Dr. Gayatri Nath Pant was born in 1940 at Singahi, Lakhimpur Kheri, U.P. After completing his M.A. and B.Ed. from Lucknow University in 1959 and 1960 respectively, he obtained his doctorate in 'Ancient Indian Arms and Armour' from Sagaur University. His proficiency in Sanskrit enabled him to collect material from classical literature. He has about 160 research papers to his credit.

Dr. Pant's first booklet 'Indian Weapons' was published by the Indian Council of Educational Research and Training, New Delhi in 1966. The second, 'Studies in the Defence History—a Bibliography' was printed by the U.S.I., Ministry of Defence. The monumental work, 'Studies in Indian Weapons and Warfare', published in 1970, fetched him the 'President Award' and his recent publication, 'Bharatiya Astra- shastra', won for him the 'Acharya Narendra Dev Special Award'. His several monographs are in press; one of them is 'The Story of Indian Weapons', being published by the National Book Trust, Government of India, in all the Indian languages. The Arms and Armour Press, London, and the University of Manchester, U.K., have proposed to publish his books on 'Indian Swords and Daggers' and 'Indian Archery' respectively.

Dr. Pant has prepared half a dozen catalogues of arms and armour and has studied the collection of almost all the Indian Museums. He is the most sought after scholar and has travelled U.S.S.R., U.K., East and West Germany, France, Netherlands, etc., and studied the oriental arms displayed there.

Dr. Pant is the member of 'Archer Antiquaries', London; 'Arms and Armour Society', London; 'Rifle Association of India', New Delhi; etc., executive member of the 'International Council of Museums', Paris, and Assistant Secretary of the 'Museums Association of India, New Delhi. He is a member of the Archaeological Survey of India and the Ministry of Defence on all the matters pertaining to old arms and armour.

Front Cover: Rhinoceros shield, 1720 A.D., Udaipur
Photo: Darshan Lalli
Collection: National Museum, New Delhi
INDIAN ARMS AND ARMOUR

VOLUME I
(Pre-and-Protohistoric Weapons and Archery)

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INDIAN ARMS AND ARMOUR
VOLUME I
DR. G.N. PANT
Armed with sword, spear, club, discus, conch, bow, arrows, slings and iron mace, O! Durga, you are terrible and at the same time pleasing, yea, more pleasing than all the pleasing things, and exceedingly beautiful.

_Durga Saptashati_, I. 80-81
Conquer the earth with your weapons
O! brave and force the enemy to retreat.

_Yajurveda_, 16. 53

The world treats with respect a man who is brave. Neither fame, nor victory, nor popularity can be achieved in this universe through cowardice.

_Valmiki, Ramayana_, 6. 21. 16
INDIAN ARMS AND ARMOUR

Top : Left Khanda
Bottom : Left Khanjar
Right : Middle portion of a shield
Right : Helmet

(National Museum, New Delhi Collection)
DEDICATION

श्रुक्षणमण्डलाकारं व्याप्तं वेन चराचरम्।
तत्त्वं दशितं वेन तस्मे श्रीपुरवे नमः।

(Salutations to the preceptor by whom that ultimate end has been revealed to me by which stands pervaded the entire universe consisting of the mobile and immobile creation and extending in the form of an individual sphere)

Prof. K.D. BAJPAI

Tagore Professor and Head, Department of Ancient Indian History & Archaeology, University of Sagaur
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The march of man from savagery to civilization is largely dependent on the development of his brain and the skill of his hands. The day he realized the power of his thumb and the forefinger to manipulate objects he began his career to conquer environment, and the dexterity that he acquired in fashioning tools helped him to overcome to a great extent the challenges of Nature. Enriched by his experience day by day, he grew from strength to strength and faced new situations with still newer tools, and today we see that he has realized his dream of reaching the moon. The story of Man the ‘tool-maker’, from his humble beginnings to the present status, is indeed very romantic and thrilling. The four-volume work, *Indian Arms and Armour*, by Dr. G.N. Pant, presents before the world of scholars with considerable clarity a formidable mass of material which will be helpful in the reconstruction of this story of Man as ‘tool-maker’.

Wars and conquests have resulted, from the beginning of humanity, in bloodshed and misery; yet these have not deterred him from waging ferocious wars and inventing weapons of massacre and total annihilation. Self-preservation and self-aggrandizement, ambition to conquer and annex territories and exploit natural resources have prompted war-mongers to build up efficient war-machines and devise new strategies. Fortified cities grew in size and strength and their architecture and layout changed with the nature of the weapons used in war. The four-fold army of ancient India, the various types of defence mechanisms as seen in forts and fortifications speak volumes of the times they represent.

Many Hindu gods have a variety of *ayudhas* symbolizing some militant aspect. The legendary fratricidal battle between the Kauravas and the Pandavas was fought with various deadly weapons and missiles. The tremendous noise of blaring conches, kettle-drums, tabors, trumpets and cow-horns filled the earth and the sky with reverberations and the tumultuous uproar rent the hearts of the warriors. Such literary descriptions conjure up the picture of battles that may best be visualized by the study of the arms left behind by our forbears. Such a study also offers us glimpses of the socio-economic condition of the age and of Man’s achievements in the realms of science and technology.

The concept of museums of the history of Arms is new in this country. Such museums could be built around materials such as arms and armour, badges and war medals, models of forts, maps and paintings giving disposition of armies and the like. Very useful material can be drawn from contemporary sculpture and painting to illustrate weapons of war and actual warfare. In this context we cannot afford to forget the mercantile and naval exploits of our people who guarded the long coastline of peninsular India and traded with distant countries of West Asia and the Mediterranean. This chapter of our history also needs to be studied in depth and the achievements illustrated with suitable material found in literature, sculpture and in various other artefacts. Establishment of such museums is not only necessary to project the facts of history but also to build up the martial character of our people. Although the Mahabharata War and Asoka’s Kalinga War gave us respectively the nectar in the form of the celebrated book, the
Bhagvatgita and the message of love, it need not be forgotten that we can survive only if we are eternally vigilant. The message of Gita “Slain you will gain heaven, victorious you will enjoy the earth. Therefore rise up, Oh! son of Kunti, resolve to fight”, is very pertinent to a nation which has to preserve its freedom.

In the end I unreservedly congratulate Dr. G. N. Pant on pursuing his studies of Indian Arms and Armour and making available the result of his research in such a well-illustrated volume.

16th January, 1978
New Delhi

(M.N. Deshpande)
Director General,
Archaeological Survey of India
When I headed the Department of Arms and Armour, National Museum, New Delhi in 1960, I was confronted with several problems of nomenclature, technique, dating, classification, etc. W. Egerton's book 'Indian and Oriental Armour', originally prepared as a catalogue to the collections exhibited at South Kensington in the India Museum from 1880 A.D., despite certain errors, was the only work that directly dealt with the subject and we, the Indians, are ever grateful to W. Egerton for producing this book which still forms the basis of research. P. S. Rawson's thesis 'Indian Sword' was one step ahead, and that is all. No doubt, a few books on Indian art of war or military history are available which throw occasional light on the contemporary weapons, but no Indian author, not even for name sake, ever attempted to present a coherent story of Indian weaponry. In the last two decades I have observed, handled and studied half a million weapons; visited almost all the important museums having arms collection, met the fletchers and bowyers, swordsmiths and gunsmiths, sikligars and lauhokaras, with the inspired interest of a student. In the course of time I have accumulated a fairly good library of books on the subject.

My privileged position in the National Museum provided me a rare opportunity of handling its more than 6000 weapons including several historical, dated and jewelled pieces and also of gathering material from the coins, illustrated manuscripts, epigraphs, miniature paintings, wood and ivory carvings, painted textiles, stone, bronze and terracotta sculptures, etc. Thus I have been able to corroborate the data collected from these various disciplines with those of the actual specimens.

Perhaps no other country is so rich in old arms and armour as India is. According to a rough estimate about 20 thousand old weapons are exported every year and still there are about one million old weapons stored in the museums, private collections, armouries of the erstwhile princes, defence depots, toshakhanas, police headquarters, etc. Very a few are exhibited in the museum galleries. These collections are not arranged in any definite plan but merely for the purpose of artistic display, and are subordinate to the general decoration of a room. In the National Museum, New Delhi, alone these have been presented in a thematic order.

Terminology has always posed a problem. The sword, for example, is known by the different names in the different regions, and what is talwara in Delhi becomes kripana in Panjab, asi in Uttar Pradesh, khanda in Rajasthan and so on. Then the hilts, blades, curvature, etc., are named after individuals or kings, like Shahjahani or Hakimkhani or Kiranshahi, etc., without specifying adequate reasons for the same. One has, therefore, to be very cautious in allotting the name to a weapon.

The dating of Indian weapons is extremely difficult. A particular type might have been made at a certain time, then copied at the main points of manufacture in other places and finally produced as something new at a small and remote place, a century later. In India the styles changed less often and the same spear or battle-axe or club was used for centuries and over much larger areas and by a greater variety of races. That is how we find some of the aboriginal tribes using a bow today which is more or less similar to the one used by the neolithic man.
There is a big fusion of Indian, Persian and Turkish styles and within the country there is so much of overlapping in the Mughal, Rajput, Sikh, Maratha, etc., styles that it leads to considerable confusion as to what country or region a piece should be attributed.

Since no methodical study of the Indian weaponry has so far been made, no system of classification could be evolved. I have taken something from the classical literature, something from the Muslim chronicles, a word from here and a line from there and in several cases used my discretion, knowing it clearly well that some of my observations are not well founded. But the ship had to be launched, and that is what I have done.

I am fully aware that the book is far from being complete or perfect. I am conscious of the many inaccuracies and omissions which are to be found in the vast field which I have dared to traverse in these pages, but I trust that it may prove an incentive to some better qualified than I am to write another treatise on Indian arms and armour that will give more accurate information.

This, and the other volumes in this series, should only be considered as an earnest effort based on my serious studies in Indian arms and armour, and as nothing more.

January, 1978
G. N. Pant
National Museum,
New Delhi
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Prostration to Prof. K. D. Bajpai, the guru, to whom this volume is dedicated.

It is my foremost duty to express my profound reverence and grateful thanks to Shri M.N. Deshpande, Director General, Archaeological Survey of India, New Delhi, who has very kindly gone through the book and has honoured it with his name and foreword.

I will be failing in my duties if I do not pay homage to Dr. K.N. Puri who inspired me to take up this subject, two decades ago; and to Shri G.D. Khullar who told me how to hold the pen. I deeply regret that both of them have passed away before this volume could see the light of the day.

Dr. Grace Morley, the former Director, National Museum, New Delhi took great pains in correcting the manuscript. She was the first preceptor under whose benevolent guidance I had learnt the fundamentals of research in museology and weaponry. Shri C. Sivaramamurti, the prolific scholar and the renowned art connoisseur, has always been a motive force. He was instrumental in goading me constantly which enabled me to get my doctorate in this subject.

Dr. N.R. Banerjee and Dr. P. Banerjee, the Director and the Assistant Director, National Museum, New Delhi were extremely generous in allowing me to use the material and the photographs of the National Museum Arms and Armour Collection. But for Dr. N.R. Banerjee’s scholarly guidance and full co-operation, the production of this volume might have been impossible.

Among the National Museum colleagues thanks are due to Shri I.D. Mathur, Dr. C.B. Pandey, Dr. Narendra Nath, Dr. B.N. Sharma, Miss R. Vanaja, Dr. V.P. Dwivedi, Mrs. Krishna Lall, Mrs. Shital Puri, Captain Mathews, Lala Aditya Narain, Shri O. P. Sharma, Dr. Chhaya Bhattacharya and Shri Iqbal Ahmad Omri. These scholars made literary, epigraphic, numismatic, sculptural and other evidences, pertaining to arms and armour, available to me. I owe my warm thanks to all of them.

My comrade, critic and caliph, Dr. S.P. Gupta, guided me at every step regarding the pre-and-protohistoric weapons and gave the book its present shape. Mrs. Nilima Roy provided concrete suggestions regarding tribal archery.

Sardar Tara Singh corrected the proofs and Shri Gopal Krishna Sharotri prepared the index. I am thankful to them. Shri Bal Krishna of the National Museum and Shri Bhagwat Shahi of the Archaeological Survey of India extended to me the library facilities.

The assistance rendered by the photographers and the artists has suitably been acknowledged. Shri A.B. Mankapure, however, deserves special mention whose sketches are the soul of the book.
Shri B.B. Dutta typed the script with utmost accuracy and in the shortest possible time. Mrs. Kamlesh Gambhir typed the Sanskrit *shlokas*. My thanks to them.

My very sincere friends Shri S.L. Kalra, Shri A.K. Awasthi, Shri J.L. Sood and Shri M.L. Khosla stood at my beck and call and provided much needed financial assistance from time to time. My heartfelt thanks to them. Mrs. Reva Pant, my wife, ungrudgingly sacrificed her personal comforts for my study. My love to her.

In conclusion I avail myself of this opportunity to record here my deep obligation to Sardar Attar Singh, the publisher, and his son Sardar Jagmohan Singh whose untiring efforts and generosity have produced the book in this format.
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CHAPTER I

STONE AGE TOOLS AND WEAPONS

Man is essentially a tool-making slave and the stone tools he made are tangible record of his hoary past. The physical existence of man has vanished without leaving any distinct trace; these imperishable tools are the only evidence left to mourn, to ponder over and to speculate on the prehistoric man of India.1

Geologically the age of the earth is divided into four main periods: (i) Primary, (ii) Secondary, (iii) Tertiary, and (iv) Quadrternary. Each of these is further sub-divided. It was during the end of Tertiary that man emerged as a tool-user and the Quaternary witnessed him as a tool-maker. Our interest as tool-technologists is confined to this last phase, viz., Quaternary which again has further been divided into two, namely, Pleistocene and Holocene meaning 'most recent' and 'recent' respectively. The Pleistocene, also known as the Ice Age, lasted almost from the beginning of the Quaternary to about a million years ago. During this period man or his ancestor appeared for the first time (fig. 1).

The earliest remains of the possible direct ancestors of man has been discovered from Burma. Evolution of the Homosapiens from the Hominids was a very complicated process. With the passage of time the body of these hominids could stand erect, their cranial capacity increased, features became refined and the limbs developed into hands and feet. Walking erect affected the centre of gravity of the body. The head was raised, the facial expressions changed, the wild teeth with their large canines grew smaller and the spine acquired new curvatures. The arms and hands were no longer used for walking but were now free to be employed for using and making tools.2

Environmental changes altered life. Deficiency of plant food had to be made good by meat which had to be obtained by hunting. First they hunted as a group with sticks, stones, fragments of bones or sharp horns. These were the first man-made implements. Though simple and primitive these credited the man with the title of tool-user. From here it was a short step to chipping the stones for sharpening or forging the ends of the sticks into points. The South African Australopithecinae were, to the best of our knowledge, the first to use sharp-edged stones or pointed bones as implements or weapons. Neanderthal man went ahead of his predecessor in the art of making stone tools.3

Man, the Tool-maker

"Man is a social animal, distinguished by 'culture', by the ability to make tools and communicate ideas. Employment of tools appears to be his chief biological characterisation, for considered functionally they are detachable extensions of the forelimbs." Now that man was blessed with extra-bodily equipment, which made him superior to all other animals, he could depend on these tools, which could quickly be

5 Ibid., p. 21.
6 Ibid., pp. 21-22.
DISPUBLION AND SUGGESTED RELATIONSHIP OF THE CULTURAL TRADITIONS OF EARLY MAN

FIG. 1 Chart showing the distribution and suggested relationship of the cultural traditions of the Early Man (Europe, Asia, Africa)

(after K.P. Oakley)

discarded, changed or used as the circumstances required. The use of these tools made him the most adaptable of all creatures. These tools were his first gods, his first ornaments, his first symbols of power, his first implements, his first weapons, his first treasure, in short, his very first possession. Painting on the walls of the caves, making fire, constructing houses, adopting agriculture, etc., followed the use of tools and these have distinguished him as a tool-making primate and he can be redefined as 'a tool-making animal'.

The Discovery of Stone Weapons and Tools

Since stone was man's first aid in the struggle for existence it is a more or less accurate guide in tracing the development of his culture. Stone implements manufactured by him or by his ancestors have been discovered in early Pleistocene period, the oldest being five to six lakh years old. These were, however, not immediately recognized as human artifacts. It was considered as thunderbolt fallen from heaven. In about A.D. 1690, Conyers discovered a pointed flint by the side of an elephant bone in a gravel pit in England and described it as an implement. This was acclaimed as 'British' or 'Pre-Roman' weapon and is the first stone tool known to have been collected as specimen of human handicraft.9

In A.D. 1715, Bagford declared that the flint implement was used as a spear-head. It was, however, for Lyttelton (A.D. 1766-1773) to make a positive announcement, "There is not the least doubt of these stone instruments having been fabricated in the earliest times and by the barbarous people before the use of iron or other metal was known."10 According to Frere, they are evidently weapons of war, fabricated and used by a people who did not know the use of metals, and belong to a remote period indeed. Evans called this discovery a landmark in the history of prehistory. Schmerling, in A.D. 1833, declared that the flints had been cut by the hands of man and they were used as arrow-heads or knives.11

Although these chipped stones were recognized as man-made tools, yet it was only in the middle of the 19th century that they were acknowledged as genuine artifacts. From the last quarter of the 18th century to the beginning of the 19th century prehistoric caves were explored which yielded some very interesting stone tools.12 A few noted early explorers may be mentioned, viz., Esper (1774), Rossmuller (1804), Goldfuss (1810), Buckland (1823), Marcel de Serres (1828-30), Schmerling (1832), Dawkins (1874) and others. During A.D. 1824-29, MacEnery along with Northmore and Buckland found some flint weapons together with a rhinoceros bone in a cave. In A.D. 1858, Pengelly, Lyell and Prestwich discovered many findings and published their accounts.

But the credit of making a scientific, logical and methodical study of these stone tools should go to France where, for the first time, these stone tools were found in regular excavations. The monumental works of Lartel (1801-71), Christy (1861), Perigord (1864), Reviere, Piette, Cartaihac, Mortillet, Breuil, Obermayer and others provided a sound footing to the prehistoric archaeology. The year 1859, which saw the publication of Darwin's 'Origin of Species', is a memorable year. In A.D. 1857, Schaaffhausen discovered the bones of Neanderthal man in association with stone tools. In A.D. 1860, with the indubitable confirmation of man-made stone tools by Evan and Prestwich, a new era in prehistoric archaeology started.

In India, in A.D. 1842 the first polished stone tool was found by Meadows Taylor at Lingsugur. Captain Abbot is said to have found a few flint flakes from Warangal in A.D. 1854 and in A.D. 1860, Le Mesurier announced the discovery of neolithic celts from M.P. and U.P. In A.D. 1862, Theobold exhibited the celts discovered by him from Bundelkhand. Foote collected many stone tools in A.D. 1863, which were exhibited before the Asiatic Society of Bengal by Oldham two years later. In A.D. 1866, Blandford's report regarding the collection of Swiney from Jabalpur was published. In A.D. 1867, Wilson collected many chipped stones from the Narmada Valley. In A.D. 1887, Foote discovered many tools from South India and claimed to have started the era of prehistoric research in India. Although this claim was refuted by Ball, Theobold holds that 'To Foote belongs the credit of first announcing the discovery of chipped celts in India though anticipated by Le Mesurier as regards arrow-heads.'13 He can really be

10 Quoted by S.R. Das, op. cit., p. 3.
11 Ibid., p. 4.
12 Ibid., p. 4.
13 Ibid., p. 64.
called the father of prehistoric archaeology in India.

Later on many collectors appeared on the stage and contributed to the study of prehistoric archaeology. To mention a few: Wynne (1865) discovered tools in the Godavari Valley, Hackett (1873) in the Narmada Valley, Ball (1865, 1875) in Bengal, Bihar and Orissa and Cockburn (1883) in Mirzapur (U.P.). Similarly, Blandford, Oldham, Hughes, Wilson, Cunningham, Oakes, Abbott, Swiney, etc., also made valuable contributions.

