possesses culture, the two most significant features of which are language and tools.

Culture has something of an attractive quality of a rainbow and it is also elusive in nature. It is not necessary to know what the word *culture* means in order to enjoy cultural activities, any more than a knowledge of optical theory is essential to the appreciation of a rainbow. All human beings, even the most primitives, have acquired some degree of culture. Oral tradition is still the only source of culture for the vast majority of people in the world as they are unable to read. Besides the bare necessities such as food, shelter and clothing in the forms of appliances, tools, weapons and garments they have some ceremonial side to life to mark occasions such as birth, marriage and death. Sometimes they have some symbolic representations or decorative arts. In recent years the study of these primitive cultural manifestations has been intensified by the anthropologists.

The cultural quality of life is an aspect or condition of life, not the whole life, just as a rainbow does not appear every day. Some primitive tribes are alive in a biological (animal) sense, but their cultural interests are so little that they seem relatively negligible. Such people begin to acquire culture and it will change the nature or quality of their lives. Culture when takes the form of music, song, dance, painting, carving, reading or writing, will add new interests over basic or animal interests of eating, drinking, sleeping, hunting, fishing and all other routine activities, mainly for biological existence.

The material objects like digging stick, hoe, and other tools and household equipments, etc., of the primitive peoples hardly merit the description of cultural achievement in the sense to which the word *culture* is understood in contemporary civilized
societies. Such objects add meaning and value to life and they qualify as cultural. These tools, equipment and machines, the means of production today, did not do more than add utility rather than meanings and values of life. As instruments increasing human efficiency they are culturally neutral. They provide means, not the ends in which culture is alone interested.

The tools, instruments and utensils sometimes enlist much human interest and by this they acquire some cultural interest for their own sake generally of an aesthetic nature. This instrumental use is then lost or overlaid by the new cultural interest.

Technology is not to be despised because utility is excluded or subordinated, so that it is not to be found among the main kinds of value to make up the idea of culture. On the other hand technical achievements and technical knowledge have largely influenced life in the modern world that if technology be ignored or excluded by a theory of culture, a long range of thought, effort and action cannot be understood. Every educated person be he a child, adult or an old must now acquire a considerable knowledge of technological matters if they are to be attuned to the culture of their times.

Sometimes satisfactions of a high cultural order are derived from a devotion to technology and to technical development. There are cultural satisfactions as these arise from a strenuous devotional search for scientific knowledge upon which technical achievement and its progress are laid as foundation. So technology is cultural:

1. cause of truth and knowledge;
2. success in the creation of efficient, functional machinery and artifacts often yields aesthetic satisfactions;
3. cause of beauty is served by some of its creations as it has been often met with in many industrial areas.

Thus technology serves to promote moral worthiness by virtue of self-discipline, self-forgetfulness, spirit of co-operation and team work which are the door keys for achievement in technological activities as in other cultural pursuits.
Cowell in summarising the definitions of culture has expressed his feelings as—"culture is that which, being transmitted orally by tradition and objectively through writing and other means of expression, enhances the quality of life with meaning and value by making possible the formulation, progressive realization, appreciation and achievement of truth, beauty and moral worth." From practical point of view the above definition holds good for culture but at the same it has to be taken into consideration that culture is not something which can be made isolated or pieces as it was. Culture essentially arises like a rainbow and also like human health and happiness as a by-product. It is to be acquired in the disinterested pursuit of forgetfulness of all self, of all stock of knowledge and all that makes the world more agreeable and beautiful for everyone.

Culture is the way of life of the members of a group or a society; the collection of ideas and habits which they learn, share and transmit from generation to generation. Culture provides the members of each new generation with problems. These problems stem from the needs of individuals living as members of organised groups. Such needs are practical and psychological. The practical needs are met to insure the physical survival of the members of a group or a society and the perpetuation of the group or the society as a going concern. The psychological needs are met to keep these members happy and contented. If the culture of a society or a group fails to provide satisfaction for both the needs it cannot have its existence for any length of time.

The practical and the psychological needs are interrelated and they provide a motive power which keeps cultures operating. They are also responsible for the growth and change of cultures, but their knowledge does not help much in the understanding of the structure of cultures. The patterns of behaviour which a group or a society transmits to its members in such a way that they contribute to the satisfaction of several needs. Thus wearing of clothes in winter to keep warm is the practical reason, but at the same time people in all groups or societies derive a high degree of ego satisfaction from the feeling that
they are well dressed. So which one of the motives with respect to dress, to keep warm or to make good impression, is dominant, stands as a problem. Here one depends on the circumstances. Thus culture as a whole satisfies the needs of the group or the society as a whole.

Groups or societies, like individuals, tend to be much more interested in somethings than in others. So cultures grow and spread in the direction of their interests. Groups or societies do not invent or borrow but their members do. Inventions are along the lines in which the group or the society is primarily interested. Thus inventions which are along the lines of the dominant interests of a group or a society have a better chance of being accepted and incorporated into the culture than those which are not. The same thing is for borrowing from other groups or societies. Borrowing is one of the most important processes of culture growth. People borrow things that are interested in while ignoring other things seemingly of much greater advantage.

As cultures tend to grow irregularly in certain directions and lagging in others so it follows that when one studies a culture at any one point in time it seems disharmonic. Cultures can be compared to growing children, disproportionately long in the body at one stage of their development and disproportionately long in the legs at another. Number of examples from the primitive cultures can be cited by the anthropologists. Here are few examples:—The Andamanese or the Birhors are satisfied with their simplest type of technological equipments and they live in happiness to which one regards as a level of extreme discomfort and insecurity. But they have elaborate arrangements of their social organisation regarding marriage etc. The Ao Nagas have developed a complicated system of rank in age-grade but they display a simple form of their religious activity. The Americans have concentrated on technological development until an average middle class home of their society is a mass of mechanical gadgets of much utility, but they are recently indifferent to their social problems.