In 1935, De Terra and Paterson made an expedition in Panjab and in the same year N. K. Bose conducted field investigation in Mayurbhanj (Orissa). The University of Calcutta, the Deccan College, Poona and the Archaeological Survey of India, New Delhi have made creditable contributions.

Localities

Logan (1906) compiled the account of the localities in India which yielded stone tools. These include the coastal system comprising Godavari, Krishna, Nellore, Chinglepet, Arcot, Pondicherry, Cuddalore, Tanjore, Madura, Tirunelveli (Tinnevelli), Travancore, Ratnagiri, etc.

EARLY STONE AGE IN INDIA

In relation to raw material

14 H. D. Terra and T. T. Paterson, Ice Age and Associated Human Cultures (Washington, 1939).
De Terra and Paterson\(^{15}\) discovered many lithic implements in the Soan Valley and classified them as Pre-Soan, Early Soan, Middle Soan, Late Soan, etc. The stone tools of the Soan type have also been found from Beas and the Banaganga valleys and the Sivalikas. In 1955 B.B. Lal reported many Soan tools from Guler, Dehra, Dhamiara and Kangra.

In 1966, Dani discovered palaeolithic tools at Sanghao cave (Peshawar, Pakistan). In Maharashtra the stone implements were first discovered by Foote, then by De Terra followed by H.D. Sankalia and others. From Mula-Mutha, Poona Sankalia collected many choppers, cleavers, scrapers and flakes in 1966. Foote, Sankalia, Rao and Joshi collected significant tools from Malaprabha basin (Dharwar district). Sankalia excavated many sites in Gujarat from time to time which yielded many varieties of tools.

Hackett, Theobold, Pilgrim, De Terra, etc., discovered many tools from the valleys of Narmada and Godavari. Seshadri recorded several tools from Mysore. V.D. Krishnaswami collected tools from Attirampakkam (Chinglepet district, Tamilnadu). In Andhra—Kurnool region, many stone tools, mostly from the river beds, were found. The caves at Bilasurgam in district Kurnool need to be mentioned in which 1,700 cut bones were found; among these about 200 were implements. In 1949, Giddalur (Kurnool district) exploration yielded many stone tools which were studied and published by Soundararajan. Tools were found at Nagarjunkonda also.

M.P., U.P., and Rajasthan have also proved to be very fertile regions.\(^{16}\) Sankalia collected many tools from the valley of Narmada in M.P. and J.P. Joshi carried out explorations in the district of Sagaur and Damoh. Flake tools have been reported from the basins of Godavari, Pravara, Mahaprabha, Tapti, Soan, Ken, Wuma, etc.

In Rajasthan first discoveries were made by Heckett, Carlleyle and others. Rao, Soundararajan, Sankalia and M. N. Deshpande collected many tools from Nathdwara, Chittorgarh, Nimbahera, Tajpura, etc. In 1966, V.N. Misra\(^{17}\) presented a comprehensive review of the stone age research in Rajasthan.

Singrauli (Mirzapur) basin in U.P. served a good region for the early stone age tools. In 1883, Cockburn discovered many tools and in 1949 an expedition was organized by Archaeological Survey of India, New Delhi under the leadership of Zeuner and Krishnaswami which proved very fruitful. Many handaxes, cleavers, cores, choppers, etc., were found.

In Bihar the first celt was found by Ball in 1870. Roy (1916) discovered many stone tools from the Chhota Nagpur area. In eastern India, Orissa yielded many palaeoliths. Bose and Sen made significant researches in this area. In 1962, Mahapatra conducted extensive investigation in the district of Mayurbhanj and Sundergarh.

Human and Natural Flaking

Implements of stone are by far the most abundant relics of the culture of ancient man. Stone tools of the more advanced stage of culture can easily be taken to be the result of human workmanship.\(^{18}\) But the actual identification of man's earliest tools is a very difficult job, because his first attempts at making tools from pieces of stone must have been all but indistinguishable from the accidents of nature. It is surmised that the naturally flaked stones would have served as the first implements. Even today, there are some backward tribes which make use of naturally flaked stones. "Some Australian tribes occasionally

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chop trees and fashion wooden implements with naturally shaped pieces of stone selected by virtue of their sharp cutting edges."\(^{19}\)

Rapid changes of temperature can also lead to the flaking of the stone but such pieces can be recognised by the roughish blank appearance because the man-made tools show a clean and definite bulb of percussion. Similarly, stones splintered by fire or faceted by sandstorms also lack a well defined bulb of percussion. Heavy stones hurled by the sea, etc., or friction of two or more stones can also produce flakes but such pieces are flat and show diffused bulb of percussion. The flakes deliberately removed by the ancient man generally have their edges dressed. "As a general rule, naturally chipped flints are easily distinguished from the works of man, for they lack logical design, flake scars occur in uneconomical proposition, the edges have bruised appearance and the flake surfaces are usually scratched."\(^{20}\)

When man trimmed a piece of stone in order to shape it for use as a tool he must have trimmed it from many angles. In a tool where there are strokes from many directions it is reasonably safe to assume that it is a product of man.\(^{21}\)

Nevertheless different forces of nature are capable of producing chipped stones which, if seen out of their geological context, are indistinguishable from the true stone artifacts of man.\(^{22}\)

Time

The earliest human relics both skeletal remains and stone tools so far discovered belong to the Pleistocene period (beginning about one million years ago and ending about ten thousand years ago).\(^{23}\) The men of this period generally preferred to live near about lakes and rivers; hence most of these tools have been discovered from river beds. Researches conducted in the valleys of the Thames and Somme have revealed a chronological sequence of tool types. It may, however, be remembered that the dating of the tool is merely relative and is never absolute in terms of calendar years.

Materials Used

Materials used in fashioning tools are various, viz., wood, bone, shell, stone, etc. (fig. 2). Let us consider them.

Wood

Wood being perishable cannot survive the ravages of time. However, two wooden artifacts belonging to Early Palaeolithic period have been reported from Europe, "One is the end of a yew spear found in an interglacial peaty loam at Clacton-on-Sea. The other is a spear also of yew wood but with fire sharpened tip, found with a skeleton of "Elephas antiquus" on a Levalloisian site at Lehringen Saxony."\(^{24}\) Even today the Australian tribes use wooden spears and digging sticks whose points are hardened with fire.

Bone

When man killed an animal for food and broke the bones for extracting marrow he must have found that the sharp ends could be used as tools. Animal bones, prepared as tools, have been found in the deposits of the dwelling sites of Stone Age Man. Many bone pieces have been found during excavations with the remains of Peking Man in the Chou-Kou-Tieu cave deposits. Eventually later Palaeolithic man learnt that he could shape tools out of bone, antler and ivory by a combination of gouging, sawing, splitting, scraping and rubbing on abrasives.\(^{25}\) S.A. Semenov has discussed in detail the different varieties of bones and their methods of working.\(^{26}\) Since bones disintegrate quickly in acidic soils, the ancient implements of bones have survived only in cave deposits, limestone gravels and calcareous sand.

\(^{19}\) K.P. Oakley, op. cit., p. 5, fig. 1.
\(^{20}\) Ibid., p. 10.
\(^{21}\) L.S.B. Leakey, op. cit., p. 64.
\(^{22}\) S.R. Das, op. cit., p. 158.
\(^{23}\) William Watson, op. cit., pp. 2-12.
\(^{25}\) Ibid, p. 16, figs. 6 e-e.
\(^{26}\) S.A. Semenov, Prehistoric Technology (translated and with a preface by M.W. Thompson, (London, 1964), sections three.
Stone Age Tools and Weapons

Shell

Where shell was available and stone and bone were scanty, shells were employed for making tools. The ancient Egyptians made their fish hooks from shell. In Micronesia adze-blades are still made of traídaena shell. But shell was not very popular and was rarely used on special occasions.

Stone

Stone, like wood, bone, shell and antler is one of those gifts of nature which man had at his disposal from the very early times. Stone, however, occupied a special position among these materials. Only by means of stone could man more or less exploit wood, bone or antler for tools. Without stone tools there was no possibility of development. Only in special geographical circumstances, where technically suitable stone was absent man turned his attention to shells, tortoise shells or fish jawbones. Wherever available, man selected flint, chert, obsidian, chalcedony, fine-grained silcretes, rock crystal, agate, jasper, quartzite, diorite, basalt and liparite. Apart from these the Stone Age Man might have used other minerals and rocks such as varieties of shale, fossilized wood, siliceous tufae, granites, sandstones, ironstones and ochre. But these taken as a whole were not basic but auxiliary materials in the technology of prehistoric man.

Among all, flint was very commonly used. It was obtained from river beds, sea beaches and mountain cliffs. In the Neolithic period flint mines were discovered and man began to mine for flint containing minute crystalline silica. It is initially bluish or white but becomes red, brown or yellowish when it is dissolved in iron compounds. Chert is the next in popularity. It is translucent and bluish white. In its red form it is called carnelian. Its another form is chalcedony. Red and yellow opaque form of chalcedony is called jasper. Obsidian was very valuable and has been rarely used for tools in the Neolithic times.

Where flint and related material was scanty, quartz was used. Rock crystal was very valuable and the tools made of it are extremely rare. In the Palaeolithic period, when the tools were made by flaking, the best stone was flint and similar siliceous rocks. In the neolithic period when grinding was known the rocks, such as basalts and diorite, were used.

The Making of Stone Weapons and Tools

The simplest method for the ancient man was to break a stone into two halves and use the one with sharp-edge as tool. But in order to reduce the stone into a tool of desired shape some steps are to be followed. The stone can be in the form of a pebble, nodule or angular fragment and by flaking or knapping it could be converted into the desired shape. When the flakes removed from the lump of stone are discarded and the lump is itself used as a tool, it is then called ‘core-tool’. But when these flakes are also used as tools they are known as ‘flake-tools’ (fig. 3).

Firstly, the core is prepared for easy removal of flake. It is commonly believed that making of tools and implements was a laborious and time-consuming process and since there was no
dearth of time with the Stone Age Man he could devote as much time as the tools required. But this is a misconception. The primitive man had to hunt animals, trap birds, dig roots, pluck fruit and do many other jobs for his sustenance and perforce devote more time in this endeavour; otherwise he would starve. Experiments of Leakey show that "once a technique required for making a particular tool type has been fully mastered, the actual making of the implement is a very quick process indeed"\(^3\) (fig. 4). H. D. Sankalia has proved that some of the original tribes in India are using stone tools even today.

**Flaking Technique**\(^4\)

The primitive man must have employed various techniques in the making of his stone tools (figs. 3, 4, 16, 17, 18, etc.). Initially he ‘most probably’ used natural pebbles and when these were not available he must have tried suitable materials broken from boulders, rocks or hills. These methods of breaking the stone are called flaking techniques.\(^3\) These have been broadly divided into two divisions i.e. free flaking techniques and controlled flaking techniques.

**Free Flaking Technique**

Free flaking technique has four subdivisions:

1. **Anvil Technique**

   In this method the stone pebble, which is to be broken into a tool, is hit against the projecting portion of a large fixed stone (or anvil).

   ![Anvil or block-on-block technique](after H.D. Sankalia)

   This is also known as the block-on-block technique (fig. 5) since the core stone (or block) is hit against a stationary stone (or block).\(^3\) Sometimes a good flake may be produced but more often than not the desired flakes could not be had through this method. Tools made in this fashion show a large and prominent bulb of percussion. The large flakes with clear bulb of percussion, discovered from the Narmada and Soan valleys, fall within this category.

2. **Hammer Technique**

   This was just the opposite of the anvil technique and was very popular with the

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31 In the West a great deal has been written on the subject of tool technology of Stone Age, but mostly it is incorrect. The account of the author is based on the personal experiments of Leakey and others.
33 Ibid., p. 19; Leakey, *op. cit.*, pp. 34-40, figs. 2-4.
primitive man all over the world. In this technique the pebble, which is to be changed into a tool, is kept in left or right hand (fig. 6). Then the blow could be given by the either hand, preferably right, and the nodule is held in the left.

It can also be kept on left or right knee. Some soft padding may be kept under the nodule to avoid the hurt to the maker (fig. 7). The nodule can also be placed in a suitable ditch hole or in the trunk of a tree. The idea is that it should be stationary.

Then the maker, with a hammer of stone or a big boulder, gives blows near the edge of the nodule. Several hammer-stones (fig. 10) have been unearthed during the course of excavation in the different parts of the world. A chip is likely to come out with every blow. It may be pointed out here that in this case the chipping will not be from the surface which is struck but from the opposite side (fig. 8). In this way the chips from all the sides are removed by alternate flaking (fig. 12) and a tool of required size and shape is obtained (fig. 14). Tools made from these techniques are preserved in all the leading prehistory museums of the world.

Gradually by his experience the primitive man might have learnt that in order to have a beautiful flake, he should hit at an angle (fig. 11) and at the point near the edge of the stone from where the flake was to be detached. In this way only a part of the force traversed the stone and the rest dissipated outside (fig. 12) with the result a good flake came out. Once this technique was learnt the primitive man had no difficulty in producing very good flakes. Such flakes also show a very prominent bulb of percussion.

In both these techniques the scar, from where the flakes were detached, showed negative bulb of percussion. Since many flakes were removed in succession so the tools made by these methods had irregular and jagged ends. These two techniques have generally been associated with the Chellean tools (fig. 20). The Chellean culture flourished about 2,00,000 years ago. In the first half of it the first technique was popular and in the second half the second technique was commonly employed.


35 Leakey, Ibid., p. 131, fig. 53.
3. Swinging Technique

The French prehistorian Abbe Dreuil has suggested another technique which might have been used. According to this, the stone, from which the flake was to be removed, was tied to a leather thong, other end of which was fastened to a wooden tripod, and the block was swung like a pendulum against the anvil. No doubt, the flakes can be removed by this technique but it is cumbersome and time-consuming. Leakey\(^{36}\) has doubted the accuracy and universality of this technique. If at all it was adopted by the primitive man it must have been restricted to a few rare types of tools only.

4. Bi-Polar Technique

This technique was very popular in ancient China. In the above mentioned three techniques the bulb of percussion is found only on one side of the scar while in this technique it is noticed on both the sides hence it is called bi-polar. If the nodule is placed on a hard and strong object and hit with a hammer the upper portion will have a bulb of percussion and on account of the rebound of the force the opposite side of the nodule will have a similar bulb of percussion.

**Controlled Techniques**

In all the above techniques man had no

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\(^{36}\) Leakey, op. cit., p. 41.
effective control and the result was that he could never obtain the flakes of his choice. In course of time man exercised more control on his tools and evolved many such techniques through which he could make very interesting tools suitable to his needs. These are called controlled techniques and have been divided into three sub-divisions:

1. **Step or Controlled Technique**

This technique proves the gradual development of the mind of man. In this technique man had to control and regulate his force. Here the pebble, to be transformed into a tool, is held in left or right hand (preferably left) and hammer in the other (fig. 12). The hammer is hit along the periphery of the pebble. Since the stroke is light, it does not penetrate deep and leaves a 'step' in the pebble. This step served as platform for the second flaking. This is done in the same way as a pencil or a vegetable is trimmed. Small hammer-stones were employed for this purpose (fig. 10.) Leakey, who has experimented with this technique, says, "Small hammer-stones were used for much of the secondary trimming during all stages of various Stone Age cultures, and by slightly altering the angle of the blow it was possible to produce varieties in the secondary flaking, including what are known as step-flaking and feather-flaking."  

![Fig. 10 A grooved hammer-stone with a bent withy](image)

2. **Soft Cylindrical-Hammer Technique**

Many tools discovered from the Saint Acheul in France and Soan cultures in India have smooth surfaces which, in the opinion of Leakey, could be obtained by using a hard wood, bone or weathered stone. The blow of the hammer is given in such a way that the force of the blow is directed at the actual edge of the stone struck and not at a little distance. Since the hammer is soft the force applied is along the rounded surface of the hammer. (fig. 11.)

![Fig. 11 Cylindrical-hammer technique.](image)

"Thus instead of the crack spreading from one point and giving rise to a marked bulb of percussion, it spreads from a longer area of contact through a flattened area." In this way a very flat flake is removed. A series of these flat flakes produce a nearly straight cutting edge.

![Fig. 12 Alternate flaking](image)

Although no wooden hammer has so far been found owing to its perishable nature yet it is possible to infer that the soft cylinders were made of wood. Leakey's experiment shows that a section of a branch, about 2

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inches in diameter with the bark removed, makes an excellent hammer for this purpose. Jaw-bones, limb-bones and cylindrical pebbles could also have been used as hammers.

3. Indirect Percussion and Pressure Techniques:

Pressure flaking, as its name applies, consists in the removal of small flakes by the application of pressure at a given point on a flint edge with a suitable implement made of stone or bone (fig. 7). Usually only small thin flakes of flint can be removed because the pressure that can be applied is hardly sufficient to remove thick flakes (fig. 13). This technique was used for making special type of blades. First the core, which was either tabular or cylindrical, was prepared. If it was smooth, it was roughened by some abrasive like sand, etc., to prevent the instrument from slipping. Now the small platforms were made along the edge of the core. This platform was called “faceted platform. The core was again prepared by making a ridge on it by alternate flaking. From the opposite side another series of flakes were removed. Now the negative scars of the earlier flakes served as platforms. The result is that the earlier flake scars are truncated and the ridge with zig zag edge is prepared (fig. 15).

The tool-maker (fig. 3) now takes a wooden stick about 2½ to 4 feet long and 2 to 3 inches thick. On its lower end is fitted a pointed bone or stone. On the top of it was a cross-piece against which the worker rested his chest. The tool-maker could either sit (fig. 4) or stand (fig. 3) holding firmly the core between his feet. Holding the stick with both hands he applied force through his chest placed against the cross-piece; a blade 10 to 12 inches long was thus detached. Such blades have been found in late Palaeolithic times. The blades produced by this technique are long, fine and have parallel edges and could be converted into daggers (fig. 13), knives, chisels, end-scrapers, spear-heads, (fig. 16) etc., by various methods of secondary flaking. Since this technique required a special know-how, the tools prepared with this are found only in the later stage of man’s development. In the early stage this was quite unknown. All the fine quality of weapons, produced during the middle or late Stone Age bear testimony to it.

A tool or weapon maker had to take several precautions. Since it was a very skilled job, certain steps might have been taken before completion. H. D. Sankalia has described the various steps involved in this technique which are: 42 (1) Selection of a core—cylindrical or quadrilateral. (2) Roughening of the surfaces, if they are very small. (3) Preparation of the platform, also called “faceting” on the core. (4) Preparation of the ridge on the core for guiding the removal of flake or for enabling the core to rest securely on the anvil or ground. (5) Removing from the core the spurs capping the ridge of the flake-scars abutting on the platform. This can be done easily on the core, but it is difficult and risky when the flake is already removed. (6) Flaking either by (i) pressure or (ii) percussion with a light hammer with the help of a punch. (7) After removing a few flakes from one side, selecting another side on the same core, so that the former flake-scars get truncated. (8) Very often in the chalcolithic industries the stones are beautifully dressed prior to the removal of the blade by ripple flaking.


Retouching or Secondary Flaking

Leaving aside the tools of the Early Stone Age, all the tools of later period bear the sign of retouching. After the flakes are removed from the core, this core as well as the flakes are further trimmed which is known as "retouching" or "secondary flaking" (fig. 14). This could have been done for various reasons. Four probable functions have been attributed to it: (1) to sharpen a blunt working edge; (2) to thin the butt so that it could be handled properly; (3) to make the tool blunt for certain purposes; and (4) to prepare the working edge (fig. 15).

In case the retouching was done irregularly, it was termed "nibbling retouching" and when it was done at a certain angle, it was called "oblique retouching". For the purpose of retouching, the tool to be prepared was stuck up against a fixed object and with a small hammer-stone (fig. 10) the tool was hit, moving it up and down. "Depending on the angle and the care with which the operation is carried out it will give a scalloped surface, having concavities which are deep or shallow, large or small" (fig. 16).

Leakey, however, has suggested the following method:

A blade flake is taken whose one end is trimmed a little on both sides to remove part of the sharp edges and to make a rough point (fig. 17). Then the point is held rightly on the edge of an anvil stone with cutting edge vertical to the plane of the anvil. A sharp tap is now given to the edge of the flake. The tip of the blade, which rests on the anvil, receives the force of the blow by ricochet. If the tip is held at the correct angle, a long narrow flake can be removed from the upper edge of the blade.

Similarly, another blade can be removed from the opposite side by turning the blade over. Sankalia has described the way blade flakes are removed at Cambay, Gujarat (fig. 18).

43 It has been noticed that in Australia the aborigines use a large number of unretouched flakes for falling a tree or preparing a boomerang. See, B. Altman in IRAI (1957), p. 125.

44 H.D. Sankalia, op. cit., p. 42.
In Europe the retouching was first noticed on the Abbevillian-Acheulean type handaxes and Mousterian points belonging to the upper Chellian or Chellean

The name of this technique is after the site “Chelles” at the junction of the rivers Seine and Marne in France. The handaxes (fig. 19) found here show deep flake scars, irregular outlines and a heavy butt. Such handaxes are very often found in the early style of Chellian culture (fig. 20). This was done by

Palaeolithic period. In the Mesolithic age this became one of the prominent features of microliths. It gradually disappeared during the Chalcolithic and Bronze ages.

45 H. D. Sankalia, op. cit., p. 43.

46 William Watson, op. cit., p. 42.
“direct percussion technique” with a heavy hammer. However, in the later phase of this culture some advanced technique was also adopted (fig. 21).

**Abbevillian or Abbevillean**

On the bank of the river Somme in France is a site known as “Abbeville” and the technique has been named after that site. There are some prehistorians who do not distinguish the two cultures and regard them as one and call it Abbeville-Acheulean culture. Abbevillian implements have deep biting scars left by flakes with prominent bulb of percussion (fig. 22). The edges are irregular. There is little trace of retouching. In the Acheulean stage of culture, more finely worked tools were produced; the trimming flakes are much thinner and their bulb of percussion are shallower and more diffused (fig. 23). The surface is smooth and the edges are straight and regular (fig. 22).

**Acheulean or Acheullean**

The site at “Saint Acheul” in Somme Valley was the first site in France where stone tools were discovered by Boucher de Perthes in A.D. 1836. It was noticed that the handaxes found here were finer than that of Chellas and Abbeville. Such fine controlled flaking was achieved by a light cylindrical hammer, either of wood, bone, or stone (fig. 10), hence the term Acheulean has now come to signify a very advanced age in the development of handaxe culture (fig. 24). In France at the site of “Saint Acheul” very minute developmental stages have been noted by Abbe Breuil who has divided it into many sub-stages (fig. 25).

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47 William Watson, op. cit., p. 42
48 R.J. Braidwood, op. cit., p. 60; Leakey, (1934), op. cit., p. 76.
Some handaxes in India do show a gradual improvement which may correspond with the Abbevillian and Acheulean types. Leakey, however, believes that the pre-Chellian, the Chellian, and the Acheulean merely represent different stages in the evolution of a great and widespread culture which is characterized by having, as one of its principal tools (fig. 26), an implement which has been given the various names of "handaxe" (fig. 27), "coup-de-poing", "boucher" and "biface."  

The tools of Acheulean culture (fig. 28) have generally irregular shape but such scrapers are also available which have carefully rounded edges and are symmetrically pointed. The margins have been retouched. The main trend of Acheulean development was towards standardization.

**Clactonian**

It began simultaneously with Abbevillian-Acheulean culture (fig. 29). Its flakes are thick and squat (fig. 22). The core is mostly biconical with deep bitting scars (fig. 30). Stone-

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49 Leakey (1934), _op. cit._, p. 112.
STONE AGE TOOLS AND WEAPONS

on-stone technique (fig. 5) was used in the manufacturing of these early tools. Most of the flakes have an angle of 90 degrees between the plane of striking platform and the plane of the main flake surface\(^*\) \(\text{(fig. 31)}\).

Levalloisian

This has been named after a suburb of Paris. Here a great advance in the manufacture of flake tools is seen. It is post-Clactonian. Beautiful flakes were produced by this technique. Perhaps the chief concern of Levalloisian Man was to produce long, thin and lovely flakes. Here the core was trimmed carefully before the flake was removed so that the shape of the flake was, to a very great extent, controlled \(\text{(fig. 32)}\). Flakes with faceted bulbs and the prepared cores, from which they were struck, are the hallmarks of this culture.\(^5\) The cores \(\text{(fig. 33)}\) of this culture have many peculiar shapes, the commonest is like a tortoise and is known as “tortoise core.” It is interesting to note that the Levalloisian craftsman spent a lot of time and energy in shaping both the outer as well as the underside of the tortoise core.

\(^{50}\) Leakey (1934), p. 119; William Watson, \textit{op. cit.}, pp. 37-38, fig. 9.

\(^{51}\) Watson, \textit{op. cit.}, pp. 38-42, fig. 10; Leakey, \textit{op. cit.}, pp. 117-18; Braidwood, \textit{op. cit.}, p. 62.
Mousterian

It has been named after a site “La Mouster” in southern France. It was contemporary of Levalloisian and there was a great similarity between the two. In this culture flakes are struck continuously from a discoid core (fig.34). Ultimately it becomes very small and then it is thrown out. The butts of large tool flakes are usually faceted. The butts of the smaller flakes are always smooth. Trimming is confined to the edges of the implement. The point is clearly intended as a dart of spearhead. Here we find tanged points which are the certain evidence for the use of the bow. In this culture a large number of side scrapers with strong, straight or curved working edges formed by skilled step flaking have been found. Many weapons with one blunted and one sharper edge appear to have been used as knives. The hand chopper is another typical Mousterian tool. It is usually oval or oblong. In this culture the handaxe of late Acheulean culture is also found. The Mousterian industries in France include burins (figs.35-36) and blades.

The Mousterian culture has a distinct chronological and geographical significance in Europe and also to some extent in north Africa. Recently it has been discovered in Eastern Europe, Central Asia and Iran. Such discoid cores and flakes do occasionally turn up in the Stone Age culture of India but as yet no positive stratigraphical idea of their occurrence is available and hence the further step in understanding their geographical distribution is out of question at present.

TOOLS AND WEAPONS THE OF EARLY STONE AGE

Pebble Tools

Handaxes, scrapers, etc., have been found on sites of Soan and other rivers in western Punjab. These have only their working edges flaked and are included under the category of pebble tools. These were first found at a site on the river Kafu in Uganda and Olduvai in northern Tanganyika. These were one of the earliest weapons used by the man and they denote his first cultural stage.


53 R.J. Braidwood, op. cit., pp. 42-43; Sankalia, op. cit., p. 46.
Choppers

Choppers are usually made from nodules or pebbles of flint or other suitable materials (fig. 37). These are unifacial, large and massive; one end being pointed and the base hemispherical. These have been found abundantly in the Soan valley. Chopper was a tool for cutting by rapid sudden blows or strokes. "For the most part choppers have round, semi-oval, almost straight, cutting edges which have been formed by the removal of flakes on the upper surface of the implements only, but certain types of choppers are flaked albeit not extensively, on the lower surface as well."

Chopping Tools

There were another type of choppers which are known as chopping tools (fig. 38). These are bifacial and are mostly large and heavy. They were used by the prehistoric man to chop meat and wood. The cutting edge of these was produced by alternate flaking (fig. 12). These choppers are always core-implements usually made on pebbles, and have sinuous edges.

These tools appear in the Middle Stone Age also but they are smaller in size.

Scrapers

Scrapers and choppers are almost identical with the difference that scraper is smaller in size and is unifacial (fig. 39). The side which is

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54 H.D. Sankalia, op. cit., p. 46.
55 Ibid., op. cit., p. 48, fig. 40.
sharp and almost straight cutting edge unlike pointed or curved end of the typical handaxe. Cleavers, in fact, look more like an axe-head than do handaxes but they were not recognized as a tool type until the latter had already become very popular. Actually the cleavers should have been called handaxes and some other name should be allotted to the tool at present known as handaxe. This tool was used for cleaving or cutting the trunks of the trees or carcasses of animals. It is essentially a tool made on a broad, rectangular, triangular or convex flake. These have been found very often in the Early Stone Age and seem to be the prototype of modern axe. Many types of cleavers have been discovered which can be distinguished on the basis of the shape of the butt, form of the edge and nature of the cross-section.*®

A few of the most important types are as follows:

A. Cleavers with square or rounded ‘U’-shaped butt.

B. Cleavers with pointed butt and straight broad edge.

C. Cleavers with broad and narrow butt and flaring sides.

D. Cleavers with parallelogrammic section.

TOOLS AND WEAPONS OF THE MIDDLE STONE AGE

The tools and weapons belonging to the Middle Stone Age are generally contemporary to the Early Palaeolithic period.® During this period the tools were made of flint, jasper, chert, agate, chalcedony and other fine material. These are comparatively smaller in size. The tool-types are:

Scrapers

As stated earlier the scrapers (fig. 39) were used in skinning the animals and scraping the bamboo shafts, etc. Whereas many cutting and skinning tool-types are restricted to certain definite cultures, the scrapers are found in almost every known Stone Age culture all over the world. Scrapers were an indispensable tools. On the basis of the shape these have been divided into the following sub-types, based mainly on the functional side:

A. Side-scraper: In it one of the longer sides is retouched obliquely. One of its sides serves as the edge while the opposite side can be used for holding. These are flake-tools and were specially common in the Mousterian times.

B. End-scraper: When the working edge happens to be the end, it is known as end-scraper. When this end is like a nose, it is called "nose-scraper".

C. Round-scraper: When on a round flake the edge is made by oblique retouch, it is called round or thumb scraper.

D. Convex-scraper: Its main working edge is convex.*

E. Concave-scraper: One of the sides of the sloping surface bears a concavity. (fig. 49).

This was very popular in the Early Stone Age but has survived into the Later Stone Age also.

61 Ibid., pp 61-61, figs. 57-58 and 81. For other scrapers see Braidwood, op. cit., pp. 77-80.
62 In his study at Cambridge L.S.B. Leakey treated the skin of an African antelope using the actual convex-scrapers belonging to the Stone Age period. Those tools served the purpose so well that the skin was nearly as soft and supple as if it had been prepared by a modern tanning process.
Borer-cum-scraper

As its name indicates it was used both for boring as well as for scraping. Its upper portion served the purpose of handhold (fig. 50). It was the characteristic weapon of this age.

Points

Small and thin points have been discovered abundantly. Thin, leaf-shaped and triangular points were most probably used as arrow-heads and the large points with medial-ribs could have been hafted in a bamboo shaft and used as spear-heads. The following sub-types have been noticed:

A. Point with Incipient tang: Such points bear incipient tangs which were used for hafting. It was very common in the Mousterian culture (fig. 51). Its upper surface is formed by a number of primary flake scars. Sometimes secondary working is so extensive and the tool is so narrow that hardly any of the primary working on the top face is visible (fig. 52).

B. Bifacial Point: Beautiful specimens of this variety have been unearthed from

the Luni Valley in western Rajasthan (fig. 53) and Teri sites in Tinnevelly in South India.

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63 Sankalia, op. cit., p. 63, fig. 59.
64 Braidwood, op. cit., p. 76; Sankalia, op. cit., pp. 64-65, figs. 60-64.
These were made on leaf-shaped flakes and worked on both the faces.

C. Triangular Points: These were triangular in shape and must have served as excellent arrow-heads.

D. Oval or Leaf-shaped Points: These were like a leaf and could have been used as spear-heads.

E. Points with Medial-ribs: Such points, being larger and stronger, must have been used as spear-or lance-heads.

Borer or Awl

It was a thick, projecting point used for boring. Many pointed flakes were retouched and converted into borers. Any suitable pointed piece of stone or flint will serve as an awl. These vary in size. Very small pieces were used for piercing the eyes of bone needles. In France the ‘awls’ are also called ‘tarauds’.

Burin

It is a small chisel-like tool on a blade-like flake having a sharp but thick-set cutting edge. These were used for various purposes. These were employed by Aurignacian artists for engraving figures of animals and other objects upon bone and ivory and also upon rocks. They were also used for cutting and working in wood. Miles Burkitt has classified the burins (also called “gravers”) in the following types:

A. Ordinary gravers
B. Angle gravers
C. Single gravers
D. Polyhedral gravers
E. Gouge-angle gravers
F. Beaked gravers
G. Flat gravers
H. Screw-driver core gravers

These might have also been used for certain kinds of pressure flaking.

TOOLS AND WEAPONS OF THE LATE STONE AGE

The microliths, which might have originated in the Middle Stone Age, predominate in this period. ‘Microliths’ literally means ‘tiny stone pieces’ which are converted into tools by retouch. These were hafted to bone or wooden handles. The following varieties have been noticed:

A. Single Straight-edged: In it the cutting edge is on one side while the second side is blunted so that it could facilitate hafting.

B. Double Straight-sided Blade: In it both the larger sides are retouched and employed for cutting purposes.

C. Straight with one end pointed: In it one end is pointed and the back is retouched.

D. Obliquely Blunted: In it the backside is straight for half the length and then it suddenly tapers into a point.

E. Crescent-shaped: It has a back like half-moon which is blunted for the purpose of hafting. The other side is straight and retouched.

F. Triangle: In it two sides are retouched while the straight side is blunt. It has many further sub-divisions like regular, irregular, equilateral, etc.

Trapeze

In it upper and lower sides are parallel but not equal. The non-parallel sides are blunted. The other sides are not retouched.

Trapezoid

It is a quadrilateral tool and its no sides are parallel. Its two sides are blunted and the other two are retouched.
Transverse Arrowheads

Its blunted sides are steepy and it is used as an arrow-head (fig. 55).

Scrapers

Some of the important types of scrapers of this period are as follows:

A. Side-scaper: The working edge is on the longer side and the opposite side is thick which serves as handhold.

B. End-scaper: The shorter side is retouched which forms the working edge.

C. Steep-ended Scraper: Its side is steep and the edge at the base is retouched.

D. Concave-scaper: One or sometimes two sides are hollowed by removing a large flake and then these are retouched (fig. 38).

E. Convex-scaper: One side in it is made convex and then retouched.

Celt

It is also called “polished axe” or “ground axe” (fig. 57). It was hafted in such a way that the cutting edge was parallel to the handle. It was generally triangular in form. It has three types of butts: (a) square or rectangular, (b) pointed, and (c) round.

Adzes

This is similar to the stone axe or celt but with a bevelled working edge (fig. 56).

Micro-burin

It is a microlith with burin-like facet. These are found throughout Southern Africa, India and Australia.

In fact micro-burins are only found in significant numbers in those areas where large pieces of flint, chert or obsidian are available. It means that comparatively large blades can be produced which are too thick to be broken by simply snapping or twisting; and the notching method is, therefore, employed.

70 Sankalia, op. cit., p. 73, fig. 78.
71 Ibid., p. 75, figs. 83-84.
72 Burkitt, op. cit., p. 110; Sankalia, op. cit., p. 76, figs. 85-89.
73 Burkitt, op. cit., pp. 102-3; Sankalia, op. cit., p. 83, figs. 95A and 96.
TOOLS AND WEAPONS OF THE NEW STONE AGE

The most common tool-types of this industry are as under:

Chisels

It was a small, narrow, cylindrical piece. The two of its smoother sides are tapering half way and form a broad edge.74

Ringstones

These are round, thick stones whose surfaces have been smoothened by grinding. Since there is a hole in the centre, they might have served as mace-heads also.75 Examples of such mace-heads (fig. 58) are available from many chalcolithic sites in India.

Fabricators

It was a small hammerstone. Its head was blunt. It served the purpose of a punch in dressing axes and other ground tools.76

Saddle-Querns

It was a stone slab—large, square or rectangular in shape having concave surfaces.77 This was used for grinding or milling the grain.

Mullers

With the help of this grain or pepper, etc., was crushed on the saddle-querns.78 Round, planoconvex, cylindrical and biconvex mullers have been found in excavated sites.

Shouldered-axes and Adzes

Such tools have mainly been found in the eastern India. Their chief feature

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74 Burkitt, op. cit., p. 106.
75 Sankalia, op. cit., p. 58, fig. 108.
76 Burkitt, op. cit., p. 108.
77 Sankalia, op. cit., p. 86, fig. 102.
78 Ibid., p. 87, figs. 103-5.
is “the prolongation of the butt-end into a tenon to provide a suitable haft”\(^{79}\) (fig. 59).

**FIG. 59** Top, axe placed in a split wood-haft and bound with cord.

(\textit{after H.D. Sankalia})

Left, pointed butt-axe hafted in a slotted handle.

Right, axe inserted in an antler and the latter hafted in a bored handle.

(\textit{after Curwen})

### TECHNIQUES

#### Grinding

The weapons manufactured in the Early Stone Age had generally the coarse, rough and uneven surfaces. In the Late Stone Age man attempted to smoothen them. The process by which such surfaces were smoothed is called grounding.\(^{80}\) The stone was first changed into the desired shape of the tool. This might be done by any of the various techniques mentioned above. Then ‘with a pointed tool’ the ridges and depressions on the tool were removed and it was made smooth. In the final stage a large amount of sand was poured in the groove and a little water was mixed which served as abrasive and then the tool was moved up and down in the groove (fig. 57). It was a time-taking process.

79 \textit{Ibid.}, p. 88, fig. 106.

80 \textit{Ibid.}, p. 79.

#### Polishing

According to H. D. Sankalia\(^{81}\) some of the highly ground tools (fig. 60) shine brightly. This effect was produced by intensive rubbing.

**FIG. 60** 1. Polishing and drilling of stone; basalt battleaxe with cylindrical shaft-hole, Chalcolithic, Denmark.

2. Battleaxe with shaft-hole.

(\textit{after L.S.B. Leakey})

It is also possible that some green or oily substance might have been applied as polish (fig. 61).

**FIG. 61** Neolithic hoe (or adze) with polished stone head restored on the basis of contemporary model, Portugal.

(\textit{after L.S.B. Leakey})

#### Hafting

A bamboo pole of suitable size was selected. Its head was cut. This provided a very good natural socket for the implement to

81 \textit{Ibid.}, p. 81, fig. 95.
be inserted (fig. 62). The wooden wedges were used to tighten it. A strong lashing was wrapped round the neck to make it very secure (fig. 63). This method is used in the Indian villages even today. In case bamboos were not available, the implement was inserted into a split pole and lashed thereafter. Cleavers and spears were hafted in this way (figs. 62, 65). Some ways of hafting the spears, cleavers, arrows, etc., which might have been employed at that time are illustrated here. The tanged implements (fig. 64) were inserted into a slit, cut in a bone or wooden handle, and then lashed (fig. 66). Some gum might have also been used. Another method

82 Sankalia, op. cit., pp. 97-98, figs 114-17.
was of tying the tool to the haft. The excavations at Nevasa and Navadatoli have revealed

that the points of the edge-scraper were also inserted into the socketed type of haft.

FUNCTIONS OF THESE TOOLS AND WEAPONS

Tools and weapons of metal which came into use late still continue with us, and hence it is not difficult to know their use and give them their appropriate names. But it is otherwise with stone tools. These have become obsolete even in countries like Africa and Australia where until the last century they were used by the aboriginal tribes. Hence archaeologists have had to coin some names. These names have been assigned on the basis of their shape, form, technique and function. The function to which a particular tool might have been used is generally guessed by the help of comparatively ethnology. Recently some scholars have taken objection to this method, known as "generalised terminology" according to which a given industry is divided into a series of scraper varieties, points and cores on the analogy of modern stone cultures. For a so-called "scraper", or a "point" could be a knife, which is hafted. To avoid such erroneous misconceptions, T.T. Paterson groups the tools simply according to the shape and character of the working edge with no attempt at suggestion as to use. The author has followed T.T. Paterson and H.D. Sankalia in this respect.