Two factors limit the distance to which such one-sided
development can be carried. The first one is the increasing disharmony produced within the culture by extending one aspect farther while failing to think and use ingenuity in developing other aspects to the same balancing point where they work in a situation created by over extension. This is just like human system as all the limbs do not function in one direction. One limb works efficiently and the corresponding limb remains lagging. Specialisation in one branch makes almost blind in another. The other one is more or less a corollary of the first one. The techniques of production in any society set definite limits to the development of its culture in other directions. The most prime needs of any group or society which may be attributed as the pressing needs are food, shelter and clothing. The ways in which these needs are met stand as the foundation of every culture. A group or a society discovers the realities through these needs. So technical processes are potential and they are no more stable than any other part of culture. Human history can be written in terms of technological growth and improvement. In human society the interest in technology is no more a constant feature than the interest in any other activity. So all technologies of the groups on the societies which practise them, are adequate as long as they provide for their material needs.

Technology refers to the methods which any group or society has developed for dealing with its natural environment. From the cultural limitation point the techniques for producing food and other necessities are their important limbs. Other aspects of a culture may not interfere with their successful operations. So technological determinism is not to be confused with the theories of economic determinism, which cannot be distinguished between the actual techniques of production and the regulations regarding ownership and distribution of a group or a society. A particular set of techniques of production may be linked with any one of several systems of ownership and distribution. The Russians and the Americans use the same technological equipment and methods of production but the patterns of ownership and distribution differ. Among the
primitive peoples it is found that the same techniques of production are linked in different groups with individual or group ownership of resources, with a system of gift exchange, money economy or a system in which the surplus is distributed among the rest of the group by the headmen as needed. Each of these systems works well as long as there are sanctions of the group or the society for the assurance of the necessities of life.

By the use of technology ignoring minor changes and improvement in specific processes, the fundamental changes occur are few. It is curious to note that the same fundamental inventions are found to have been made at different times by the groups or the societies living in different parts of the globe. Thus the development of civilisation in the Old World and the New World shows a greater number of similarities which were surely not due to contact. This process is attributed to parallel evolution. In each case where such fundamental changes in technology have occurred they have been followed by rapid and far-reaching changes is other aspects of the culture. In the evolution of culture such basic technological advances play the same role as the fundamental mutations which occur on occasions in the evolution of living forms. They start with a nucleus point for development and variation which result in the production of new forms greatly different from any which have existed before. "These seem to have been only three of these fundamental mutations in human history, but each of them had far-reaching and long enduring consequences"—as observed by Linton. The first basic mutation came at a very remote time and it consisted of the development of tools and use of fire. The second one came with the invention of food raising. The third one is the basic changes in technology. It springs from two fundamental inventions, (1) that of how to produce power and (2) that of the scientific method.

The present technological advance like those of the past, has opened up a wide range of possibilities for social and cultural reorganisation. As has already been pointed out, for any successful endurance, culture must provide satisfactions for man's psychological as well as his physiological needs.
The anthropologists have used the term culture as the sum total of man’s products and activities. So the culture of a man comprises the sum of all his activities, customs and beliefs. The physical, the social and the religious are the three categories in them. The first one i.e. the physical deals mainly with material things or elements like food, clothing, huts, implements, arts, etc., so the anthropologists have designated it as material culture. These elements of culture are tangible. They are open to observation and capable of preservation when comparing with the non-material and more perishable social and religious factors. Social groupings, marriage, customs and political organisations are the features of the social while religious beliefs and practices are included in the religious category. Each of these main categories into which culture is divided, comprises of a number of cultural elements or traits. Thus in material culture pottery, weaving, bow, shoe, tattooing and then writing are cultural traits. Therefore any complex or developed culture can be analysed into its component traits and every culture consists of a lesser or greater number of such traits. In fact, culture can be analysed into its component traits and every culture consists of a lesser or greater number of such traits. These can be developed individually either slowly or rapidly, or feebly or strongly. The analysis of cultures into component traits helps one not only to compare cultures but to enquire into their origins and growth. When comparing between a lower and a higher culture the first thing for consideration is that a lower culture differs from the higher in having lesser number of traits and traits of lower stage of development.

To find out the origin of culture one is to find out first of all the number of traits of which the culture is composed of and to trace its growth he is to observe the processes by which a new trait is added to an old trait. This produces the whole garment of the culture from that of a lower one to the developed. Enviromment, diffusion and race are the primary factors for the origin and growth of human culture.

A culture has many facets like culture trait, culture complex and culture centre or focus.
Culture trait—If one looks at a culture as a total functioning system, he can break it down into its simplest units, which are called traits. A trait is either a single custom or a custom plus equipment. Take the example of tying of shoe lace. It is a trait of a culture of a people who puts on shoes. It involves customary activity and artifact. It is patterned and the pattern implies a series of motions.

A unit of a tribal culture is spoken of as a trait. This term also implies to mannerism and to concepts of any kind. Thus the custom of a man marrying his wife’s sisters may be observed and if so, is set down as a trait of the tribal culture.

Culture complex—Traits are seldom observed in life as independent entities. These simple units of behaviour are almost invariably linked together in human organism into functional units of response, which may be called complex. The example being the act of kicking a football is combined with a great many other unit traits of behaviour to make that complex, which one knows as a football game.

If one means by trait a unit in the tribal culture, then he must find out the nature and characteristics of this unit. It sometimes seems to have regarded traits as similar independent units, to be scooped up in the tribal measure and dealt with as a mere collection. Yet when it is carefully scrutinised a trait is found not a clean cut unit but a kind of complex. The name is usually given to a chain of activities known as trait complex. Some of the known trait complexes are head-hunting, riding on horse-back, turning the wheel, etc.

Culture centre or focus—Culture centres are the sources from which spring new cultures. The central part of the culture area may be regarded as the central point of dispersal or the centre of influence. In the distribution of pottery, Nelson discovered that the radii of distribution varied with the time. Thus the traits confined to the small central section were the oldest, while those reaching the outer zones were of recent origin. He was able to prove this absolutely since at the centre he found stratified deposits, one style of pottery above the other, the time relations for which were obvious.
It follows then, that in this case, the centre of the area was not only the point of dispersal, but the point of origin, in the usual acceptance of that term. One is therefore justified in assuming that the true culture area is a succession of distribution zones encircling a nucleus and that this centre is a point of dispersal from which trait complexes are diffused.
THE ROLE OF DISCOVERY, INVENTION AND DIFFUSION IN CULTURE CHANGE

Discovery and invention are the two major processes for the study of cultural growth and change as new elements can be added to the total content of man's culture by these processes. Developed cultural traits are transmitted from one culture to another and most cultures owe a major bulk of their contents to these processes. Every culture is ultimately traced to a discovery or an invention or to a more or less complex combination of various discoveries and inventions which sprang at a particular time and place.