Functional nomenclatures like cleavers, choppers, handaxes, scrapers, burins, points, blades, etc., described above are most commonly employed for the classification and identification of stone tools. It would be wrong to think that all these tools were

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85 Sankalia, op. cit., pp. 44-103
really used for the same purposes as none of them bears any positive proof about its function. Even Movius contends that purpose. If at all it was made for any immediate need, it might have definitely been used for other purposes as well. Washburn has admitted that the use to which these earliest tools were put is uncertain. Coon also says that an industrious archaeologist could make a study of the handaxes in the museums of world, to see how many were chipped by purposes of facilitating the description of the material. Most of these tools might have been used for many purposes. Braidwood says that almost any of them (the stone tools) might be used for drilling (fig. 71), hacking, digging (fig. 70), chopping, boring (fig. 68), cutting (fig. 67), and scraping (fig. 72). At that time when man was technically not very advanced, hardly any tool was made for any specific

use, how many were broken, how many were dulled by contact with soil and how many were polished by repeated rubbing with oily hands. This study might reveal that some of them were not used as tools at all. Some of these so-called tools might have been used as sacred objects and others as symbols of the mutual relation of man to man and man to the landscape.\(^87\)

No doubt one of the first needs of primitive man was a weapon wherewith to kill the wild animals which formed his food. His first idea would probably be to break off a bough of a tree with which to knock them on the head. When, at a later stage, he sharpened one end of his stick a little, it penetrated further and he may be said to have already discovered two weapons \textit{viz.}, the club and the spear. The next step was a long one. The primitive man must have desired to throw his weapon at a long distance on the running animals or at the flying birds. In due course, however, the solution came and in three totally distinct forms \textit{viz.}, the throwing stick (with its relatives the amentum and the sling), the blow-pipe, and the bow.\(^88\)

\(^{87}\) S. R. Das \textit{op. cit.}, p. 118.

inventive brain to which the idea first occurred of utilising the elasticity of wood by attaching a cord to a stave we know not. Although many of the stone pieces, belonging to the palaeolithic times resemble arrow-heads, yet their size and weight preclude the likelihood of their having been used as such. So far there is no evidence that the use of the bow was known to the palaeolithic man. Then came neolithic man with his bows and arrows, with domestic animals, and with a knowledge of agriculture and of pottery. Abundant evidence exists that this race of men were archers.

The earliest farmers settled near springs, rivers and lakes and combined agriculture with hunting. They tilled the soil with stone hoes (fig. 61), grew barley and wheat, which they reaped with flint-toothed wooden sickle (figs. 74, 75). They stored the grains in pits lined with basket work and ground it on saddle-querns with millers. They fished with hook-and-line and hunted extensively with bow and arrow (figs. 51 to 54). In due course new and specialised crafts like mining, basketry, weaving cloth, making pottery and eventually working of metals developed. Modern civilization owes its form to machine-tools, driven by mechanical energy; yet these perform in complicated ways only the same basic operations as the simple equipment in the tool-bag of Stone Age Man: percussion, cutting, scraping, piercing, shearing and moulding.89

89 C.J. Longman and H. Walrond, Archery (London, 1894), p.9
CHAPTER II

WEAPONS IN THE HARAPPAN CULTURE

INTRODUCTION

The Harappan Culture, earlier known as the Indus Valley Culture, flourished within a time bracket between the third millennium B.C. and the first half of the second millennium B.C. The culture represents a highly organized civic life and as such it is reasonable to expect that it had a sort of military organization, as well, apart from the normal agricultural, trade and other peaceful activities (fig. 77).

According to Mortimer Wheeler, "......... It is to be supposed that the wide extent of civilization was initially the product of something forcible than peaceful penetration. True, the military element does not loom large amongst the extant remains but it must be remembered that at present we know almost nothing of the earliest phase of the civilization".¹ Excavations at Harappa, Mohenjo-daro and Kalibangan, the major cities of this culture, have brought to light remains of citadels of protective walls, evidence forcing the inference that the people of this culture were well guarded against external aggressions. Some specimens of weapons have also been unearthed from the Indus cities, a study of which would be interesting.

SWORDS OR DIRKS

The swords are among the most exceptional specimens of this period. These were found for the first time in 1930-31 A.D. by Mackay. Marshall, however, believes that there are no swords in the Harappan culture.² His conclusion is perhaps based on the plea that these blades are commonly thickened in the middle and their points are generally blunt, and hence they could not be used effectively for thrusting at the enemy. But the general shape and the sharp edges definitely bring these blades closer to the class of swords (fig. 81).

These swords are double-edged and indicate an advanced craftsmanship. They are well shaped and heavy for their sizes. Most of these are in a good state of preservation. One figured as No. 3 in pl. CXIII of Mackay,³ is a long, narrow, copper weapon found in a hoard. It measures 15.75 inches in length and its maximum thickness is 0.4 inches. There are two rivet holes at the junction of the tang and the blade. The tang is rectangular and its thickest part is 0.65 inches wide. The blunt edges and point of the blade would suggest that it was unfinished. Another piece (No. 9 in pl. CXIX of the same hoard)⁴ is of copper and 18.5 inches long and 0.48 inches thick at the junction of the blade and tang. Its point is not sharp. The two rivet holes, slightly chamfered, pierce the blade close to the tang. A stout medial-rib runs down the blade on both sides. It is not very heavy and weighs only 1½ pounds. It was perhaps used for slashing and not for thrusting.

³ E.J.H. Mackay, Further Excavations at Mohenjo-daro, vol. I. (New Delhi, 1938), p. 467 (also see pl. cxviii. 9).
⁴ Ibid., see also pl. cxx. 17.
A broken copper casting, No. 5 in pl. CXXVIII of Mackay, is 3.2 inches long, 1.21 inches wide and 0.22 inches thick. It appears to be the point of an unfinished sword. Thus, these three, along with another of similar type with a slight median thickening and diamond-shaped section, represent short swords or dirks. "We have no evidence that either of these weapons was an importation; indeed it would be difficult to say whence it could have come, for nothing of the kind has yet been found at Elam at this early period and only one example is reported from Sumer, at Telloh whose blade and hilt measure a trifle over 16½ inches long. Swords are just as rare in Egypt as they are in Sumer, and a weapon of very similar shape to our second specimen found in Egypt, but of much later date, is regarded as an importation from either Syria or Cyprus."

A similar sword has lately been discovered by Flinders Petrie at Tell el Ajjul in Southern Palestine which is made of copper but is more tapering in shape. It has been dated to the Sixth Dynasty of Egypt. Mackay has rightly observed, "Thus in India, Sumer and Palestine the short sword was used as early as or before 2500 B.C., but to what country its invention should be ascribed is, at present, very uncertain." In view, however,
of the great probability that the sword was derived from the dagger, it might easily have been invented in each of these countries independently.

ARROW-HEADS

Excavation in DK area has produced a number of arrow-heads. Mackay’s observation is as follows, “Their number in this area is perhaps accounted for by the poverty of many of these houses of the late period. One would not expect bows and arrows to have been used by the wealthier residents of Mohenjo-daro nor are arrow-heads often found in the larger houses.” However, this statement is not convincing. The bow and arrow are simple weapons having a continuity right from the prehistoric times. It is quite probable that being the cheapest and easily available weapon it was popular and was found in the smaller houses which were in all probability in occupation of soldiers and the people of similar status.

These arrow-heads are thin, flat pieces of copper with long narrow barbs and no tang. These were inserted into a split bamboo or wooden shaft (fig. 79). It is impossible to set these heads in the shaft without enclosing a part of the arrow-heads into the wood. These shafts might have served as mid-ribs. Mackay observes that the tie-holes were made for this purpose in arrow-heads of almost identical form from Zafer Papoura, Crete. The bronze arrow-heads found at Mycenae have three tie-holes for fixing it to the shaft. But these are of later date. However, Egypt and Sumer have not yielded any. Perhaps the prototypes of metal arrow-heads were the swallow-type flint arrow-heads of the Stone Ages.

The average length of the ‘Indus’ arrow-head is 1.19 inches, breadth 0.64 inches and thickness 0.07 inches. All these are, more or less, of one type. While a few stone arrow-heads have been found at Harappa, no such specimen is known from Mohenjo-daro. This indicates that the use of stone for this purpose had already become obsolete. The majority of the tools is of copper.

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11 Ibid., p. 46f.
12 Hall, Aegean Archaeology, p. 251.
KNIVES

It is difficult to discriminate between knives and daggers. Most of the specimens unearthed might have served both the purposes, like the medieval European dagger which was used for cutting meat at the dining-table and also for killing an enemy in the field. The basic function of a knife is to sever and of a dagger to thrust. Therefore, under this heading only those weapons have been included, which, on the basis of their shapes, seemed to be the cutting weapons (fig. 80).

Mackay has grouped the knives as follows:

1. Broad Leaf-shaped Blade

This type is the commonest knife and has been found in good numbers. The blade is broad, leaf-shaped, double-edged and sufficiently long. Except one (No. 5, pl. CXIX of Mackay), which is of bronze, all others are made of copper. In other examples a copper strip is wrapped round the short tang in order to thicken it.

2. Leaf-shaped Blades with Curved tips

No complete knife of this variety has so far been excavated from Mohenjo-daro. A few perfect specimens have, however, been unearthed at Harappa. All these are made of copper and seem to be very popular in the earlier levels. The general shape indicates that such knives were used for very fine work.

3. Narrow, Straight Knives

These copper knives are smaller in size. The edges are narrow and parallel and the blades show the signs of repeated sharpening. The biggest in the series is about 5 inches long.

4. Triangular Knives with Upturned Points

Only one knife of this type has been found at Harappa (fig. 80) and two at Mohenjo-daro. A similar knife has been traced in Egypt. These were perhaps used for cutting fine leather.

5. Broad Curved-edged Knives

Three knives of copper, very carefully made, have been excavated at Mohenjo-daro. The
tang in such type was riveted to the blade. No.23 in pl. CXXX of Mackay has still a fragment of wooden handle stuck to it which is secured by three rivets set in a triangle. The handle is a single piece of wood which was split for the insertion of the tang and a portion of the blade (fig. 81). The wood is of *Dalbergia Sisu* (Roxb) variety, also called *yali* which is in common use for handles of many tools in India today.

6. Narrow Curved-edged Knives

Five knives of copper of this variety have been found at Mohenjo-daro. The back is straight and the edges are slightly curved.

7. Hollow-backed Knives

Only one specimen, made of copper, has been found at Mohenjo-daro. It has a thick concave back from which it gradually fines down towards the convex edge.

8. Double-curved Knife

The only example of this kind in copper has been unearthed at Mohenjo-daro. This is double-curved, and, therefore, is a very curious specimen.

DAGGERS

Some varieties of daggers have also been found:

1. Knife-cum-daggers

It might have been used for thrusting or cutting. In some cases it is very difficult to distinguish a dagger from a knife and such type can be called dagger-knife.

2. Shouldered Daggers

Some daggers have abrupt shoulders which would have withstood very considerable pressure and must have provided an ample bearing for the haft. Most of these are made of bronze. These were not riveted to the handle.

Daggers with mid-rib

In some cases the tang of the dagger is very sharp, which might have facilitated its insertion into the handle. Some of the daggers have mid-ribs which have been found at later levels.

Narrow Double-edged Daggers

The concave sides of these weapons suggest that these were used for thrusting. These have been found in earlier levels.

No sheath has yet been discovered. It is quite possible that the sheaths were made of wood, leather or some such perishable materials which have not survived the ravages of time. Possibly, the daggers of a bigger size were suspended from the waist by a leather belt and the smaller ones were simply slipped into it. In any case, this suggestion is hypothetical and does not have corroborative evidence by way of graphic representation.

SPEAR-HEADS

It is very difficult to distinguish between certain types of spear-and lance-heads and the larger knives and daggers (fig. 82). The longest spear-head, so far found, comes from SD area and it is of bronze, measuring 15.3 inches in length, 4.8 inches in breadth and 0.15 inch in thickness (fig. 85/10). Two small...
holes at the bottom of the blade were intended to secure it in a split wooden shaft in order to strengthen it. Another type, 10 inches long, 2 inches broad and 0.13 inch thick, has been found but without tie-holes. A spear-head, which due to its repeated sharpening has become very short and looks like a knife blade or a lance, is illustrated by Mackay. The copper spear-head No. 11 in the same plate is 9.1 inches long. It has a thin, well-preserved blade and the end of the tang is edged to facilitate insertion into a wooden shaft. The holes on the lower base of the blade are wide apart which suggests that the rib was of considerable width. Petrie has remarked that broad blades in ancient Egypt were used as a kind of long sword for slashing.

Harappan spear-heads are invariably tanged. Most of them could buckle on impact and must have been strengthened by setting in the split end of shafts. The leaf-shaped spear-head is universal. No barbed blade has been found although there is a clear illustration of a barbed spear on a Mohenjo-daro seal. A
barbed spear-head from Ur could also be cited as an instance.

The spear-heads in use among the Indus folks are unaccountably primitive in form, thin and broad in the blade without any strengthening mid-rib (fig. 87/1-10). These contain a tang instead of a socket (fig. 87/3-5). Mackay points out that in Egypt and Sumer they had socketed spear-heads with well developed mid-ribs before 3000 B.C. He believes that these spear-heads of Mohenjo-daro were spoils taken from inferior jungle tribe and not manufactured on the spot.†

**LANCE-HEADS**

The blades are similar to the spear-heads but being smaller in size they have been designated as lance-heads (fig. 82). They are more or less triangular in shape. Their average length is 3 to 4 inches. These are double-edged, pointed and are made of copper (fig. 83).

![Diagram of weapons](after E J.H. Mackay)

31 This opinion of Mackay is discounted by the fact that, with one exception, the spear-heads from Harappa are of the same flimsy type showing a close correspondence with the specimens from Mohenjo-daro. In one exception from Harappa there is an incipient tang but no socket.
AXES

The blade axes or celts were of two types, (i) long and narrow, and (ii) short and broad. Both types are widely distributed in the Middle and Near East. Stone prototypes of both are common in Northern and Central India. The first type was more popular and has been frequently found. Some of them might have been used as adzes as well. The working end has a crescentic shape in section and it is in double convex. (fig. 78 A.B.) The butt is straight or slightly rounded. The sides are nearly parallel. The thickest part is the middle portion. The axes of the second variety have considerably splayed edges (fig. 78 C.D.).

MACE-HEADS

Mace-heads were of stone and copper. The copper specimens are from Harappa only. Those made of alabaster, sandstone, cherty limestone and green coloured stone were doubtlessly used as weapons. Three different shapes have been noticed. Of these the pear-shaped mace was the commonest, as it was indeed in most other parts of the then civilized world. The other varieties were lentoid and circular. These were suitable for self-defence, particularly in hand-to-hand fight in lonely or forest area. Their perforation is of hour-glass form bored at both ends. They were presumably lashed to a handle with leather thongs. Wheeler informs us that maces of this type have been found at Susa, in Egypt, in Caucasus and in prehistoric Europe. A bronze or copper mace-head has been discovered at Chanhu-daro, which belongs to the late Harappan phase.

MISSILES

Several clay missiles have been found. These have been grouped by Wheeler into three types:

A. The numerous clay pellets, either round or ovoid, are about an inch in diameter and up to two and a half inch in length. These might be sling-pellets.

B. Second type are lumps of clay, first compressed in the hand and then lightly baked. These weigh about six ounces.

C. Same as the second variety but weigh twelve ounces.

Many such six ouncers have been found at the foot of the citadel at Harappa. 98 such pieces have been recovered from the parapet of the tower. Further in south in the same area quite a large hoard of the pottery balls has been reported. The shape, material and findspot certainly lead us to believe that they are weapons of offence. The method of use, whether they were thrown by hand or projected from a sling, is not clear.

ARMOUR

Several small domed pieces of copper, each perforated with two holes, have been found here. These were perhaps sewn on to a garment and used as a coat of mail. In the National Museum, New Delhi several such pieces, belonging to the 16th-17th century A.D., stitched together on a cotton tunic to form a body armour, are preserved. But no other evidence of body armour or helmet has been traced. Shields, too, are unknown although certain pictographs in the Harappan seals may represent men holding shields.

OTHER IMPLEMENTS

Among the tools and implements found at Harappa and Mohenjo-daro, celts, axe-adze (fig. 88) and saws account for a large frequency. Only one example of socketed bronze fragment is known, which is remarkable for its technical advance (figs. 89 and 90). Razors of four types are known, the commonest being one with a long handle. The most
interesting is the saw. Its cutting edge is semi-circular and serrated. Roughly flaked stone celts up to ten inches in length were commonly used for cutting. Chert ribbon-flakes separated from prepared cores have also been found.

**FIG. 88** Shaft hole adze-axe from Mohenjo-daro

(after B. B. Lal)

**FIG. 89** The first socketed implement found at Mohenjo-daro: 10.15 inches long and has a somewhat irregular projecting socket that averages 1.7 inches in diameter outside. The horizontal blade is 2.52 inches wide and the axe-blade 3.5 inches and both have double-shaped edges; Copper.

**FIG. 90** Details of fig. No. 89.

**INScribed Implements**

There are no signs or inscriptions on any of the blades of the later levels, but in a group of implements found at the lower level several blade axes and other objects bear signs and inscriptions incised upon them (fig. 91). It is not clear whether these are the names of the owners or mere numbers (fig. 92). Mackay suggests that single strokes represent digits and the inverted ‘U’-shaped signs read 10. But this is highly conjectural. Inscribed tools and weapons of bronze and copper have been found in larger numbers at Harappa than at Mohenjo-daro. From this it has been deduced that the former city is slightly older than the latter.

**MATERIAL**

The most abundant metal in the Indus culture is copper (fig. 93). Bronze comes next. It is commonly believed that copper preceded the use of bronze. But the

inhabitants of this culture, from their earliest settlement, knew the use of a compound of tin and copper. Some of the weapons discovered from Mohenjo-daro contain excessive amount of tin to yield the necessary amount of hardness to it (fig. 94). The sources of tin were far away from the Indus region and it is presumed that the people of the Indus region and cities obtained ready-made tin from outside. Copper must have come from the mines in the neighbourhood of Khetri in Jaipur or from some old workings of Udaipur district.

That the copper ore was smelted at Mohenjo-daro is proved by the discovery of a quantity of ore and ingots in the excavations. It seems that the ore was smelted in open hearth with charcoal40 over a cavity in the ground, into which the metal ran. The metal workers of Mohenjo-daro apparently obtained their raw material from the smelters ready in the form of ingots.

The use of stone was confined to the scrapers of the ribbon-flake variety and the chert blades which occur profusely in all the Harappan sites.

Wood and bamboo were used as handles, leather for belts and cotton ropes for fastening. One handle of stag's horn, four inches long and one inch in diameter, has been discovered, which might have served as a hilt for a dagger. This is the only specimen of horn and might have been brought from elsewhere.

40 We have ample evidence that the charcoal was used as fuel at Mohenjo-daro for ordinary purposes if not actually for smelting.

TECHNIQUE

In manufacturing swords, care had evidently been taken to see that the axial centre of the casting was sufficiently thick to form a mid-rib when the weapon was finally finished by the hammer. In the case of knives these were cut out of metal sheet and the blade was subsequently hammered. The tanged weapons were hafted to a split handle and were bound fast (figs. 94 and 95). Two pottery models of shaft hole axes recorded from Mohenjo-daro and a bronze example from Chanhu-daro prove that the people of the Indus Valley knew this mode of hafting as well. No metal rings have been found. It seems that lashings or rings of cord or fibre might have been used. These, like the hafts themselves, would inevitably have perished. Regarding hafting of the blade-axes, Mackay has suggested that the blades were lashed into a split haft from the back of which the near-end projected some considerable distance. The spring of the haft, when the two limbs were securely fastened together above the blade, would grip it very securely. Quite possible, in order to bind the lashings together, some kind of cement was used.

Apart from the weapons discussed above, traces of fortifications have been noticed both at Harappa and Mohenjo-daro. The dockyard of Lothal and the clay model of boats reveal the navigational activity of the people. Thus the citizens of the Harappa culture, though peace loving, were fully prepared for their defence.
CHAPTER III

COPPER HOARD WEAPONS

INTRODUCTION

The 'Copper Hoard' tools and weapons were first brought to light in 1822 A.D. but it was Vincent Smith who made the first comprehensive survey of these weapons in 1905 A.D. Later on Hiranand Shastri discovered some more weapons, including the famous antenae swords from Bithur, Bulandshahar and Hardoi. In 1915 A.D. Coggin Brown recorded several weapons of this category from Bihar and the next year A. Campbell and S.C. Roy also found many new types. In the annual report for the year 1937-40 of the Archaeological Survey of India three more antenae swords and a few flat celts from Hyderabad are published. Stuart Piggot and R. Heine-Geldern have made further researches in the field. B.B. Lal, D.H. Gordon and S.P. Gupta and K.N. Dikshit have reviewed the whole problem afresh. The account given here is largely based on the observations of these scholars.