In the early times elements of culture are only referred to as discoveries or inventions but they are still novelties. No culture element is classified as a discovery or an invention after it has achieved general acceptance. Thus the use of cloth in a Bengali society does not refer to as an invention except in connection with some research work into its early history. But the new cultural feature of radio or television is always referred to as an invention or when certain of its principles are under discussion, as a discovery.

Both discovery and invention mean to carry a further implication of being elements which have originated within the bracket of a particular combined society and culture. An element which one society borrows from another is never a discovery nor an invention of the receiving group. One recognises American, German, French or English discoveries and inventions even though he disputes the priority of these over similar ones made in his society. So a discovery or an invention is regarded as having a direct genetic relationship to a particular society and culture. It is nothing but something which originates with a member or members of this society and which assumes form and function always in relation to the culture of that society. Such elements are distinguished by these factors from the borrowed ones. These borrowed ones come to a culture with form and functions already developed.
and these are modified to integrate them with their new cultural context.

Besides these common features for discoveries and inventions, it remains to establish a real line of demarcation between the two phases of phenomena. The most current view of distinction is based on motivation and it makes discoveries a result of accident and inventions a result of intention. This is not tenable now and is far from satisfactory. One often speaks of the discovery of a new chemical element, the process which goes in making this discovery is as intentional and fully motivated as the invention of improving features of a phonograph.

In a discovery which is accidental in nature and the important factor from the cultural aspect is not a mere recognition of an unknown phenomenon. This can be illustrated as an example. that a kind of black stone known as Coal, burns, but the perception of this is observed in a phenomenon and a realisation of its potentialities for use. So long there is this application of rational processes, a discovery remains an isolated scrap of information. Such information is then a part of the total knowledge—culture. It is transmitted by a society but it has no social significance. The knowledge here is a latent element in one’s culture. It becomes an active functional element when one inventor discovers a method of combining this knowledge with other knowledge to produce a socially significant result.

A discovery is the perception of previously unnoticed relations existing between the aspects of nature and of their significance for human life, as for example the perception that the copper ore on melting can be shaped into tools or appliances, or the discovery of the sea route to India around South Africa. An invention is the establishment of old elements into new relationship, as for example the placing of stone-tip on a reed shaft to make an arrow. Both discovery and invention require the ability to symbolise relationships-and results mentally which are not immediately obvious; they are often the products of symbolic trial-and-error learning. The inventor and the disco-
verer provide in part these new ways of doing things and new forms of thought. But the inventor and the discoverer are subject to the influence of their socio-cultural environment.

One defines a discovery as any addition to knowledge, an invention as a new application of knowledge. This can be illustrated with a concrete example of an individual rather than a social basis. When a little child pulls a dog's tail and gets scratches or bites, this particular sequence of cause and effect is a discovery as far as the child is concerned. The observed truth that the dogs scratch or bite when their tails are pulled is an addition to his store of knowledge. If the child pulls the dog's tail when someone else is holding it, so that that person gets scratches or bites. This is in the nature of an invention. The knowledge is utilised in a new way to get a particular end. So the application of knowledge, i.e. invention is functionally important to culture. Hence all new active elements are developed within the frame of a particular culture and society as inventions.

There is always an intimate association between the inventor and his products and also the cultural setting in which the inventions are produced and function. As per the definition of an invention—a new application of knowledge, it implies that the knowledge always precedes the invention. The knowledge incorporated into a new invention derives in part from a fresh discovery, and most of it always derives from the culture of the inventor's society. Every inventor builds upon this stored knowledge and every new thing grows directly out of other things which have their existence before. So no inventor nurtured in a culture which was ignorant of the principle of wheel could produce even such simple appliance as the potter's wheel. The wheel is to be invented first. The content of the culture in which the inventor works thus imposes always limitations upon the exercise of his inventive abilities. This is applicable not only to mechanical inventions but also to inventions of all other fields. The mathematical genius also carries on from the point which mathematical knowledge within his culture has already reached. Thus if Professor
Satyendra Nath Basu had been born in a primitive tribe which was unable to count beyond nine or ten, life-long application to mathematics probably would not have carried him the development of a decimal system based on fingers. So also the reformers who attempt to devise new systems for society like Raja Rammohon Roy and Pandit Iswarchandra Vidyasagar or new religions (in the case of Christ, Mohammad, Sri Chaitanya) can only build with the elements with which their culture has made them familiar. It is not fair to make any attempt in understanding the form and the content of such sects as Christianity, Mohommedanism, Hinduism etc., unless one knows the cultural background from which they sprang.

The culture not only provides the inventor with appliances which he uses in invention but also controls, to a large extent, the direction of his interest. An evaluation is an integral part of all cultures. This differs from one culture to another.

Another influence which a culture exerts upon invention is that of selection. Culture dynamics indicate that successful invention is simply the one which is accepted by society and incorporated into culture. The acceptance seems to be controlled much more by the factor of the society’s directed interests than by any factor of practical utility. A society does not accept a new invention simply because it works better than something which the people already have if it lies in a field which they consider unimportant. The real gain does not seem to them to be sufficient to repay for the troubles of changing the established habits or making other alterations in other elements of culture which the acceptance of any new element always entails. So a society which has existed contented for generations on a hand-labour basis and fixed its attention on speculations regarding the nature of the world and man’s relation to it usually feels no great urge to adopt labour saving appliances, even those which yield a high degree of efficiency. It feels still less urge to accept them while they are still subject to occasional breakdowns and uncertain performance which attend the early stages of most inventions. The non-acceptance
of a motor tractor for tilling the agricultural fields by the
Indian farmers might be attributed to this as one reason
besides their social traditional bias.

Invention has become a focus of interest as long as it
confines itself to mechanical lines. Social and religious inven-
tions are still frowned upon, but this attitude is changing as
the necessity for advance in these fields becomes increasingly
apparent. There has been a time as revealed in history when
individuals were afforded a better opportunity to add to the
material aspects of a culture. It is a surprise that in many
societies few inventions survive to be actually incorporated
into culture. Every invention has been successful in the
cultural and social sense but there have possibly been over a
thousand which have fallen aside. Many of these have been
successful in the practical sense, being actually more efficient
than the appliances which were used before and continued to
be used after. However, society rejected them, and if they
have not been completely forgotten they survive simply as
antiquarian curiosities in the form of museum specimens.