R. Heine-Geldern first wrote his views in his paper on the "Archaeological Traces of the Vedic Aryan" J.I.S.O.A., IV (1936), pp. 87-113, and followed it up a year later in his paper on the "New light on the Aryan Migration to India" in the Bull. Amer. Inst. Iran. Art. and Arch., V (June, 1937), pp. 7-16 in both of which he recognized the Aryans as the introducers of the copper implements into India. B.B. Lal in his paper on "Further Copper Hoards from the Gangetic Basin and a Review of the Problem", Ancient India, No. 9, pp. 20-39 pointed out the obvious anomaly between the specialized objects of apparent western inspiration and those from the Ganga plains. Heine-Geldern's latest views were expressed in his paper on "The Coming of the Aryans and the End of the Harappa Civilization", Man, vol. LVI (Oct. 1956), pp. 136-40.

These hoards have been reported from time to time from different parts of Uttar Pradesh, Bihar, Madhya Pradesh, West Bengal and Orissa. B.B. Lal's treatment of the subject has not been improved upon, though a hoard was recovered from Bahadurabad in 1953 A.D. (B.B. Lal, 'Protohistoric Investigation', Ancient India (Delhi),

1 Vincent A. Smith, 'The Copper Age and Prehistoric Bronze Implements of India', Indian Antiquary, XXXIV (1903), pp. 229-44, and XXXVI (1907), pp. 33-55.
9 B.B. Lal, 'Further Copper Hoards from the Ganga Basin and a Review of the Problem,' Ancient India, No. 9 (Jan., 1951), pp. 20-39.
No. 9, p. 93) and with this the story of the actual finds is practically up-to-date, save for one relatable object from the upper levels of Lothal. (Ancient India, (Delhi, 1957-58), p. 13, pl. XXI).

These implements made of copper have been found in various parts of India (fig. 96) from Bengal to Uttar Pradesh and from Rajasthan to Deccan, singly or in hoard, one time containing as many as 424 examples. Since most of these have not been found in regular excavations, no cultural horizon could be established. These implements have variously been linked with the Harappans, the Aryans, or some of the aboriginal tribes of India and fall within a time bracket of c. 1200 B.C. – c. 800 B.C. These copper weapons have been collectively called ‘The Copper Hoards of the Gangetic Basin’ without any adequate reasons. Since many specimens have been found outside the region, it is, therefore, not justified to consider these as a homogenous group. Secondly, their origin and development in the context of time and space has yet to be ascertained. Thirdly, the vexed problem of the authorship of the hoards still looms large.

A distinctive cultural ensemble, as yet not clearly correlated either in stratigraphy or the sequence of Indian cultures, is formed by finds of ‘Copper Hoards’ in varying volumes over widely expansive regions
### Table: Distribution of Copper Hoards and Other Bronzes in Protohistoric India

<table>
<thead>
<tr>
<th>Location</th>
<th>District and State</th>
<th>Copper Hoards</th>
<th>Other Hoards</th>
<th>Total Hoards</th>
<th>Museum or Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nageshwar</td>
<td></td>
<td></td>
<td></td>
<td>Madras Government Museum, Madras</td>
</tr>
<tr>
<td>2</td>
<td>Bantul</td>
<td></td>
<td></td>
<td></td>
<td>Western Government Museum, Calcutta</td>
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<tr>
<td>3</td>
<td>Sagar</td>
<td></td>
<td></td>
<td></td>
<td>Western Government Museum, Calcutta</td>
</tr>
<tr>
<td>4</td>
<td>Kotrikad</td>
<td></td>
<td></td>
<td></td>
<td>Western Government Museum, Calcutta</td>
</tr>
<tr>
<td>5</td>
<td>Dhanalik</td>
<td></td>
<td></td>
<td></td>
<td>Western Government Museum, Calcutta</td>
</tr>
<tr>
<td>6</td>
<td>Calcutta</td>
<td></td>
<td></td>
<td></td>
<td>Western Government Museum, Calcutta</td>
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*Fig. 97: Table showing the distribution of ‘Copper Hoards’ and other bronze and copper implements of protohistoric India.*

*Note: Data from various sources, including archaeological excavations and museum collections.*
but with a marked concentration in the Ganga plains, reaching up to Chhota Nagpur and Ranchi in Bihar.

THE PROBLEM OF HOMOGENITY

The findspots of the different types of the implements viz., flat celts, shouldered celts, bar celts, chisels, spear-heads, antennae-hilted swords, harpoons and anthropomorphic figures, etc., when plotted on a map of India, two things stand out prominently: (i) some are universal in their geographical distribution, and (ii) regional differences are seen in tool-assemblages. The findspots of these copper weapons can be grouped into (i) ‘Eastern Zone A’ engulfing Bengal, Bihar, Orissa and eastern Madhya Pradesh; (ii) ‘Northern Zone B’ spreading over the Ganga-Yamuna doab, and (iii) ‘Chalcolithic Zone X’, about a dozen excavated sites have produced such copper and low-grade bronze implements in small numbers. Some of these weapons are similar to those found in ‘zones ‘A and B’, but others have regional differences. These implements unearthed from regular and securely dated strata, have been associated either with late Harappan culture or post-Harappan chalcolithic cultures. Therefore, they have been designated as ‘Chalcolithic Zone X’. In ‘Zone X’ all the types of zones ‘A’ and ‘B’ have been found except the harpoons. Two new types of weapons, in addition, have been noticed: (i) curved axe-blade and (ii) single splayed-sided axe-blade. The first five types, having been prevalent in all the three zones, are universal. The common occurrence of these would warrant the possibility of zonal interrelationship besides the culture itself being contemporaneous with the chalcolithic culture of India.

In 1905 A.D. Vincent Smith had a weapon from Gungeria chemically analysed and
found in it only 0.5% of lead as impurity. He believed that these implements were of pure copper. In 1951 A.D. the archaeological chemist, B.B. Lal\(^{15}\) analysed the anthropomorphic figure from Bisauli which showed 98.77% of copper content. Smith has referred to four other implements which were chemically examined and were found to be of bronze. These are:

(i) A Celt from Jabalpur which contains 13% tin.

(ii) Elliot Sword\(^{16}\) No. 634,3.83, preserved in the Natural History Museum, Edinburgh, discovered from Fatehgarh. It may also be called hooked spear-head.

(iii) A Harpoon of the Ganga basin origin preserved at Norham Castle, U.K. It has 7.97% tin.

(iv) Elliot Harpoon.

These definitely belong to the Copper Hoard culture-complex because of their singularly characteristic features. Harpoons have been found only in ‘Zone B’. It proves that copper and low-grade bronze were used simultaneously in some cases.

**STAGE OF DEVELOPMENT\(^{17}\)**

The weapons found in ‘Zone A’ are rough and coarse as compared to those found in ‘Zone B’ which proves a slow and constant refinement in typology. Secondly, ‘Zone B’ indicates more advanced form of manufacturing techniques including casting, forging, filling, etc. Harpoons, anthropomorphic figures, antennae swords and spear-heads have been found only in ‘Zone B’ which suggests that perhaps these were locally produced in the Yamuna-Ganga Valley. It shows the migration of tools from ‘Zone A’ to ‘Zone B’. Zones ‘A’ and ‘B’ as suggested by S.P. Gupta, correspond to two successive stages of development of this industry, both in time and space.


\(^{16}\) Walter Elliot Smith describing a weapon in the National Museum of Antiquities, Edinburgh has used the term ‘Sword’. The weapon was similar to the one discovered at Fatehgarh. Since then Fatehgarh specimen is called ‘Elliot Sword’ but, as has been discussed later, it is a spear-head.

\(^{17}\) This is based on the observations of S.P. Gupta.

**ORIGIN**

These weapons originated in ‘Zone A’, because:

(i) ‘Zone A’ contains only five types which shows that the industry was in its early stage.

(ii) The types in ‘Zone A’ are simple and basic in character. There does not seem to be any earlier stage of evolution.

(iii) The technique employed in the manufacturing of tools in ‘Zone A’ is simple. It includes simple forging, hammering and rudimentary casting. The weapons of ‘Zone B’ reveal developed form of casting, cutting, notching, etc.

(iv) In ‘Zone A’ the actual specimens have been found where the copper ores in Garhwal and Kumaon region are quite far from the hoard sites.

(v) It has been suggested by some scholars that the copper shouldered celts and bar celts of ‘Zone A’ have been copied from similar stone tools of the neolithic period which also proves that ‘Zone A’ was the original home of this industry where the weapons followed the Stone Age culture.

**THE PROBLEM OF AUTHORSHIP**

According to Heine-Geldern\(^{18}\) the Vedic Aryans produced these weapons sometimes between 1200 and 1000 B.C. He has tried to establish the cultural interrelation between Persia, Transcaucasia, Northern Caucasus, South Russia and India during that period. In his opinion these tools bear foreign influence and also reflect a period of cultural fusion. However, the Koban implements have hilts and blades separately, while Indian examples are cast all in one, but a few implements like a dagger with a blunt antennae from Bithur has an exact replica in a Koban dagger now lodged in a museum at Saint German. Regarding the two types of harpoons found from Ganga Yamuna doab and Maitat-hal in Chautang valley, he thinks that type
I (Sarthaulli) (fig. 98) is indigenous and type II (Bisauli) (fig. 99) has evolved from the contact of type I. With the javelin-heads and arrow-points having simple barbs and mid-rib found prevalent in Transcaucasia, Talish and Luristhan, he says, "If we could hope to find some archaeological traces of the Vedic Aryans it could be among those prehistoric and bronze objects from Northern India". Stuart Piggot, however, tried to associate these weapons with the Harappan refugees. He writes, "It would be tempting to associate this movement with something more than trade and to see in it the colonization of Ganga basin by refugees and displaced persons from Punjab and the industry during the time of break up of the Harappan empire and coming of the raiders from the west. The deposition of hoards itself suggests a time of insecurity and economic instability, and may mean that invasions gathered momentum and pressed on beyond the old frontiers of Harappa kingdom and down into the Ganges valley".

Y.D. Sharma has discovered ochre-coloured ware at Bahadarabad (near Hardwar) which is a Copper Hoard site. R.C. Sharma and O.P. Tandon have also found similar types in the ochre-coloured ware at Manpura and Bhatpura. On the basis of this similarity Y.D. Sharma thinks that it is quite probable that the Harappans evolved new types with their movement and then the 'Copper Hoard' culture may be termed as the last phase of the eastern movement of the decaying Harappan culture. But the views of Y.D. Sharma do not sound accurate. Half a dozen sites, having Copper Hoards or ochre-coloured ware, have since been excavated, but nowhere the ochre-coloured ware and the copper tools have been recovered together.

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19 Ibid.
On the basis of several excavations in Malwa and Deccan, H. D. Sankalia feels that the pottery and the wares of Navada-toli suggest Iranian or West Asian influence. He also thinks that the possibility of the Copper Hoard people being an earlier group of Aryans or Iranians, cannot be ruled out.

B. B. Lal has made three prepositions. First, the people may be the aboriginals of the Ganga basin belonging to the proto-Australoid group. Secondly, they may be identified as the ancestors of modern Mundas, Santhals, etc., living in the hilly tracts of Bihar and Bengal. Thirdly, they may be the Nishadas of the Vedic texts whom the Aryans encountered on their arrival in the Ganga basin.

S.P. Gupta has analysed the views of all these scholars and has surmised that in ancient days Munda speaking people inhabited Bengal, Orissa, Bihar, M. P. and U. P. Amongst some of these Munda speaking people the copper industry originated. Due to the pressure of increasing population and natural search for better land, these people migrated into Yamuna-Ganga valley. Soon they had to encounter the Indo-Aryans who were proceeding from the West to the doab. They were defeated. Intermingling of people using the Indo-Aryan and Munda languages took place. The group which could not coexist with the invaders fled and took refuge in the adjoining hilly tracts.

CHRONOLOGY

Vincent Smith dated these tools to c. 2000 B.C. Piggot and Y. D. Sharma keep them between c. 1750 and 1000 B.C. B.B. Lal assigns them the date of c. 1200 B.C. Gordon suggests c. 800 B.C. and H.D. Sankalia has given c. 1500 B.C. as their date. However, on the basis of the stylistic comparison and circumstantial evidence these can be assigned to the post-Harappan period. The chalcolithic culture and Copper Hoard culture existed side by side during the period from circa 1700 B.C. to 1000 B.C. in zones ‘B’ and ‘X’. As a natural corollary to this preposition, the beginning of the Copper Hoard weapons i.e., the ‘Zone A’ stage, can easily be placed in the first half of the 2nd millennium B.C.

COPPER METALLURGY IN INDIA

The copper metallurgy in India dates back to the close of the 4th millennium B.C. Much is not known about the factors responsible for it but the experiments carried out by Gowland Coghlan and Witter have advanced the theories regarding the evolution of copper metallurgy by the shaping of the native copper which took place in Western Asia in 6th-5th millennium B.C. Very soon the malleability and annealing (heating and hammering) of native copper was also known. But it was the fusibility of copper whose knowledge was responsible for the melting, casting and solidifying of this metal. Casting introduced the use of open and closed moulds. More complicated forms, in due course, were evolved by core-casting and cire-perdue (lost-wax) methods.

THE SOURCE OF THE RAW MATERIAL

It is possible that the people of Indus valley might have obtained copper from the mines in Baluchistan (Ras-Kuh and the Khwaja Amran ranges) and in Rajasthan (Ajmer, Rohira Khetri and Singhana). Copper was also available from Orissa-Bihar regions specially at Singhabhuma and Chhota Nagpur. The mixture of 20% of tin with copper gave rise to an alloy called bronze. This metal suited very much for the construction of complicated weapons and was popular throughout the Indus culture. The chemical analysis of a few copper and bronze tools has revealed the presence of impurities such as arsenic and nickel and since the copper ores from Rajasthan and

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23 H. D. Sankalia, op. cit.
25 S.P. Gupta, op. cit., p. 5.
26 Vincent Smith (1905), op. cit., pp. 229-244.
28 Y. D. Sharma, op. cit.
29 B.B. Lal, op. cit., p. 38.
31 S.P. Gupta, op. cit., p. 5.
Afghanistan contain both nickel and arsenic as impurities, it is possible that the raw material was obtained from these places.

TOOL TYPES

(i) HARPOONS

Harpoons, similar to those from India, have occurred among bone objects in the Magdalenian Culture, widely removed from specimens in time and space. Though simple barbs from Transcaucasia, Talish and Luristan in Iran are known, they can, in spite of Heine-Geldern's insistence, scarcely have inspired the Indian specimens. Besides the intermediate land-mass has not yet yielded specimens to suggest any definite cultural link. Nearer home they are comparable, on the contrary, to cave paintings in Ghormangur in district Mirzapur, Uttar Pradesh (fig. 103), and suggest the source of inspiration.

So far six sites have produced these specimens and all of these are in Uttar Pradesh. Pariyar has yielded a few, Bithur, Rajpur Parsu 6 and other sites have yielded 1 each. The harpoon, at present in the Bharat Kala Bhawan, Varanasi, found from Bisauli (fig.98) is 17 inches long and is a fine example. It has a strong medial-rib and a long

32 vide the chart prepared by B.B. Lal, op. cit., opposite p. 38.
33 B.B. Lal, op. cit., p. 25.
tapering blade. The middle part has three pairs of barbs which are incurved and between the harpoons from Bisauli (fig. 98) and Sarthauli (fig. 99) and, 

pointed. At the junction of the barbed portion with the tang there is a pair of knobs of which one is perforated. A cord was inserted in this perforation (also called 'eye') which tied it to the shaft. Although there had been some hammering at the later stage but originally the weapon was cast. B. B. Lal's examination of one from Sarthauli (fig. 100) shows that it is also possible that the barbs were cut out from the blade by chiselling and then trimmed up with a file, though they may have been cast as barbs and then sharpened by filing. One such hook-barbed harpoon made in a mould is kept in the Horniman Museum which is of a fine massive casting of excellent workmanship. Although most of the harpoons, so far discovered, fall within one general category yet there is some technical difference, therefore, these have been called sub-type A and B respectively. In the Sarthauli specimen (fig. 101) the blade is not a well-developed entity. It is only 3 inches while the total length of the implement is 11 inches. Its barbs are flat (fig. 102). The Bisauli blade is nearly half the total length of the implement and its barbs are incurved. It has rightly been suggested that while Sarthauli piece was cast, the Bisauli specimen was made by trimming a plain spear-head because there are indications of trimming on the outlines of the barbs.

D.H. Gordon has referred to some multi-barbed mesolithic horn harpoons

34 D.H. Gordon, op. cit., p. 137, pl. XXVII, a.
35 B.B. Lal, op. cit., p. 28; for Sarthauli, pl. VII B, 2; figs. 4,8; for Bisauli, pl. V. 2, figs. 2,3.
36 The harpoon illustrated by Hirand Shastri in the Journal of Asiatic Society of Bengal, XI (1915), pl. III, 1 also shows trimming marks on the outline of the barb.
37 D.H. Gordon, op. cit., p. 137, figs. 17,4.
found in Europe but these have nothing
to do with the harpoons under study.
Similarly, the bone harpoons found at
Magdalenian also are not related. Heine-
Geldern38 has proposed that the arrows with
barbs from Transcausasia, Talish and Luristan
might have given rise to the Indian harpoon
but, as discussed earlier, the barbed arrow-
heads are fundamentally different and in
their shape and method of hafting these
are distinct from the harpoons. In some of
the prehistoric cave paintings barbed-spears
have been painted which may give some clue
to us. For example Ghormangur cave at
Mirzapur (U.P.) depicts a scene of
rhinoceros-hunting in which five persons,
carrying harpoon-headed blades, are
attacking the wild animal from different
directions (fig. 103). Another cave
Likhunia, in the same district portrays,
a man who has thrust a multiple spear
into the body of a sambhar. It cannot be
said with certainty as to what was the
implement made of, i.e., metal, bone or wood
combined with microlithic barbs but the
fundamental conception is same. B.B. Lal39 is
right in telling that the copper harpoons of
the Ganga basin may have had some
relationship with those portrayed in the
central Indian paintings.

(ii) ANTENNAE SWORDS

Another interesting type of weapons
belonging to the Copper Hoard is the antennae
sword. Eighteen such swords have been
recorded by B.B. Lal, of which thirteen were
found from Fatehgah (fig. 104), 1 from
Bithur and 1 from an unknown place. Four
more such swords have recently been pur-
chased by the National Museum, New Delhi
from a dealer in Mehsana, Gujarat40 (fig.102).
Thus outside the Ganga basin Kaltur (where
three swords are found) and Mehsana
(where four swords, referred to above, are
recovered, are the only places which have
yielded antennae swords.

Antennae swords of a comparable shape
have been found in the Koban region of
upper Iran with a difference in that the hilt
and handle are separate pieces that have been
joined subsequently, besides being plain cross-
section, as compared to the ridged one of
the Indian specimens, and having a hole in
addition.

The antennae swords are long, tapering,
double-rapiers with a strong medial-rib.41 The
hilt bifurcates like the antennae of an insect;
hence the name. The two projections of the
hilt stand at an angle of 45° to the base,
i.e., straight hilt. In some cases the other
projection of the hilt is so much bent that
it almost touches the hilt. The most
surprising thing is that the hilt and blade is
of single cast. There is no hole in the hilt.
However, there is one specimen from Shahabad,
U.P. which has two holes on the blade, one
on each side of the medial-rib, in the lower
portion. This is displayed in the National
Museum, New Delhi. The two edges of the

39 B.B. Lal, op.cit., p. 35; e.f. J. Cockburn, ‘On the Recent
Existence of Rhinoceros Indicus.’ Journal of Asiatic Society
of Bengal, LII, pt. II (1883), pp. 56-64, pl. VII.
40 Prehistoric Gallery, National Museum, New Delhi.
41 Annual Report of the Archaeological Department,
blade were originally badly battered and irregularly twisted, probably due to their use against some hard object. A similar sword has been reported from north Caucasia but there are some technical differences between the Caucasian and Indian sword. In the Caucasian type the hilt and the blade are two separate parts which were joined at a later stage. The hilt has a hole and the blade is flat-sectioned. All these characteristics make it entirely a独立 weapon and there does not seem to be any affinity between the two.