There are few cultures which can show more than a mere
handful of traits which have been invented by members of the
societies which bear them. All cultures have grown mainly
by borrowing.

It has been observed how a particular culture within which
any inventor works directs and circumscribes his efforts and
determines whether his inventions will be accepted socially.
For this the number of successful inventions originating within
the confines of any one linked or contiguous society and culture
is always small. If every human group had been allowed to
grow by its own unaided efforts, the progress would have been
so slow that it is a doubtful affair to note whether any society
by now would have advanced beyond the level of the Old
Stone Age. The growth of human culture as a whole becomes
rapid due to the ability of all societies to borrow elements from
other cultures and to incorporate them into their own. So
transfer of culture elements from one society to another is
called diffusion. It is a process by which man is able to pool
his inventive ability. Invention is made and accepted socially by diffusion. It is then transmitted to an ever-widening group of cultures and in course of time it spreads to the whole of men.

Diffusion plays the role of a double contribution to the advance and progress of man. It enhances the growth of culture as a whole and also enriches the content of individual cultures. These bring the societies to move both forward and upward. It accelerates the evolution of culture as a whole by removing the necessity for each and every society to achieve perfection in each and every step in an inventive series for itself. Thus a basic invention made at one point ultimately brings the attention of a number of inventors and its potentialities for use and improvement. For this more minds are put to work upon each problem and the acceleration on the process of culture advance is made. The rapid progress during the last decade is mainly due to easy communication and the techniques for ensuring the inventor the economic rewards of his labour. Any invention of the present day time is quickly diffused over a long range of area and it becomes a part of the store of knowledge available to many of the inventors. Before the development of the present condition it took long times for any new element of culture to diffuse over the same area to which it is now extended within a very short time.

The slow cultural advance or progress of a society is left to its ability. This can be illustrated by the conditions in an isolated human group. The Birhors of Chotanagpur, the wild Kharias of Dhalbhum and the Tasmanians of Tasmania stand for an outstanding example. These people were cut off from the rest of the human group for a long time. When they reached the area of their habitation they seem to have had a culture of their own. This in their material development roughly speaking corresponded to those of the early primitive men of the Old Stone Age. They were still in this stage when they were made to contact with the missionaries, civilians, reformers and others during the later part of the eighteenth and the early part of the nineteenth centuries. During these long
periods of isolation they made some minor advances and progresses but their lack of outside contacts was reflected very much in culture lag. Their isolated condition with their unaided effort contributed little to their culture. From this it can be said that the more opportunity for borrowing any society has the more rapid its cultural advance or progress will be.

The service of diffusion in enhancing or enriching the content of individual cultures plays an important role. Possibly there is no culture extent in the modern world which owes a fragment of its total element to inventions made by the members of its own society. To-day every man lives in a period of rapid invention. He is apt to think of his own culture as mainly self-created, but the role of diffusion plays in its growth and progress. This brings home to him if he considers the beginning of the day of the average man.

It is quite natural to point out in this context how a man gets his cultural elements from others by way of diffusion. A Bengali gentleman on entering a restaurant is confronted with a new series of borrowed elements. First his plate is made of a form of pottery invented in China. The knife he uses, is of steel, an alloy first made in South India, a fork a medieval invention and a spoon a derivative of a Roman origin. He takes a cup of coffee, an Abyssinian plant, with milk and sugar. The idea of milking a cow originated in the Near East, while sugar was first made in India. With coffee he takes a cake made by a Scandinavian technique from wheat planted in Asia Minor. As a side dish he takes an egg of a species of bird first domesticated in Indo-China or thin strips of flesh of an animal domesticated in Eastern Asia which are salted and prepared by a process developed in Northern Europe. When he finishes his palatable dishes he settles back to smoke, an American Indian habit, consuming a plant domesticated in Brazil in either a pipe, derived from the Indians of Virginia or a cigarette, derived from Mexico. Sometimes he may attempt a cigar transmitted to him from Antilles by Spain. While smoking he reads the newspapers of the day, imprinted in types invented by the ancient Semites upon a material invented in China by a process inven-
ted in Germany. He then goes home on payment with coins, an ancient Lydian invention. These refer only to the origin of points of various culture elements from which the Bengali gentleman obtains materials or objects through trade. But though he is diffused in culture elements under the principles of borrowing he always identifies himself as a true Bengali.

All societies represent the end results of many different experiments carried out by nature. Groups that have gone largely their way without being absorbed in the great civilisations of the West and the East show one the variety of solutions which men have worked out for perennial human problems and the variety of meanings that peoples attach to the same and to different cultural forms. Contemplation of this vast tableau gives one perspective and detachment. By analysing the results of these experiments, the anthropologist also gives one practical information on what works and what doesn’t. Thus the only limit to ones realisation of to-morrow will be doubts of to-day.

THE ANDAMANESE

South of the mainland of India in the Bay of Bengal there is a chain of islands from Cape Nigrace in Burma to Auchin head in Sumatra, known as Andaman island. It consists of great Andaman, little Andaman and a number of small islands. It looks like a series of low hills. It is densely covered with tropical forest from the top of the hill to the coastal line. The climate is hot and moist.

Racially Andamanese belong to the Negrito stock. They are also known as a race of pigmies. Their stature is 1845 m.m. The skin colour varies from bronze to dull sooty black. They have scanty body hair. Their head hair is short and woolly. The head is small but brachycephalic. The face is broad, eyes are prominent and the nose is much sunken at the root with straight and small size and is platyrhine.

The Andamanese are divided into two main groups—the forest dwellers and the coast dwellers. The forest dwellers live mainly in the forests and they are seminomadic. They have a traditionally fixed region in which they move throughout the year. The coast dwellers are more nomadic than the forest dwellers. This is possibly due to better facilities of transport enjoyed by them. They move from one place to another with their belongings by the canoes made by them. But the forest dwellers carry their loads on their shoulders. The forest dwellers have a main camping ground where they pass their rainy season. During the summer and the winter times they move from camp to camp. In former days their main camping places had circular beehive communal huts. But these have practically disappeared and have been replaced by individual family huts. When a group of individuals go out for hunting
and fishing they build temporary shelters which are known as wind break type of huts. The ordinary hut of the Andamanese is constructed on four posts with one sloping roof covered with palm leaf mats. Two types of village are found among the Andamanese. In one type the huts are placed side by side touching one another facing behind. In another type the huts are placed in a circular fashion facing inward and the open space in the centre is used by them as the dancing ground. Sometimes this open space is covered on the top.