About the antennae swords, Heine-Geldern is positive, in spite of B.B. Lal's reasoned emphasis on the basic differences between the antennae swords of India and those of other region, that they were inspired from the west of the Khaban and that they occur in the Khaban region between circa 1200 and 1000 B.C., or even a little later.

(iii) ANTHROPOMORPHIC FIGURES

The Anthropomorphic figures have baffled the scholars. So far only 7 specimens; 3 from Bisauli, 3 from Fatehgarh (fig. 106) and 1 from Sheorajpur have been reported. These are unique examples and are not found in any other part of the world. Nor have they been reported either in the preceding or succeeding cultural levels. Its exact purpose is not known but it is quite probable that it was an 'all-purpose tool'. The curved 'arms' are sharp which was deliberate and could be used for cutting purposes. The comparatively long and blunt 'legs' might have served as a grip. Since these are very heavy, some as heavy as ten pounds or even more, they might have proved deadly when hurled at close quarters. The intentionally blunted 'head', hammered into a flanged ridge, was most suitable for breaking the skulls of the animals and enemies (fig. 106).

D.P. Agrawal has also suggested that it might have been used as a missile.

The 'anthropomorphic figure' from Bisauli is exhibited in the Municipal Museum, Allahabad. Its total length is 124 inches (from 'head to foot') and width 11 inches (from 'arm to arm'). It was first cast and then hammered because the marks of trimming are visible. The 'arms' are incurved and have sharp outer edges. Two other such figures are kept in the Bharat Kala Bhawan, Varanasi of which one is tall and the other is dwarfish. The former implement is 17 inches long and has a very prominent ridge. The second type is only 9 inches long and 13½ inches wide. The curved portions of the 'arms' of both these types are comparatively thinner and the outer edges are very sharp. The hammer-marks visible on the 'arms' suggest that this portion was expanded by beating.

In this connection a reference to the so-called Lothal anthropomorphic figure may also be made. S.P. Gupta has compared this with the Copper Hoard anthropomorphic figures, but D.P. Agrawal has refuted this comparison on the ground that the basic feature of the Gangetic anthropomorph is its thickened top appearing nail-head like in section, whereas Lothal specimen has a flat section. According to D.P. Agrawal, Lothal specimen is not an anthropomorph at all, but something else. K.N. Dikshit has tried
to associate these figures with the tin images of Shani devata dipped in oil which are taken out by a few sadhus on Saturdays, but it is highly conjectural and has not been supported by anyone else.

(iv) FLAT CELTS

Flat celts have been reported from Hadda and several other Indus sites besides four from Jorwe near Nasik, Maharashtra. As B.B. Lal has pointed out, the shape of the celt is so basic that it cannot be used as a means of typological comparison or related conclusions.

Out of the 34 Copper Hoard sites recorded by B.B. Lal, 23 have yielded flat celts. This was the most common implement. The celt from Pondi, now in the Municipal Museum, Allahabad is flat having square butt, slightly concave sides and a splayed out cutting edge. It is 7 inches long, $5\frac{1}{4}$ inches wide and $\frac{1}{2}$ inch thick. It weighs 44 pounds. In the same Museum five celts found from Bithur (figs. 109, 110, 112, 113, 118 and 122) are preserved. No. 2 of the group (fig. 110) is comparatively longer and the last (fig. 122) is stumpy being only $3\frac{1}{4}$ inches long and 3 inches wide. The celt from Bisauli, at present in the Bharat Kala Bhawan, Varanasi is very long having a length of $11\frac{1}{4}$ inches and its maximum width is $2\frac{1}{2}$ inches. The celt from Hardoi, displayed in the State Archaeological Museum, Lucknow is $6\frac{1}{4}$ inches long and $4\frac{1}{2}$ inches wide. In this museum is also a celt found from Indilapur (fig. 107) which is $10\frac{1}{4}$ inches long and $7\frac{1}{4}$ inches wide. The blade here begins to develop into a separate entity and on the basis of its shape it seems to occupy an intermediary position between the flat and shouldered type of celts.43

These celts have been divided into four sub-types:

A. Long flat celt of irregular variety, having edge as broad as the butt end. Length approximately 23 cms.

B. Triangular flat celt with straight cutting edge. Length 10.5 cms.

C. Triangular flat celt with crescentic cutting edge. Length 16.5 cms.

D. Oval flat celt with rounded cutting edge and butt end. Length 14 cms.

(v) SHOULDERED CELTS

Apart from Gungeria collection in which several such specimens have been found, 17 sites have produced shouldered celts. Four pieces found in Bithur are in the Municipal Museum, Allahabad. In these types of implements a clear ‘shoulder’ is visible where the blade joins the sides. From the table given by B.B. Lal (fig. 97) it is clear that such specimens have a more south-easterly distribution and have mainly been found from eastern U.P., Bengal, Bihar and Orissa. As stated earlier, it is also plausible that this type might have developed from the flat celts. Five shouldered celts, found from Dhaka, are kept in the State Archaeological Museum, Lucknow (figs. 117, 119, 120, 121). One of them is $8\frac{1}{4}$ inches long out of which the

43 B. B. Lal, op. cit., p.29.
COPPER HOARD WEAPONS

blade portion alone measures 5 inches. In another example the case is just opposite. Here the blade is only 3 inches out of the total length of 7 inches (fig. 117). All these celts are sturdy, well-made and normally weigh 4 lbs.

One shouldered celt with two kinks has been found at Chalta, district Midnapur, West Bengal which has recently been mentioned in a booklet “Exploring Bengal’s Past” published by the Directorate of Archaeology, West Bengal. This is the second example of a copper shouldered celt from West Bengal, the first being the one discovered at Tamajuri, district Midnapur.

(vi) BAR CELTS

It is a parallel sided bar. Its width ranges from 4 to 6 inches while length from 1 foot, 6 inches to 2 feet. Its bottom is flat, section rectangular, and upper side convex. The cutting edge is sharpened.

B.B. Lal has noticed similar features in some stone bar celts discovered from hilly regions of Bihar, West Bengal and Orissa and says that there is a good reason to believe that the copper celts developed from their prototypes in stone in course of time when metal began to replace stone (figs. 137 to 140).

D.H. Gordon, however, differs. In his opinion the stone celts have all the signs of careful workmanship, which characterise a stone copy of a metal artifact, and there is little doubt that they are derived from the copper celts and not vice versa. “This long, narrow tool must have had a peculiar pur-

pose which it served at Chanhu-daro and Nal and possibly elsewhere in that general area during the second half of the 3rd millennium B.C. The Gungeria bar celts (figs. 123 and 124) are from 12 to 24 inches long, those from Hami 15 to 24 inches and the probable prototype from Chanhu-daro 10 to 13 inches. The stone celts regarded by B. B. Lal as being the prototypes are only 8½ inches long, probably the greatest length obtainable in a stone copy, and so unlikely to the original tool designed to serve the purpose for which length possibly for leverage was necessary.”

These were certainly used as cleavers although these could have been used in several other ways also.

Only three sites have yielded such specimens. Many pieces have been found from Gungeria, 17 from Hami and 1 from Rajpur Parsu.

(vii) SPEAR-HEADS

Altogether 8 such pieces have been discovered: 5 from Sarthauli (figs. 125 to 128), and 1 each from Fatehgarh, Manpur and Niorai. The hook of the Fatehgarh weapon is not very clear. These have also been termed as “hooked swords”. The broad-bladed spear-head found at Fatehgarh is commonly known as ‘Elliot Sword.’ All these weapons are more than 28 inches long and, in spite of their long blades, these should be taken to be spear-heads and not the swords. D.H. Gordon says, “Both (Fatehgarh and Niorai) weapons have a projection curving outwards from the tang, and the same contrivance is found on three out of five spear-heads found at Sarthauli. The ‘Elliot Sword’ has all the appearance of a sword but the three examples from Sarthauli (fig. 129) with similarly furnished tangs are barb-headed and must be intended for spears.”

This type of projection is seen on the harpoon-head found from the same site and was evidently a method of fastenings alternative to the holed lug.

44 Ibid., p. 32 pl. XIA; fig. 5, 1.
45 E.J.H. Mackay, Chanhu-daro Excavations, (1943) pls. LXVIII and LXXI.
46 D.H. Gordon, op. cit., p. 137.
The smallest of the five Sarthauli spear-heads is 12\(\frac{1}{2}\) inches long (fig. 127). Like others, it has leaf-shaped blade with a stout mid-rib and a small flat tang which is only 2 inches long. The longest of the lot is 20\(\frac{1}{2}\) inches long (fig. 125). The medial rib is very prominent. Vincent Smith has also opined that, “In spite of its length it should be called a spear-head. I possess a Somali spear-head which is 24 feet long without, and 33 feet long with the socket. The hook on the side of the tang seems to have been intended for fastening the blade to the shaft by a thong”. Thus in all probability these were spear-heads.

(viii) PARASHU (BATTLE-AXE)

In the State Museum, Lucknow is kept a hatchet or parashu which has been discovered from Sarthauli (fig. 130). It has an unusual shape and measures 6\(\frac{1}{4}\) inches long and 9 inches wide. Its cutting edge is not sharp. The hammer marks are visible on its surface. It was originally cast but in order to give the final touch, some trimming was done with the hammer. This is the only specimen of its kind.

(ix) DOUBLE-HEADED AXE

Copper double-axes have also been reported in India from other cultural levels. At Harappa there are two specimens of a tool type that recalls double-axes. The caution implied in this statement is due to the fact that the two working ends are not sharp and there are kinks between the edge and the waist. There is another double-axe of Harappan culture at Lothal. It is of slightly different type. It is only a rectangular piece of copper flattened at both ends and sharpened. The waist is narrow but not so prominently as in examples from the hoards. A terracotta double-axe has been reported from period III (c. 1000 B.C.) at Pandu Rajar Dhibi. It is also depicted in the from of a motif on a clay seal.

Three such pieces, one each at the State Museum, Lucknow, Baripada Museum, Orissa; and Patna Museum, Patna are preserved. These were found on the bank of Gulpha river, at village Bhagra Pir in Mayurbhanj state of Orissa. These were apparently intended for use as battle-axes, the shaft being split at the end and the narrow neck of the axe-head firmly bound in the cleft. (fig. 131) The largest axe measures 18\(\frac{1}{4}\) inches in length and 15\(\frac{1}{2}\) inches in breadth and might have been intended


49 B. B. Lal *op. cit.* p. 29, pl. VII B, 1, figs. 4, 6.

for ceremonial or sacrificial use. The other two measure 10 inches by 8½ inches and 10½ inches by 7 inches respectively. Two of them are 1/8 inches in thickness and the last one is about ⅜ inch thick. These were made by casting or hammering out a roughly oval disk of metal, sharpening the edges and then cutting out two more or less circular holes to form the neck. Two such examples were excavated at Hallur, district Dharwar by M.S. Nagaraja Rao of Dharwar. It comes from the Neolithic-chalcolithic culture of the Southern Deccan and is ascribable to the later half of the 2nd millennium B.C. Its butt-end is sharp and rounded in shape as the primary working edge. The butt portion is shorter and narrower than the primary end.

(x) MISCELLANEOUS WEAPONS

It would be advisable to discuss those weapons also which have wrongly been included in the list of Copper Hoard weapons. Some of these are the socketed celt, Fort Munroe sword, adze-axe, Trunnion celt and Kurram axe.

(A) SOCKETED CELT\(^51\)

In 1921 A.D. a socketed celt, the only one of its kind so far known, was unearthed from the site of Raja Karna ka Kila near Kurukshetra, Haryana. Whence it came is a puzzle. It looks like a developed and derivative object and is positively a non-Harappan specimen of protohistoric times. Although discovered in the regular

\(^51\) E.J.H. Mackay, op. cit., (1943), pls. LXII ff.
excavation, its stratigraphical details were not recorded and hence it is difficult to assign it a correct date. This is made of low grade bronze.

**B) FORT MUNROE SWORD**

The ornamented bronze sword, cast in one piece, 17\(\frac{3}{4}\) inches long, from the Panjab presented by J.M. Davie to the National Museum of Antiquities, Edinburgh in 1883 A.D., has a much more modern appearance\(^{53}\) (fig. 134). It has West Asiatic influence and it belongs to post-Harappan period. It is double-edged, straight, and pointed with a medial rib. Crescent-shaped hilt is well made.

**C) ADZE-AXE**

The adze-axe of Mohenjo-daro has been traced to anywhere in Rumania, the Ukraine, the Northern Caucasus, Assyria and Iran. It is said to have evolved in Transylvania in the first half of the second millennium B.C. From there it travelled to the Near East, where it occurs at Hissar III C and Turang-tepe between 1200 B.C. and 1000 B.C. [Heine-Geldern, op. cit., (1936), pp. 94-98]

It has been described by John Marshall. It is 6.25 inches long and 0.3 inch thick. The rounded edge is sharply sloped on both sides. The square butt also has a blunt edge. The sides are cut square with slightly rounded edges. It is of copper and has been unearthed from 5 feet below surface. It is possible that it was used as an adze, for it has a true chisel-edge. It has a blunt edge at the butt but it could be sharpened and utilized, if required.\(^{53}\)

**D) TRUNNION CELT**

This copper celt was found in a Deputy Commissioner's bungalow at Daltonganj. It was noticed by Mangar Dusadhi chowkidar on the 27th September, 1910. The celt, which is a broad one with slightly convex face and unsymmetrically developed sides, is a fine example of early Indian workmanship. Its apex is wide and from it the sides gradually expand to meet the rather splayed out edge. It seems to have been roughly cast then beaten out into its present shape; for the hammer marks are clearly visible. The form is very primitive and seems to have been influenced by a stone model.\(^{54}\)

**E) KURRAM AXE**

It was found from Shalozan village in Kurram agency and was presented to the Peshawar Museum by Captain R. A. Lyall (fig 135). The axe is narrow and truncated and the sides parallel as far as two propelling lugs, below which they gradually expand to meet a crescentic, splayed out edge, symmetrically moulded with respect to both back and front faces. It appears to be composed of pure copper and is very close to certain flat types from Gungeria.\(^{55}\)

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55 Ibid., p. 246, pl. LXVII B.
The Kurram axe is said to have parallels in the Mediterranean region in Europe, Transcaucasia and Iran, in a chronological range of circa 1200—1000 B.C.

These implements reflect Harappan influence. All these implements are of bronze while those comprising the Copper Hoards are of copper. "Thus, while the socketed axe, adze-axe, trunnion celt and Fort Munroe sword, etc., with their demonstrable West Asiatic affinities, are likely to have been associated with the upheaval and movement of people that followed the break up of the Harappa culture, the 'Copper Hoards', on the contrary, seem to point to a culture which was mainly confined to the Gangetic basin with a possible southward extension across the Vindhya and Kaimur ranges."55

TECHNOLOGY

According to D.P. Agrawal,57 who has carried out spectroscopic and metallographic analysis on a number of copper hoard artifacts, these people did not know alloying. They, however, knew close-casting technique but did not use cold work and annealing. In metal forging the Copper Hoards are different from the Harappans and the chalcolithic cultures. The Harappans used deliberate arsenic, lead and tin alloying, the Banasians used lead only, the Malwa and Jorwe cultures employed lead and tin alloying, but the Copper Hoards are generally of pure copper.

MID-RIB TECHNIQUE

Mid-rib was evolved in Western Asia as early as 4th millennium B.C. Its main purpose was to strengthen the implements so that it may not bend down in action.58 Such implements have been recovered from the excavations at Shah Tape, Iran and Afghanistan. Mackay found six implements (dagger, knives and dirks) with mid-ribs at Mohenjo-daro. Harappa has also yielded two examples of spear-heads having mid-rib. On the basis of these technological similarity S.P. Gupta thinks that there was some contact between Copper Hoards and Harappans. The implements with raised mid-ribs have also been noticed from the post-Harappan chalcolithic context at Navadatoli, Chandoli, and Daimabad.

S.P. Gupta believes that the Copper Hoards originated in Bihar, about 2000 B.C., developed in the Yamuna-Gangetic Valley and reached maturity between circa 1800 and 1300 B.C. when it came into contact with the late phase of the Harappa culture and early phase of the chalcolithic cultures. Though the hoards continued for some time, say a couple of centuries, it was over-shadowed by the Painted Grey Ware people between circa 1100 and 500 B.C. when iron came into

57 D.P. Agrawal's thesis includes the available chemical data for determining the ore types and the spectroscopic and metallographic analysis of metal samples.
58 K.N. Dikshit, 'The Copper Hoards in the light of Recent Discoveries', Bulletin of Ancient Indian History and Archaeology, University of Sagar (M.P), No. 11 (1968), pp. 43-50.
use. During the North Indian Black Polish Ware period and later i.e., after 500 B.C., the hoards were no longer any effective industry.

In 1965 A.D. the National Museum, New Delhi acquired eight Copper Hoard weapons. These are:

1. Double-barbed harpoon with straight barbs, having four bars on each side of the shaft. The blade has a medial ridge and the shaft has two projecting knobs, one on either side, one of the knobs is having a hole. Its total length is 35 cms. (fig. 141).

2. Double-barbed harpoon with curved barbs. Except the curved barbs the tool is similar to number 1. Length 37 cms. (fig. 142).

3. Antennae sword with one portion of the antennae-type hilt broken and missing. At the base of the blade there are two holes, one on each side of the medial ridge. Total length, from the hilt to the tip-end, is 47 cms. (fig. 143).

4. Shouldered celt with two short kinks. The crescentic edge is slightly damaged. Length 21 cms. (fig. 144).

5. Long flat celt of rectangular variety having edge as broad as the butt end. Length 20 cms. (fig. 145).

6. Triangular flat celt with straight cutting edge. Length 10.5 cms. (fig. 146).

7. Triangular flat celt with crescentic cutting edge. Length 16.5 cms. (fig. 147).

8. Oval flat celt with rounded cutting edge and butt end. Length 14 cms. (fig. 148).

The weapons belonging to the Copper Hoards are very much individualistic and uncommon and where parallels have been found, either in the contemporary, late Harappan culture, or in the Stone Age tools, their comparison is superficial and rarely convincing. It is, therefore, in the fitness of things that these weapons are treated in a group and as a separate entity. They certainly add one more chapter to the glorious military history of our country.
ARCHERY

ORIGIN AND DEVELOPMENT: LITERARY EVIDENCE

With Bow let us win kine, with Bow the battle,
With Bow the victors in our hot encounters.
The Bow brings quiet and sorrow to the foeman;
Armed with Bow we may subdue all regions.

Rigveda, VI. 75, 2; Yajurveda, 29, 39.

In the Rigveda\(^1\) under the garb of a well formed mytho-poetic style we have descriptions of the terrestrial war at many places. War in its fierceness is finally described against the background of the “War of Ten Kings”.\(^2\) It is not always a happy affair; on the contrary it is dreadful. It appears that the ends of the earth would fall asunder,\(^3\) and the tumult reaches heaven.\(^4\) The arrows are said to shoot like tuftless children. The bow vanquishes the desire of the enemy and defeat is expected.\(^5\) The bowstring

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\(^1\) The Rigveda, like the Bible and the Quran, is said to have a divine origin. Historically it was composed round about 2000 B.C., passed on orally from one generation to the other and finally written down in Sanskrit (ancient Indian language) in about 1500-900 B.C. The other three Vedas i.e., Samaveda, Yajurveda, and Atharvaveda are more or less contemporary and all these four Vedas (literally the ‘sacred science’), together with their commentaries, are covered within the term the Vedic literature and signify the (warlike) conditions of India in the 2nd-1st millennia B.C.

\(^2\) Rigveda, published by the Dayanand Sansthan, 1st edition, vols. I and II (New Delhi, V.S. 2031–1974 A.D.), VII. 18. 83; cf., VI. 75. 17:

\(^3\) Ibid., VII. 83.2.

\(^4\) Ibid., VII. 3.

\(^5\) Ibid., VI. 75. 5:
being stretched, reaches the ear and embraces it, as does a damsel her lover; she (the string) whispers softly and darts on her target. The ends of the bow are two mothers and take the arrow on their lap. The hero armoured with black leather plates and equipped with quiver, bow and arrows rides a chariot and roars. The king of the Rigvedic period was required to be of stiff command and the wielder of a terrible bow.

In the Vedic literature frequent references to the bow and arrow are found. In the Rigveda, Rudra has been eulogized as the killer of his enemies. Repeatedly it has been advised in this Veda that the country should abound in brave men, well versed in the science of archery, who should maintain peace and order. In the Yajurveda, knowledge of the science of archery has been considered as one of the essential qualifications of a king who has been called shatdhanva (i.e., ‘the holder of hundred kinds of bows). While blessing the general (senapati) it has been said, “So long as thy bow is fitted with the string, thy will never be defeated and thy country will always be prosperous.” This was the period of bow and arrows and the chariots. Cavalry and elephantry were still not introduced in Indian battle-field, that is why, for every achievement bow was the only medium and has, therefore, rightly been praised.

Fig. 141 (1) Prehistoric (2) Prehistoric (3) From the Indus Valley excavations (4) From the Indus Valley excavations (5) Vedic (6) From the Punch-marked coin (7) From the Tribal coin (8) From Taxila excavations.

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6 Ibid., VI. 75.3.
7 Ibid., VI. 75.4.
8 The Rigvedic warriors seem to have been protected by various appliances like the hand-guards, quivers, etc. See Rigveda, VI. 75. The attires of the Maruts, the divi-e warriors, are to be noted cf.,
9 For a general survey of war n the Rigvedic India please see Hopkins, “Position of the Ruling Caste in Ancient India,” Journal of American Oriental Society, XIII, p. 57 ff. For weapons see Ibid., p. 235; P.C Chakravarti, Art of War in Ancient India (Delhi, 1942), chapter XIV, pp. 150-180; V. R. R. Diksitar, War in Ancient India Also see Keith, Religion and Philosophy of the Vedas and the Upanishadas (Cambridge, Harvard University Press, 1925), vol. 31, p. 288;

10 “Rudra” is the most ancient god of Hindu pantheon. He is the first preceptor of the science of archery. In the later period he is associated with Siva, the Lord of Destruction.

11 For further references of bow and arrow in the Rigveda, see II. 24.8; VIII. 7.4; 72.4; IX. 99; X 18.9; 125. 6, e.c.,
13 Ibid., 16.10:
14 Ibid., 29.39. For other references of bow and arrow in the Atharvaveda see 16.1 (isu); 16.3; 16.4; 16.5; 16.9 (abahu); 16.10 (shalya); 16.21 (issudhimate) 16.26 (mounted archery); 16.27; 16.39; 16.34; 16.52; 16.53; 16.54; 16.55; to 16.66; 17.43; 17.44; 17.45; 17.47; 17.49; 29.39; 29.40; 29.41; 29.42; 29.43; 29.45; 29.46, 29.50; 29.54; 29.56; 29.57, etc.,

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According to both the Atharvaveda and the Samaveda, the horse-chariot, corset and bow and arrow constitute the warlike equipment of a kshatriya (person belonging to the knightly caste). In the eleventh kanda (section) of this Veda, Rudra has been praised as the holder of a golden bow. In the Vedic literature occur such words as isu-dhanva\(^15\) (bow and arrow), isu-dhanvina (the holder of bow and arrow) adhijya-dhanva (bow fitted with string), etc.\(^16\)

Originally even the gods had no intimate acquaintance with the precepts of warfare. This deficiency was one of the causes of their defeat at the hands of the devils (asuras) in many a war. Then Mahadeva, the Lord of Lords (also known as Rudra and Siva) called the saint Vashistha and dictated a miniature Veda (upaveda) called Dhanurveda\(^17\) (literally the ‘science of archery’) which is exclusively devoted to the Indian mode of warfare in general and to the bows and arrows in particular. This treatise was regarded

\(^15\) Rigveda, II. 24.8 ; 24.8; 30.10 ; VI. 59.71 ; 75.2 ; VIII. 20.20 ; IX. 69.1 ; Atharvaveda, I.3.9 ; IV. 4.7 ; IX. 9.1, etc., Nirukta, IX, 17.

\(^16\) Taittiriya Samhita, V.2; Aitareya Brahmana, VII, 19 ; 1.25 ; Shatapatha Brahmana, IX. 1 ; 1.6.

\(^17\) This is ascribed a date of about 1000 B.C. The copy in the possession of the author entitled Dhanurveda Samhita has been translated with commentary into Hindi by Kshemraja Shrikrisnadasa Shresthina. The quotations from the Dhanurveda used in this book, except where otherwise specified, are from this manuscript.
so sacred that only the **brahmanas** and the **kshatriyas** were permitted to learn it. Similarly, the robbers, thieves, cowards and persons of bad character were not allowed admittance to the study of this **upaveda**. Only the virtuous people could learn it for the welfare of the masses and for the defence of their religion, caste, self and country. It was here that every god and goddess was provided with a weapon; thus, Siva* was armed with a trident (trishula), Vishnu with a quoit (chakra), Indra with a thunderbolt (vajra) and so on (fig. 150).

The **Aitareya Brahmana**, a composition earlier than 600 B.C., throws interesting light on the preparation of an arrow. The point of an arrow represented Agni, the socket Soma, the shaft Vishnu, and the feathers Varuna.

Gradually, the bow and the arrows became all the more important and in the later Vedic period (1500 B.C.—1000 B.C.) it was considered a projectile **par excellence** (uttam). It was considered so precious that the bow, arrows and quiver, which the warrior was holding (or wearing) at the time of his death (if in the battle-field) or those

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18 Indian society was divided into four castes i.e., the **brahmanas** or the priestly caste, the **kshatriyas** or the warrior caste, **vaishyas** or the trading caste, and **shudras**, the lowest caste or the untouchables. The honourable position accorded to the profession of arms at an early period is shown by the fact that in the Vedic period **kshatriyas** originally enjoyed the exclusive privilege of carrying arms and subsequently stood next in the scale to the **brahmanas**.

19 **Dhanurveda Samhita**, op. cit., verse 5: द्वारकनाथसाम्बुर्यार्थमः सातु शंकरास्य द्वितीयः।

20 A single **dhanurdhara** (archer) can maintain law and order in a village, as a single lion rules the entire forest. **Dhanurveda Samhita**, verse 6: याकलो तल मध्यान्तः प्रभुस्तोः।

21 There are many gods and goddesses in the Hindu pantheon. The three supreme gods, known as trinity, are ‘Brahma’ the Creator, ‘Vishnu’ the Preserver, and ‘Siva’, the Destroyer. Each god has several manifestations, and Vishnu alone has ten incarnations. Each god has a favourite weapon of his own.

22 Indra, like Rudra, Varuna, Marutis, etc., is one of the Vedic deities.

23 **Aitareya Brahmana**, IV. 6.4.

24 According to **Nirukta Naigamkanda**, a treatise written in about 800-600 B.C., bows and arrows were superb (urtama), spears and javelins were mediocre (madhyama), and sword was the most inferior (adhama) weapon (See the 5th and 6th chapter of the second section of this work).

25 **Rigveda**, X. 18. 9

26 The **shudras** (persons belonging to the lower caste) could learn it of their own for hunting purposes; vide, **Dhanurveda Samhita**, op. cit., verse 3; **Agni Purana**, 100.7.

27 According to the **Kautsatiki Brahmana** the best daksina to the guru (preceptor) was a bow and three arrows.

28 The **Ramayana**, one of the two epics, written by the saint Valmiki in Sanskrit celebrates the deeds of Rama (the hero and the incarnation of Vishnu) whose wife, Sita, was kidnapped by Ravana, the ruler of Ceylon. In a ferocious fight Ravana, together with other devils, was killed by victor Rama, and Sita was regained.

29 The **Mahabharata** describes the wars of two branches, Kaurvas and Pandavas, of the reigning family of Hastinapur. The ‘Five Pandavas’ (‘Yudivistara’), the elder and a pious man, ‘Bhimaa’, the mace wielder, ‘Arjuna’, the most renowned archer, ‘Nakula’, the swordsman, and ‘Sahadeva’, the spearman were five brothers) were ultimately victorious who transferred the seat of government to Indraprastha, the site of the modern New Delhi.


31 श्रद्धा वाच्यालेले वाच्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेल्यालेंगे।

In the poetic histories—the **Ramayana** (c. 1200 B.C.) and the **Mahabharata** (c. 1000 B.C.) we find graphic description of Indian archery. Every noted knight was a distinguished archer. The fate of a battle was often decided by the armed Bowman. Rama, aged sixteen, had to shoot his very first arrow against an ogress named Tataka who hurled so many stones upon Rama that the latter was virtually covered with them. But as soon as Tataka roared out of joy, Rama hit his **shabdabhed** (to
hit with the help of the sound only when the target is not visible) arrow right in her breast with the result that she fell down and expired.31

Though well versed in all kinds of projectiles, edged-weapons and divine astras (missiles) Rama32 confined himself to bow and arrow and in all his battles this was the only weapon used by him.33 All the demons, from Tataka to Ravana, were killed with arrows. The Ramayana speaks of consecrated arrows capable of destroying complete armies.34 The arrows could produce fire, storm, water and other destructive elements such as serpents of various deadly forms. Rama shot towards Khara, the demon, arrow of agnidiptamukhani (fire arrows) and suryamukha (dazzling arrows).35 The two divine bows (one36 which decided the wedding of Sita and the second which ascertained the identity of Rama37 as god) and the different varieties of arrows mentioned in this epic will be discussed later.38

The Mahabharata abounds in the reference of bows and arrows.39 Every warrior40 was an expert archer and was capable of performing miracles. The most renowned was Arjuna, one of the five Pandava brothers, who could kill an elephant, upturn a chariot, Pierce an armour with a single arrow41 shot from his personal bow known as Gandiva.42 Only one archer, Eklavya by name, could have superseded Arjuna but his right thumb was got cut and thus he was made ineffective.43 There are innumerable anecdotes in this epic which prove the superiority of this weapon.

Hopkins,44 however, holds that the standard of archery was relatively low in the epics. The heroes of the epics were more concerned with throwing with a fast speed numerous arrows without much care for the accuracy of their aim. Even when two warriors fought

31 Although killing a woman in the battle is strictly forbidden yet there were a few precedents where women of extremely bad character were killed in the battle-field. Thus Indra killed Manthara (daughter of devil Virochana and granddaughter of Prahlada) and Vishnu killed Bhrigu, the mother of Shukracharya (the preceptor of the demons), both fought against the respective gods in the battle. Ramayana, XXV. 20-22:

32 Rama is one of the few gods who has always been depicted in sculptures or paintings as having two hands, holding bow in one and arrow in the other, with quiver on the back. Most of the other gods are multi-headed and multi-armed.

33 Vishwamitra, the preceptor of Rama, had taught him the use of all kinds of shastra (worldy weapons) and astra (divine weapons), vide, Valmiki, Ramayana, Balakanda, XXVII. 7 to 21 where a list of all such weapons is given.

34 Ramayana, Yuddhakanda, canto 80.34-37; 88.16-25; 90.25-36; 93.21-38; 99.34-36; 100.10-12; 102.67-68; 103.4-6; 107. 1-106; 108. 13-19, etc.


36 Ibid., Balakanda, canto 66.8-12.

37 Ibid., Balakanda, canto 75.20-28.

38 See the chapters 'Bow' and 'Arrow',
a duel with their bow, many arrows were shot so that the sky was overcast with them. On such occasions neither the aim was accurate nor the shot was effective, because so many arrows were shot to kill one person.

Hopkins further thinks that the few legends of accurate aiming are accretions of a later date, out of harmony with the tone of the epic archery. But the opinion of Hopkins has been refuted by S.D. Singh, who states that in the epics are mentioned several warriors who could perform miracles with their bows and arrows. The rapid discharge of many arrows did not go in vain; rather they took the lives of untold numbers in every battle. Bhishma (the oldest general fighting on behalf of the Kauravas and commonly known as the ‘Grandfather’) alone accounted for ten thousand lives a day. Arjuna, Karna, Drona and several warriors could achieve the impossible. “Almost every battle-scene presents a net-work of arrows crossing and cutting one another in mid-air. Bows are rent asunder and bowstrings are cut in twain; charioteers are slain, and the chariots are destroyed together with their horses. The archer strikes wherever he likes with an impeccable accuracy of aim. An arrow is often enough to fell a huge elephant. Yet if many arrows do not kill a hero despite the fact that they rip across his body, we must remember the superhuman prowess of these epic characters.”

The period just described was the legendary and heroic age of India followed by the dawn of two great religions, Buddhism and Jainism, in the 6th century B.C. Siddhartha (567 B.C.—487 B.C.), commonly known as Gautama Buddha himself was an expert archer. On one of the bas-reliefs at Sanchi (2nd—1st centuries B.C.) is represented the legend of Prince Siddhartha, thus described by Fergusson: “When the prince had reached his 16th year, his father sought a wife for him among the daughters of the neighbouring rajas (kings). All refused, however, because the prince, though handsome, had not been taught any martial accomplish-ments, and was, therefore, incapable of controlling women. To prove, however, his power in this respect, he strung a bow that no one else could string, pierced with his arrows iron targets thicker than those of the ‘Warrior’ or ‘Minotaur’ and at distances which neither ‘Armstrong’ nor ‘Whitworth’ could attain; and lastly shot an arrow an inconceivable distance, and where it hit a spring of water gushed forth, which afterwards, Fa-Hian tells us, was formed into a fountain for travellers.” In the foreground of the picture are three warriors armed with Parthian bow and short straight sword of Roman shape, carried over the right shoulder.

The same text says that one hundred properly trained bowmen in a fort are a good match for ten thousand enemies on the ground.

Many Buddhist chronicles furnish interesting accounts of archery. In the Jain canons the bow was called chapa, the iron-tipped arrows were called noracha, and other arrows were known as kanaka.

A similar theme is expressed in a couplet (16.40) of the Yajurveda where it is said that one who handles the bowstring and draws it taut can handle his wife better.

There are several sacred books like the Aranyakas, Brahmanas, Samhitas (commentaries on sacred books), Smritis, Puranas, Dharma Shastras, etc., where bows and arrows have been repeatedly mentioned. Agni Purana (c. 7th cent. B.C.) has devoted two chapters on archery; Vaisnayi Samhita tells about the bow-makers and the Athareya Brahmana (c. 800—600 B.C.) tells the measurement and the method of construction. Manu in his Manusmriti (chapter VII, section, 185) has thus advised a king, “On a plain let him (the king or the general) fight with his armed chariots and horses, on watery places with manned boats and elephants, on grounds full of trees and shrubs with bows, on cleared ground with swords and targets and other weapons”. The same text says that one hundred properly trained bowmen in a fort are a good match for ten thousand enemies on the ground.

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Since the invasion of Alexander in 327 B.C., India is brought into a direct contact with the classic world. From the accounts of Quintus Curtius we learn that Alexander crossed the river Indus by a stratagem, taking advantage of a cover afforded by a wooded island. The opposing force of Indian king Porus consisted of 85 elephants, 300 chariots, each of which carried six men: two bearing shields, two archers, and two driving the horses and throwing darts; 3000 foot, among them were archers who shot barbed arrows difficult to extract, and 4000 horse. Alexander’s first onset was on the chariots, which got into confusion from the slippery nature of ground, as it had rained the previous day.

![Diagram](attachment:image)

**FIG. 151 From the Gupta coins: 1-9 bows, 10-11 Arrows.**

(after Vidya Prakash)

and lost their drivers. The elephants, on which the Indians relied most, were maimed by the arrows, axes and swords of the Greeks and the Indian foot-archers were no match to the horse-archers of Macedonia. Porus, riding the tallest elephant, was still pressing the Macedonian phalanx when an arrow hit him hard. Describing it, Arrian says, “Porus was wearing a body armour which was shot-proof and remarkable for its strength and the closeness with which it fitted his person, as could afterwards be observed by those who saw him. But he was wounded by an arrow, in the right shoulder, where alone he was unprotected by mail”.

Herodotus (VII-65) wrote that the Indians in the Persian army, in the fourth century B.C., were armed with cane arrows, tipped with iron. This is the earliest literary evidence, after the Vedas and the epics, on the use of iron in India or by the Indians.

Chandragupta Maurya was the first Indian monarch, in the 4th century B.C., who expanded his empire on a major portion of this sub-continent and maintained a very
large and well disciplined army. According to Megasthenese, the soldiers used very long bows and to string these bows they had to employ one of their feet.

Kautilya’s account of archery will be taken up while discussing the types of bows, arrows and quivers.

The archery of the Shunga period (2nd—1st centuries B.C.), Kushana period (1st—2nd centuries A.D.) and Gupta period (4th—6th centuries A.D.) is revealed through the sculptures, coins and inscriptions of the respective periods and is dealt with under the archaeological evidence.

Kalidasa, the greatest Sanskrit poet and dramatist, has described various kinds of bows and arrows in his several dramas, but most of his description are poetic and allegoric. In the Ritusamhara (a Sanskrit drama) he says that, “the separation from a husband is as painful to the wife, as being hit by a poisonous arrow.” Again, “Not to talk of shooting an arrow, the mere twang of the stretched bowstring of Dushayanta (the benevolent king and hero of the drama) was capable of eliminating all worries.” The ‘eye-brows’ and the ‘well developed breasts’ of the maidens have very often been compared with bows.

Under the Vardhana Dynasty (606—647 A.D.) the soldiers did carry long spears, shields, swords and bows and arrows, but bows and arrows no longer enjoyed the supreme position.

The first Muhammadan attack on India was under Khalif Walid in 711 A.D. His youthful general Muhammad Kasim attacked Sindh with catapults and captured the town. The Arabs, however, did not hold their conquest for more than 36 years. The next attack was from Afghanistan. Subuktigin invaded Indus and defeated Jaipal, the Indian king. His son Mahmud Ghazni...
made as many as seventeen invasions between 1001 A.D. and 1030 A.D. In his fifth expedition to India in 1008 A.D. Mahmud Ghazni met the combined forces of the rajas of Northern India under the command of Anandpal, in a great plain near Peshawar. The Sultan, having entrenched himself, sent 6000 archers to the front who were met by 3000 Indians armed with spears, swords and bows and arrows, who forced their way into the Muhammadan cavalry and nearly defeated them, when the elephant of Anandpal took fright at the flight of arrows and the effects of the naptha balls, and caused the Indians to fly in a panic.

In his last expedition (1029 A.D.), Mahmud attacked the Jats (a warrior class) on the Indus near Multan. He built for the occasion 1400 boats, each of which was armed with six iron spikes to prevent the enemy from boarding, and in each were 20 archers and five naptha men. The Jats opposed Mahmud in 4000 boats, but were completely defeated, many of their vessels being set on fire by the naptha. Of his son Masud it is related that “no man could lift his mace from the ground and no iron target stay his arrow.”

During the 11th and 12th centuries A.D. the Indian bows and arrows had lost their importance both in the trade and in the battle-field and its place was taken by the Turkish and Persian bows. A well equipped warrior of this period, if we are to believe the Persian literature, had to provide himself with “an Indian sword, a Tartar lance, an Afghani horse and a Persian bow.” Persia and Afghanistan had specialised in the production of weapons of all kinds including bows and arrows and exported them to India and other neighbouring countries. The anonymous author of Hudud ul Alam says that, “from these provinces (Persia and Afghanistan) came slaves, zirah (armour), tir-o-kamana (bow and arrows), jaushan (coats of mail) and horses.” These Ghur bows and arrows played very significant roles in the two battles of Tarain. The first battle of Tarain (A.H. 587 = 1191 A.D.) was fought mainly with lances and javelins in which Sultan Muizzuddin himself was seriously wounded with a javelin, hurled by Govind Rai, and had to retreat. Muizzuddin did not repeat that mistake when he reached Tarain the second time (in A.H. 588=1192 A.D.), pitched his tent at the same place where he had suffered a serious defeat exactly a year before. This time he had brought with him one hundred and thirty thousand horse-archers and spearmen out of which ten thousand mounted archers were kept in

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66 The term naptha originally meant ‘Greek fire’; in modern Persia it means petrol. Since we find naptha being used again and again for burning of houses by the Mongols, the reference can only be to gunpowder.