The Andamanese are a hunting and food gathering people. The knowledge of food producing activity is not known among them. Domestication of animal was not even known to them till the middle of the nineteenth century. The first domestic animal dog was introduced to them in 1858. They collect roots and tubers and hunt in the interior of the jungles and fish in creeks and sea. They use pointed wooden digging stick for collecting roots and tubers and employ hooked pole for gathering fruits from the jungles. Bow and arrow are used by them for catching fish. The women use small nets to catch prawns and the men larger ones to secure turtle and larger fish. Originally they had no hunting spear and harpoon. Now they have some which they sometimes poison to stupefy both fish and animals. Traps and hooks are not known to them even today.

The Andamanese are now making the use of iron for cutting implements. Probably they have learnt the use of iron before the end of the eighteenth century when they received this from the ship wrecks on their coasts. Before this they were not acquainted with the use of any metal. Most of their tools and implements used were of bone, shell and stone. They used quartz and flakes to scarify their skin which even now they practise. Shells were used for making knives, scrapers, spoons, plates and adzes. Bones were used to make the points of fish arrows.

The Andamanese did not know any method of making fire. Now they use matches brought from Port Blair. From the Burmese and the Nicobarese some of them have learnt a method of producing fire by friction of bamboo splits. Originally they
used to keep fire on earthen pots and to carry it on the occasions of their movement. They make earthen pots and dry them in the sun and then bake them in fire. These are all handmade pots as the use of wheel is not known to them.

The Andamanese have three types of canoe made from the trees locally available which are scooped by fire and adze. The types of canoe are—(1) canoe with one outrigger propelled by paddles or poles; (2) canoe with two outriggers propelled by paddles or poles; (3) canoe without any out rigger propelled by oars.

Clothing is unknown among the Andamanese, but they wear girdles round waist from which strings of shells or shreds of leaves are suspended. Now the natives of great Andaman wear clothes obtained from Port Blair.

THE TODAS

The Todas are a pastoral group of people and known as the pastoral buffalo herders of the Nilgiri hills of South India. They live on the undulating plateau of the hills. The plateau is formed by the meeting of the Eastern and the Western Ghats. The total area of the plateau is about 500 square miles and is occupied by the Todas—a buffalo herder; the Badagas—an agricultural tribe; and the Kotas—an artisan tribe. The Badagas supply the Todas food grains and other farm products while the Kotas supply pottery objects to them.

The climate of this region is salubrious. There is heavy rainfall during the monsoon which causes the grass to grow in abundance and forests flourish. But during the dry climate from December to March parches the grass.

Ethnically the Todas are an anomalous group ‘who have a rich brown colour’, as stated by Haddon. They are tall with dolichocephalic head, leptorrhine nose and with profuse growth of hair both on face and body. Some believe that there seems to have some connection between them and the Nambudri Brahmans. Keane speaks of the Todas as strikingly European.
in feature with a well-proportionate body, stalwart stature and regular features, approaching the Ainus in physical characters specially in their hairiness. He thinks that they are a group of Proto-Aryans who have reached this extreme southern limit of the Asiatic continent.

The Todas lead a very rudimentary form of economic life. Their main concentration of work is centered round dairy products. So they subsist mainly on dairy and vegetable products. Their favourite dish includes rice boiled in buffalo’s milk or whey, rice, vegetable broth and a curry. Only on one occasion they take the meat of their buffalo. They also take the meat of Sambar deer found in the forest. The meat of all other animals are socially tabooed to them.

The Todas domesticate mainly the buffaloes and a few cats. The male Todas look after the buffaloes and the female folk are socially tabooed in all work concerning the dairy and the buffaloes. The buffaloes usually graze during the day time near about pastures and turn back at night. The tasks of herding the buffaloes are done to different places at different seasons. Milking of buffaloes is done twice daily by the male folk. They do not take fresh milk. Milk is turned sour by adding a little whey from the previous churning. The coagulated milk is churned in an earthen pot procured from the neighbouring Kotas, with a bamboo rod moved by means of a string. In this way butter is separated and heated over fire for clarified butter known as ghee.

The Todas have two kinds of buffaloes—the ordinary and the sacred. The different Tarthar clans of the Todas have different herds of sacred buffaloes. Each such herd has its sacred pen the priest—the dairy men who are taken from the Tievalior clans. The sacred dairy houses of the Todas are made of stone walls, circular in ground plan with high conical thatch roofs. They are situated away from the village. The animals in each of the sacred herds are again of two groups. The sacred rituals are confined to the milk of one of them. The milk of the other group goes to the priest dairy man for his maintenance.
It is evident from the above statement that the Todas neither hunt fish nor till the soil. So they have practically no tools, implements or weapons for their occupational operations. Most of their domestic utensils like knives, axes, earthen pots, baskets, etc., are procured from the Kotas. They make fire with a fire-drill. Their artistic activities are confined to dress and ornaments. Ceremonial occasions are glamoured with music and dancing. These are over shadowed by ritualism. They wear coarse cotton garments obtained from the Hindus of the plain. In former days they used bark clothes which are found even now in the interior. Both sexes wear loin clothes and a long loose mantle or cloak thrown over their shoulders. The male folk also wear a perennial band and ring and ear-rings and they have cicatrices on the left shoulders. The female folk decorate themselves with a number of ornaments made of silver, brass and even gold, such as armlets, bracelets, necklace, ear-rings, etc., and tattoo themselves in the chest, upper arms and shoulders.

Though a pastoral group, the Todas have fixed abode of their own. The Toda hut is like one half of a barrel cut longitudinally. The roof comes down to the ground on the two longer sides and is made of thatches or reeds. The other two sides have walls made of planks. One of these has a small door on the front side. The inside of the room is extremely dark and stuffy and there is no outlet for the smoke from the hearth which is kept constantly burning. The male Todas carry on their dairy operations in the front part of the hut while the female folk cook at the back. A Toda village consists of one to six such huts surrounded by a stone wall and is situated on a raised ground near some streams and wood.

THE ORAONS

The plateau of Chotanagpur is the homeland of a large number of tribes of whom the Oraons occupy the foremost position. The major concentration of the Oraons is in the central and western part of the district of Ranchi. Besides the
Chotanagpur plateau the Oraons are also found in West Bengal and Assam, where they have been recent immigrants as labourers.

The climate of this region is generally salubrious. The place is dry except in the rainy season. The general weather is agreeable with delightful cold night.

The Oraons live in villages which are generally composed of members of this tribe along with some other groups who serve the needs of the Oraons. The Lohars and the Kumhars supply them iron implements and earthen pots; the Chick Baraiks weave their cloths; the Ahirs tend their cattle, the Mahalis make mats and baskets for them and the Ghasis work as their mid-wives.

The Oraons call themselves Kurukhs in their own language and speak a dialect of the Dravidian family. So the Oraons are often termed as the Dravidian speaking tribe. Physically and culturally they are a kin to the Austroic speaking Mundari tribes of Chotanagpur but their language and traditions point towards South India as their original home. S. C. Roy has traced the history of their migration from the south through the Rhotas plateau to Chotanagpur from traditional point of view.

The Oraons are short statured, long headed and broad nosed people. Their skin colour is dark brown often black. The eyes are medium sized often small and the colour of the iris is black. The lips are thick and the nose depressed at the root.

Agriculture is the primary and main occupation of the Oraons. So they are predominantly agriculturists and their staple food is rice, marua and maize. Rice-beer is their favourite drink which enlivens them on all occasions of social and religious festivals.

The Oraons have a large number of domestic animals. The live-stock consists of cows, bullocks, buffaloes, goats, fowls and pigs. Besides these they have also one or two dogs in each house. Cows are seldom kept for their milk. They do not drink milk as it is socio-religiously tabooed to them. They believe that milk is the white blood of the cow which is regarded as an object of veneration.
Fishing among the Oraons cannot be pursued on a large scale owing to the absence of long water ways. They catch small fish with the help of a number of simple traps such as Toradang, chopa, Jhumri, etc., in the terraced paddy fields or in the streams when they are filled up during the rainy season.

In the Oraon society trade is limited to the selling of extra farm produce and there are few persons who make a living by this means. They do not manufacture any article for the market and they depend mostly for their implements, appliances, domestic utensils, dress and ornaments, on their neighbouring groups of people who have specialised in these lines. Recently some of the Oraons have gone to the tea gardens of North Bengal and Assam, to the mills, mines and factories in the neighbouring areas as labourers. A small section of them is also employed in their home area in making and mending roads. Besides these the entire population is devoted to agriculture as means of their livelihood.

The Oraon villages are situated on the tops of the undulations. The houses in a village are huddled together known as compact or agglomerated pattern by the side of narrow streets which run in all directions forming lanes and bye-lanes. The homes are made of mud walls with roofs of country made tiles known as Khapra. The roofs are either two or four sloped called Do-chala or Char-chala. The ground plan is generally rectangular. The houses are not usually provided with any window. Some houses have kitchen gardens with a well known as Kua-bari, where small vegetables such as mustard, chillies, turmeric, onions, tomatoes, brinjals, etc., are grown. The Oraons know sowing and transplantation and prepare the soil for cultivation with ploughs drawn by bullocks. Manuring in indigenous method by the deposition of cowdung and refuse matters kept in pits on one side of the house in open space, is known to them. Women take equal part with men in all operations of the agricultural field except ploughing, levelling and sowing. The femalefolk are socio-religiously tabooed to touch their ploughs.
The dress of the Oraons is very simple. The adult male one consists of a lenguti which is passed between the two thighs, twice and brought round the waist to dangle in front. Besides they wear a coiled girdle round the waist. Within the house or even in the village an Oraon woman wears a small cloth around the waist. In former times they did not cover their upper part. But nowadays they both men and women dress themselves with dhuties and saries usually of a smaller size. The Oraon women are fond of ornaments. Usually brass metal is used but silver and rarely gold have now appeared among them. Tattooing is practised by the Oraon girls.
CHANGES IN MATERIAL CULTURE
OF THE HOS

Economic and technological changes among a group of people can be studied from three different aspects—traditional economy of the people, technological change and changes in the economy of the people as a social system.

The Hos are an agricultural group of people and mainly concentrated in Kolhan and Seraikella areas. They are ethnically allied to the Santals, the Oraons, the Mundas and other neighbouring tribes. They speak a language of their own known as Ho language.

Agriculture has been the main source of subsistence since the very early days among the Hos. But there are some among them who possess no agricultural land of their own. They practise agriculture on the land of others on the basis of either rent or share crop. Recently some have gone out of their homes for their economic enrichment being employed in nearby factories and mines. They are also practising agriculture on their land on the basis of rent or share crop. Originally they had kitchen gardens. The products of kitchen gardens were not expected to contribute substantially or even materially to the household owning it. Traditionally they were considered to be meant as a place where the womenfolk of the family or the household staying back at home kept themselves engaged. So cultivation in kitchen gardens or what is called horticulture was not taken seriously by these people. The crops cultivated were usually maize, chillies, in some cases brinjals, etc., meant for their domestic consumption. Practically no manuring was done but sometimes refuses (usually at one end of the house a pit was dug in which household refuses together with cowdung are kept) might be strewn. For the last several years (say about 20 years) the intensification of the Community Development Programmes and the introduction of other vegetables in the local markets have made these people fully conscious of starting cultivation of cabbages, cauliflowers, lady's fingers, carrots,
radishes, beans, cucumbers, gourds, pumpkins, tomatoes and even potatoes in their kitchen gardens. They now consume these kitchen garden products and sell them sometimes to make their economic wealth.

The agricultural implements used by the Hos are few and traditional, not much change has been evidenced in them. Besides agriculture, horticulture and other traditional occupations to which one would take, were agricultural labour and small trade. Previously due to the absence and inconveniences of much facility of proper and regular communication and contact with other places, one would find work for himself within the village, rather than ever go out. Moreover there were hardly any avenues or provisions for employment within the village except in agricultural operations. Now-a-days the regular communication by automobiles, railways, trade communication and through the cooperative system have created numerous provisions for them within the village and scopes for going out of their villages to distant lands. These have facilitated their outlook in the changing phases of their material existence.

Traditional agriculture of the Hos depended largely on the occupation of near relatives, friends and neighbours within the village. Tilling the soil by means of their plough, levelling, sowing, weeding, harvesting, threshing and husking, etc., were generally done on mutual cooperation. Similar function was made for the construction and repairing of their huts. But now the importance of hired agricultural and other labours were increased due to the introduction of cash crop. Besides the technological changes in the agricultural operations and employment pattern there were some other aspects of technological change also. Technology does not mean only techniques and appliances used by the people in their actual occupational activities, but it implies to these material facilities which help them in proper and better utilisation of their skills and resources and also for the provision of new avenues for employment changes in such aspects of technology are now experienced by the Hos. They are the regular communicative links by the
construction of more and better type of roads, provision for agricultural loans and starting of many development schemes and programmes and these have created numerous employment of local labour. Besides, the Independence of India has given much facility for the opening up of more communicative roads in the Ho locality, which have a direct impact on their village market—a local place for their economic, material and social conditions. A market is a meeting place of the Hos. They usually come from the different parts to the market to satisfy their economic condition as well as their social needs through their material objects. The mercantile commodities sold in their markets are changed. Besides consumers' goods, there is a tendency to introduce more and more of luxury goods there. Previously, in a typical market of the Hos the usual articles sold were salt, nuts, spices, pulses, paddy, rice, vegetables (locally grown), dry fish, dried up tobacco leaves, haria (country made liquor), neem oil, wood for fuel, earthen pots, bidi, and locally made coarse clothes (both saris and dhotis), napkins, etc. Most of the traders were of local and surrounding villages (with a radius of 10 to 15 Kilometers centering the weekly market). The conveyances used to travel a long distance with commodities for sale were bullock carts and also carrying balances on shoulders, sometimes on head with a strawpad. There was the barter system. Usually it was necessary on the market day to bring paddy and sometimes pulses, etc., to convert them into cash money for other purchases. Now-a-days with the introduction of cash crops and opportunities to work as day labourers on daily wages in the road making, repairing, etc., in and around the villages it is usual with the Ho people to have cash money, so most of the transactions are made through cash money. The cash money directly earned thus brought not only a change in the pattern of transactions in the markets of the Hos but it has also increased the purchasing capacity. Over and above the improvement of communication facilities has increased the size and content of the markets in the Ho locality. Buses and lorries have been frequent visitors in the markets carrying
traders from distant places. A market place is provided with permanent, semi-permanent and open air shops. There are now mobile shops with foreign articles introduced. So the variety of things sold in the market is also changed. The mill woven clothes (saris and dhotis), shorts, trousers, petty coats, blouses, wrappers, etc., have made their way in the market in place of hand loom clothings, which are fast going out of the market. The importance and sale of distilled liquor in place of country made liquor haria, have also increased because of more cash money. The demand of foreign goods among the Hos (both men and women) has become current. So also the luxury goods like soaps, cosmetics, scents, powder, mirrors, combs, even the ornaments of silver, rolled gold, plastic, nylon are now prominent in the markets. Of the food articles varieties of sweets, breads and other confectionaries have been in great demand. Surveys of the markets of the Hos of Kolhan and Seraikella reveal that the foreign goods are gradually occupying the places of indigenous ones.

Food is one of the important articles with each and every Ho. The Hos are a rice eating people but they used to take stale rice, a socio-traditional practice. They are abhorred to this even today in their villages. But those who are employed in factories or mines and temporarily severed away from their home environment, at the initial stage they are found to take rice making it stale or when fresh rice is given they pour water into it. Taking of other condiments with rice is also gradually changing. But the most redeeming feature of the preparation of vegetables and other curries like fish, meat or egg, they are using mustard oil now-a-days in place of neem oil previously taken by them. They do not drink milk but they are using it with tea, a drink recently introduced in them.

The Hos have practically given up their old traditional clothings. They are sometimes found to wear their loin cloths when they are at work in the field but they cover their body with a half-shirt or a ganji. The women folk are found to wear not only a sari but a petticoat and a blouse even. Foot gear was not known to the Hos in former days. First sandals
and then shoes are used by them—even the young girls are found to use sandals in recent times.

The cooking utensils are in many cases changed to that of an aluminium pot in place of a fire baked clay pot. Previously they had no beds practically, they had ordinary mats made of sebai grass available in their locality or in some cases small bed stead with wood logs or bamboo poles and woven with sebai grass. Now almost everyone has traditional bed stead and sometimes with cotton tape woven ones in place of sebai grass. Their huts were not provided with any window but in recent days windows if not circular holes just below the roof on the walls are provided in their huts. The women folk have practically given up their old traditional ornaments to those of modern metallic ones. They had no boxes in their houses, if any, they are made of cane or palm leaves but now they are using fibre and leather suit cases or steel trunks.

The Ho villages grow in a linear fashion on both sides of an open space used as road. The huts are rectangular in shape with country made tile roofs and mud walls. They are still maintaining their traditional patterns but recently in very few cases roofs and walls are replaced by corrugated tins and bricks respectively.

The idea of sanitation has not entered in their mind. They attend their nature’s call in the open field. But those who are employed in the factories or mines, have realised the idea of sanitation. In very few cases in their villages they have constructed latrines in a crude way by digging pits.

Formerly the Hos were in the habit of taking indigenous plants and leaves as their medicines when ill but now-a-days they are inclined to modern medical treatment. Previously they had some sort of training system by way of imitation and association of the elders to get manhood but modern system of education has gradually entering into them. They use papers and pencils for writing and even ordinary fountain pens have reached their hands.

A change in the occupational pattern of the Hos has significantly changed their social structure. The members of the
Ho society are connected by social structure, the network of social relations seen in the group system. These include kinship, neighbourhood, sex, rank (as in the case of Manki and Munda) and occupation. The membership of the Hos is determined by virtue of birth right.

Every culture always changes even while, in whole or part, it persists as a recognisable entity for a long time. Sometimes change is slow and many elements remain relatively the same from one time to another. The Hos' material culture is persisting to maintain its traditional basis, though changes are going on both in social structure and value system for their existence.
A FIELD APPROACH TO PRIMITIVE TECHNOLOGY

The culture of a people may be defined as the sum total of the material and intellectual equipment, whereby they satisfy their biological and social needs and adapt themselves to the environment. The culture of any group of people involves two sets of phenomena. First of all, there are material objects which they manufacture in order to satisfy their wants, such as tools or implements, weapons, utensils, clothings, ornaments, houses and canoes as well as temples, idols, amulets and other objects, used for magico-religious purposes. The smaller objects of material culture are referred to as artifacts. Logically we should apply this term to all modifications of the material environment by the hands of man, including houses, temples, canoes, bridges and such alterations to the landscape as fortifications and systems of irrigation. But by convention the use of the term ‘artifact’ is usually restricted to the smaller objects of material culture which may be carried or handled by an individual. The study of the techniques by which objects of material culture are made, is known as Technology.

For procuring food, man employs such artifacts as hunting weapons, snares, traps, nets, fishhooks and lines, and agricultural implements, while he protects himself from the weather by erecting houses or tents or other shelters as well as by making clothings. The manufacture and use of the objects cannot be understood without reference to the matrix of social culture in which they occur—system of land tenure, the economic organisation of production, distribution and exchange, the exercise of authority and finally the religious and magical beliefs. On the other hand these elements of social culture are only comprehensible in their material setting of geographical environment and in relation to the objects of material needs of man are satisfied.

The study of primitive culture requires a specialised technique which lays emphasis upon the inter-relation of all
cultural facts. Primitive culture is not divided into discrete spheres of human activity such as economic, legal and technological, to the same extent as our own. It follows that such spheres as economics, law and technology cannot be studied in primitive society without reference to their relation to other aspects of culture. The work of primitive hands is but a tangible expression of primitive thought. Without running the risk of over-emphasising the importance of material things, it can safely be said that their study helps to illustrate the history of man's endeavour to adapt himself to or to utilise his environment, and the increasing complexity, specialisation and efficiency of his material aids may be regarded as indications, to some extent of his general progress, and of a trend towards his greater individual freedom. In studying any particular artifact we must try to understand the particular process of thought that led to its invention and manufacture and that was involved in its use, and also the degree to which it enables its maker to adjust himself to his environment. Implements are but the outward signs or symbols of particular ideas in the mind; and the sequence, if any, which we observe to correct them together is but the outward sign of the succession of ideas in the brain. It is the mind that we study by means of these symbols.

There are yet other contributions which the subject can make, specially the light it may throw upon the history and the movement of peoples. Some peoples such as those of prehistoric times, are known to us, apart from skeletal materials, by the material objects which they have left. From these we can deduce much of their culture and of their wanderings. Even at present there are many tribes who have no written history. Yet something of their past may be revealed by an examination of their present methods of hunting or agricultural operations, dress, habitations, weapons, etc.

Man depends on various objects for his livelihood, comfort and luxury. These objects which have got material existence together with the tools or appliances, each necessary for producing these objects, are the subject matter of Technology.
Man requires food above everything else and production, preparation and preservation of food form the most important topic of Practical Technology.

General technological work may be taken into consideration in the field under the following headings:—

I. Aim—To learn how to observe things correctly.

II. Ideal—To describe in a manner so that a man who has never seen the object will be able to reconstruct the same from the given specimen.

III. Realisation of the ideal—

(1) Divide the object into component parts.
(2) State the material used in each part.
(3) Give the dimensions of each part.
(4) Note the junctions.
(5) Sketch with scale or draw proportionately the object as a whole and if necessary different parts too. Drawing must be neat and not artistic.
(6) Describe the decoration if any, where it is found.
(7) Note the native preservative where the material is easily perishable.

IV. Manipulation—Give the manipulation of the object stating whether you depend for it upon the worker's knowledge or information.

V. Function—Indicate the function of the specimen as a whole and its component parts pointing out the source of knowledge or information as in the previous case.

But for a detailed study of the tools or appliances of the material culture of a people in the field the following information about each and every specimen are advised to be recorded. From these not only the social and cultural status of the people but also the economic level of the people can be drawn up by the field-worker.

1. Name of the specimen—Under the heading the local term of the specimen is to be given together
with the English equivalent. It should also include an analysis of its parts in English with the commentary note on its derivations when needed. The names for the different parts are also to be recorded.

2. **Locality**—The place where the specimen is in use.

3. **People**—The type or group of people using it.

4. **Appearance**—One or more sketches of the specimen (proportionate drawing) should be given.

5. **Manufacture**—This section should be devoted to the data which contribute to one's understanding of the manufacture of the specimen as opposed to its use. Informations are to be classified under the following categories in this section:
   (a) **Material**—out of which the specimen is constructed.
   (b) **Construction**—This section should contain the technical details of the manufacture including a description of the physical movements involved on the part of the maker. The time requires for constructing the specimen should also be noted, if possible.
   (c) **Variation**—under this heading are given the data on variations in materials, size and method of construction.

6. **Where made** *(Place of making)*—This category determines the place where the specimen is constructed. The principal distinction lies whether the work of construction goes in the open or in certain types of huts. When it is constructed in the house, the nature of the house is to be recorded.

7. **When made** *(Time of making)*—Under this heading the field-worker is to specify the appropriate weather, time of day and season for constructing the specimen.
8. **Maker**—This category primarily indicates the sex of one who manufactures the specimen. Age of the person should be noted where it is particularly significant, so also any particular social qualification of the individual as maker should be noted.

9. **Use**—This section should be devoted to the data which contribute to one’s understanding of the use of the specimen in contrast to its manufacture.
   (a) **Utility**—Under this heading a synoptic statement of the function or the use of the specimen is to be given.
   (b) **Method of use**—Under this heading physical actions manifested by the user of the specimen as well as the physical results of using are to be noted.
   (c) **Variation in use**—Various functions and uses of the specimens as well as variation in method of use are to be noted here.
   (d) **Where used (Place of use)**—This category includes information about the nature of place where it is used.
   (e) **When used (Time of use)**—Under this heading the field-worker is to record the appropriate weather, time of day and season for using the specimen.

10. **User**—Primarily the sex of the user of the specimen is to be noted.

11. **Length of Life**—Under this heading the approximate length of life of the specimen is to be noted i.e. its durability.

12. **Ownership**—Under this heading any proprietary rights which of a particular sex may have over a particular specimen; where possible, the method of inheritance should be noted.

13. **Economic value**—In this section the actual market price of the specimen is to be noted.
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