68 Ibid., p. 15.

69 Egerton, op. cit., p. 15; cf., the Tabaqat-i-Nasiri, translated by H. G. Raverty.

70 M. Habib and K.A. Nizami, op. cit., p. 139.

71 Hudud ul Alam, 110; Habib and Nizami., op. cit., p. 144


73 Ghur, from where the invaders came in the 12th century A.D., lies in the west centre of what is now Afghanistan. Muizzuddin Mohammad Ghuri first invaded India in 1191 A.D. and finally established the Turkish slave aristocracy (also known as the Slave Dynasty) which continued till A.H. 689 (i.e. 1290 A.D.) when Kaigubad, the paralytic king, was stabbed and his dead body was thrown into the Yamuna river (in Delhi).

74 The location of this site is the subject of some controversy. Minhajus Siraj Jurjani in his Persian text Tabaqat-i-Nasiri (Bib. Indica edition, 1897) p. 118. A.H. Habibi, Kabul; English translation by H.G Raverty, vol. 2, p. 399) calls it Tarain. Nizamuddin (Tabagat-i-Akbari, 38) and Farishta (vol. I. 57) follow Minhaj, but later historians call it Narain. Elphinstone (History of India, p. 359) locates the battle-field between Karnal and Thaneswar. Cunningham (Reports, XIV, 68-69) located Tarain between Bhathinda and Sirsa, and identifies it with a village called Torawana, 27 miles from Bhathinda and 20 miles from Sirsa. This identification has widely been accepted as it fits in with the details given by some early historians, particularly Yahya Sirhindhi (Farikh-i-Mubarak Shabi, 8.)
reserve. The battle ranged from morning till afternoon without any decision. It was very difficult for the Indian kings, fighting from the elephant-backs or the footmen with their talwars (straight swords) and bhalas (spears) or those carrying bows of cane and arrows of reed, to overpower the Ghurid cavaliers, fully equipped with steel coats and armour. In the afternoon Sultan Muizzuddin put on his helmet and armour, hung his quiver filled with poisonous arrows and then, holding the bow, joined the battle with his reserve force. Govind Rai dashed ahead with an army of elephants and from his howdah showered arrows on Sultan Muizzuddin. The Sultan hurriedly protected himself by putting a karawa before his face and directed his horse-archers to aim at the elephant-drivers, since the warriors were well protected by the howdahs. As soon as three or four drivers (mahauts) were killed, the whole line of elephants was disturbed. One arrow, shot by the Sultan, killed Govind Rai outright, who fell down from his exalted howdah, and another arrow pierced Rai Pithora (Prithviraj Chawhan) who, being wounded, got down from his elephant, mounted a horse, and while trying to run away was caught by the Ghurid archers and later on executed. The victor Muizzuddin raised his slave general, Kutubuddin Aibak, the Turk (1206 A.D.—1210 A.D.) to power who captured Delhi and founded the "Slave Dynasty" which extended the Muhammadan power over a great part of India. This marks the beginning of India's slavery which lasted for more than seven centuries to come.

Describing the arms and armour of Indian soldiers of this period (i.e. 12th century A.D.) Minhajus Siraj says, "All the defensive arms of the Indian were of the pieces of the spear-bamboo, namely, their cuirasses and body armour, shields and helmets, which were all slips of it, crudely fastened and stitched, overlapping (each other) and all the people were archers and (furnished with) long bows." Naturally the Ghurid warriors had no difficulty in conquering them.

80 The famous monarchs of this Dynasty were Kutubuddin Aibek, the founder (1206-1210 A.D.), Iltutmish (1211-1236 A.D.), Rauja Sultan, the first Turkish queen of India (1236-1240 A.D.), and Balban (1266-1286 A.D.).
From the purely military point of view the Indian armies had not kept themselves abreast of the development that had taken place in the art of warfare in Central Asia or elsewhere. There were basic differences on which Indian, Turkish and Mongol forces were organised. A well-equipped cavalry with tremendous mobility was the great need of the time. Indian military strategy gave greater importance to weight rather than to mobility. The Indian kings (specially the Rajput chiefs) believed in crushing instead of moving rapidly and striking. Huge and unwieldy phalanxes of armies headed by elephants were bound to be signally beaten when face to face with swift and easy moving cavalry. After mobility, R. C. Smail has rightly pointed out, the second tactical

characteristic of the Turks was their archery. They used their bows from the saddle, supporting themselves with the stirrups while moving.

Chengiz Khan's attack on the Indian frontier in 1221 A.D. had a very lasting effect. After two invasions of Northern China in 1209 A.D. and 1210 A.D., the Mongol army was not only overloaded with spoils but had also learnt the sedentary people's art of war. About ten thousand families of Chinese craftsmen were brought

82 Jadunath Sarkar, Military History of India, first edition (Calcutta, 1960), p. 25. The Islamic faith also contributed to it. 'Islam gave to its followers three characteristic virtues which no other religion has inspired so successfully, and which imparted to natural soldiers like the Arabs, Berbers, Pathans and Turks, a wonderful military efficiency. These were, first, complete equality and social solidarity, as regards legal status and religious privileges. Secondly, fatalism, springing from an absolute reliance on God and the belief that what Allah wills must triumph over every human effort. This bred contempt to death in fighting. Thirdly, freedom from drunkeness'. Ibid., p. 26.

83 Elphinstone, History of India, p. 361.

84 The element of mobility was totally absent from Indian armies. Jadunath Sarkar remarks, "The arms and horses of these trans-border invaders gave them indisputable military superiority over the Indians. Their provisions also were carried by fast trotting camels, which required no fodder for themselves but fed on the roots and leaves of the wayside, while the Banjara pack-oxen of the Hindu commissariat were slow and burdensome".

85 R.C. Smail, Crusading Warfare, a Contribution to Medieval Military History, pp. 80-81.

86 M. Habib and K.A. Nizami, op.cit., p. 163.

87 Chengiz and his people called themselves Dida 'Mang-Ku', from which 'Mongol' is derived, is a Chinese term meaning 'brave'. The Muslim gave the name of Tatar, Turk, Mughal and even Chinese to this horde, The Europeans preferred to call them Tartars (after the Greek hell Tartarus).
to Mongolia who constructed catapults and munjanigs\textsuperscript{88} for them. The disciplined Mongol army had also learnt the use of naptha and horse-archery\textsuperscript{89} and therewith paralysing large cities and reducing inaccessible forts to distress. The Turkish Sultans of Delhi, trained in the same line, alone could check the onslaught and save India from the frequent Mongol invasions.\textsuperscript{90} In the sphere of tactics, the Turks, who now became the masters of India, were quick to bring India on a par with Central Asian powers. The paiks (foot soldiers) were replaced by the sawaran-i-mugatala (mounted archers), and mobility and striking force rather than heaviness and crushing strength came to be regarded as the basis of military organization.\textsuperscript{91}

During the period of Sultan Iltutmish\textsuperscript{92} (1211 A.D.—1236 A.D.) Yalduz, one of the powerful amirs revolted and hoisted his flag at the historic field of Tarain in 1215 A.D. Only one arrow shot by Muayyidul Mulk Muhammad Junaidi, one of the generals of the Sultan, decided the course of the battle as it hit Yalduz at his breast and made him senseless.\textsuperscript{93}

In the year A.H. 639 (12th July, 1241 A.D.) the Mongol forces assembled at the Indian frontier and planned to capture Delhi. Sultan Bahram Shah, the son of Iltutmish, was on the throne. The Indian horse archers sallied against the Mongols so suddenly that eighty thousand Mongol horses and forty thousand horsemen were killed and, if Minhajus Siraj is to be relied upon there was no one in the Mongol camp,\textsuperscript{94} who had not suffered from a wound from an Indian arrow.

That the Indian archers of the 13th century A.D. could easily hit an elephant-rider is revealed from the fact that in A.H. 655 (1258 A.D.) Ikhtiyaruddin Yuzbeg Tughril Khan, the rival of the then Sultan Nasiruddin Mahmud, while riding an elephant was mortally wounded on the breast by an arrow\textsuperscript{95} but was saved by the prompt action of his mahaaut (elephant-driver) who extracted the pierced arrow-head with the help of paikan-oksha.\textsuperscript{96}

Sultan Ghiyasuddin Balban's (1260 A.D.—1288 A.D.) political experience had taught him that the army was the main pillar of government, hence it had to be reorganized properly. To keep the army vigilant and active, he emphasized the need of frequent

\begin{figure}[h]
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\includegraphics[width=0.5\textwidth]{fig157}
\caption{A bow of the Delhi Sultanate period.}
\end{figure}

\textsuperscript{88} This instrument has very widely been used in the siege of the medieval Indian forts.
\textsuperscript{89} For horse-archery in India see the chapter 'Mounted-archery'.
\textsuperscript{90} Elliot and Dowson, History of India as told by its own Historians, vol. II, Introduction; Nizami, Some Aspects of Religion and Politics, pp. 86-87; Habib, Political Theory of the Delhi Sultanate, pp. 126-30.
\textsuperscript{91} Habib and Nizami, op. cit., p. 188.
\textsuperscript{92} Iltutmish (spelt 'Altamsh' by Elphinstone, History of India 5th ed. (1866), p. 371; and 'Altmash' by Elliot and Dowson, History of India as told by its own Historians, p. 320) literally means 'maintainer of the kingdom'. The fact that Pakhr-i-Mudabbir thought of writing a book on the art of warfare entitled Shajara-i-Ansab (edited by Denison Ross, London, 1927) and dedicated it to Iltutmish shows, inter alia, the Sultan's interest in the problem of the organization of the army.
\textsuperscript{93} Minhajus Siraj, op. cit., p. 135.
\textsuperscript{94} Ibid., 235-6.
\textsuperscript{95} Habib and Nizami, op. cit., p. 271.
\textsuperscript{96} It was an implement used to extract arrow-heads from the body. It has been discussed in detail under the chapter "Quivers".
military exercises. Every winter in the early hours of the morning, he proceeded towards

Rewari, about 80 miles away from Delhi, under the pretext of going for a hunt; took with him a thousand archers on foot, saw their performance the whole day, and returned late at night.  

When Tughril Khan revolted at Lakhnauti (Assam, North-eastern India) in 1281 A.D. Balban marched in person, regardless of the rainy season. On reaching Avadh (modern Lucknow city), he ordered a general enlistment and some two lakhs (i.e., two hundred thousand) of men, horsemen, foot-soldiers, paiks, archers, kahaars (attendants), kaiwani (bowmen), riders on ponies, arrow-shooters, slaves, servants and shopkeepers were enlisted.

In A.H. 684 (1285 A.D.) Prince Muhammad, the son and the heir apparent of Sultan Balban, was fighting bravely with the Mongols when an arrow shot by the garuna 99 of the Mongol army killed him outright. The Mongols put the body of the Khan-i-shahid (i.e., heir apparent) Muhammad in a coffin with the intention of taking it to their own country. But Kalu, the father-in-law of the Khan-i-shahid, purchased the dead body of the prince after paying a huge amount to the Mongols. 100 His death was a smashing blow to Balban, who had reached his eightieth year, for the prince had been the sheet-anchor of his worldly hopes. 101 Sultan's second and the only surviving son, Bughra Khan, had gone on an expedition to the North-eastern India and there was not much time to call him back, therefore, the Sultan, on his death-bed, appointed Kai Khusrau, the son of late Prince Mohammad, as his heir. But after the death of Balban the powerful amirs, instead of Kai Khusrau, placed Kaikubad, the son of Bughra Khan, on the throne of Delhi in the year A.H. 686 (1287 A.D.). Kaikubad, despite of being a very romantic person and a drunkard, was a wonderful archer 102 of his time and his love for archery was so great that, in the words of Barani, "young girls whose breasts had not yet developed were taught archery and horsemanship and

99 The garunas are often referred to. It meant the son of a Muslim mother and a Mongol father.
100 We have two marsias (elegies) on the death of the Khan-i-shahid, one in prose written by Amir Hasan and the other in verse written by Amir Khusrau. Perhaps no poem of Amir Khusrau evokes so many tears as this marsia, which has been quoted in part by Badami in his Muntakhabat Tawarikh; Isami, op. cit., pp. 166-70.
101 Isami narrates a tragic tale in this connection. Some persons, alleged to have minted coins (galbkari) were brought before Sultan Balban. Amongst them was the only son of an old widow. He was innocent but had wrongly been arrested. The widow made pathetic representations to the Sultan but they were not heard. All persons implicated in the case were put to death. This put the old woman's heart on the rack. Every night she appeared before the imperial palace to bemoan the death of her son and to demand Divine Punishment for the Sultan. The Sultan used all possible methods to dissuade her but she ignored all admonitions. After the death of the Khan-i-shahid, she did not come near the palace again and all attempts to trace her whereabouts failed. Futuhus Salatin, op. cit., pp. 177-78; Habib and Nizami, op. cit., p. 300.
102 Isami, op. cit., verses 3521 and 3800-05; Amir Khusrau gives a beautiful description of it in the Qirans Sadain, 54 et seq.
commander of Alauddin Khalji, captured the fort of Mandu and Rai Mohlak Dev found himself surrounded by the archers, and while trying to run away, an arrow killed him then and there. It was 24th December, 1305 A.D. (Thursday, 5 Jamadi, II, A.H. 705). In the Khazainul Futuh, which is meant to record Alauddin’s victories, Amir Khusrau describes an almost invincible fort which was under Rai Sital Dev. ‘The imperial army reached (Siwana) on the 3rd July, 1309 (Wednesday, 13 Moharram, A.H. 708). The Sultan stationed himself to the east of the fort, the right wing of the army was encamped to the south of the fort and the left wing to the north. Malik Kamaluddin Gurg was put in charge of the munjanigs. But the fort was captured by the construction of a pasheb and this work must have started long before the Sultan’s arrival. When the pasheb was completed, the Sultan ordered his archers to attack and the battle ranged from morning till night. The next morning, 9th September, 1309 A.D. (Monday, 22 Rabi, I, A.H. 708), the body of Sital Deva, riddled with arrows, was brought before the Sultan and every one was surprised at his enormous stature.’

Next year (15th February, 1310 A.D.) Rai Pratap Rudra Dev, the ruler of Warangal, gave a very tough fight to Malik Kafur, the general appointed by Alauddin to conquer the South India. The stone fort of Warangal was so strong that ‘no steel instrument could pierce it and a munjaniq stone rebounded from it like a nut thrown by a boy’. Malik Kafur got the sabat and gargaj raised higher than the level of the fort and from there the archers showered incessant bulleys of arrows resulting in the final surrender by the Rai.

Bahlul Lodi ascended the throne of Delhi on the 19th April, 1451 A.D. (17 Rabi, I, A.H. 855) and had to proceed to Panjab immediately to curb an uprising. He left the capital in charge of his eldest son, Khwaja Bayazid, Shah Sikandar Sarwani and Bibi Mattu, the widow of Islam Khan and the mother-in-law of the Sultan. This was an ideal situation for Mahmud Sharqi, king of Jaunpur, to strike. The wife of Mahmud Sharqi, who was the sister of the Sultan Bahlul Lodi, used to incite her husband to take rigorous action against Sultan Bahlul, her uterine brother. She used to say, “I shall tie the quiver and ride against my brother all alone if you do not march against him.” The Afghan forces stationed at Delhi tried to meet the challenge. Bibi Mattu dressed up many women in male attire and posted them as guards all along the ramparts of the fort “Sikandar Sarwani, who was an excellent archer, shot an arrow at the enemy water bag. It was through the bag and the ox on which it was being carried and then pierced into the ground. This excellence in archery made the Shargi forces rather hesitant in approaching the walls of the Delhi fort”, and disheartened he retreated.

On Mahmud Sharqi’s death in 1457 A.D., his queen, Bibi Raji raised her eldest son

118 Dawal Rani Khizir Khan, p. 68, Khazainul Futuh, pp. 55-9; Ferishta, p. 115.
119 Amir Khusrau, Khazainul Futuh, edited by M. Wahid Mirza (Calcutta, 1953), and English translation by M Habib under the heading The Campaigns of Alaaddin Khalji (Madras, 1931).
121 Amir Khusrau describes that, ‘the walls of the Warangal fort were so smooth that an ant could not climb them; its stones were so artistically joined together that the point of a pick-axe would not dare to harm them and so beautifully constructed that no munjaniq would have heart to do them injury’. Dawal Rani Khizir Khan, p. 70.
122 We have to contemplate a road ascending to the top of the foot on the earth filled bags. The lower part was called pasheb (from pa i.e., foot) and the upper part was the gargaj.
123 M. Habib and K. A. Nizami, op. cit., p. 344 footnote.
125 Nizamuddin, op. cit I, 301.
Muhammad Sharqi to the Jaunpur throne but his ruthless behaviour excited the fury of the mother who, after a few months, decided her younger son, Husain Shah Sharqi, to be placed on the throne. “As soon as this army (of Husain Shah) approached the Delhi palace, the nobles and officers of Muhammad Sharqi, who were disgusted with his cruelty and harshness, deserted him and joined the army of Husain Shah. Muhammad became panicky and hid himself in a garden. When chased by Husain’s soldiers, he took out his bow and arrows and started shooting at his pursuers. But to his great misfortune, Bibi Raji had already bribed his body-guard to make his arrows harmless by removing their iron-points. Muhammad was an excellent shot but this made him helpless. He, however, took out his sword and killed several soldiers before he himself fell dead, when an arrow pierced his neck.”

Marco Polo, the earliest European traveller to India, has described a war between the king of Bangala (Bengal) and the troops of Emperor Kublai. “The king of Mein and Bangala is said to have had 2,000 great elephants, on each of which was set a tower of timber, well-framed and strong, and carrying from 12 to 16 well-armed fighting men. And besides these he had of horsemens and of footmen good 60,000 men. The Tartars were not so numerous and were mounted on horses, who took fright at the elephants, but they immediately dismounted, and tying their horses to the trees of the forest, plied their arrows so stoutly that the advancing elephants were, in a short space, either killed or wounded, or turned tail and fled”.

Like Marco Polo, Ibn Batuta and the Institutes of Timur, the Lame (who died in 1405 A.D.) make no mention of the use of matchlock in any Indian war. It is, therefore, evident that though the knowledge of fire rocket was quite ancient and fire-arrows had also become common after the Arab invasion, the fire-arms were still not popular and the common soldier still used a bow and arrows with a sword. In the Zafar-Nama we find Timur presenting quivers with gold belts. Clavijo tells us that the Amir (Timur) peopled his capital Samarkand with master craftsmen and bow-makers of all the nations.

The first battle of Panipat was fought between Babur, the founder of the Mughal Dynasty in India and Ibrahim Lodi, the last Indian Afghan ruler, on the 21st April, 1526 A.D. The Indian force, heavily outnumbering that of Babur’s, consisted of one thousand armoured elephants, 20 thousand well-equipped state cavalry, 20 thousand baronial levies mounted on country horses and 30 thousand foot soldiers armed with pikes, swords and bows and arrows. “There was nothing like artillery which came to be used effectively in later times; but rockets and naptha balls and a sort of mechanical artillery, consisting of various crude machines

126 Ibid., I. 305.
127 Yule, Marco-Polo, vol. II, p. 63; Egerton op. cit., p. 18
128 Ibn Batuta, an African traveller, visited India in c. 1333 A.D. during the reign of Muhammad Tugluq (1325 A.D. - 1352 A.D.) who, like James I of England, is called the ‘wisest fool’.
129 Egerton, op. cit., p. 18.
130 The travellers Nicolo Comi and Nikitin, who visited India in the 15th century A.D., also mention that the elephants were generally used in the battle. Each elephant carried a cit-d-l (howdah), and in the citadel were seated 12 men in armour with bows and arrows. Vide, Egerton, op. cit., p. 18.
131 Abdul Aziz, Arms and Jewellery of the Indian Mughals, p. 10.
like munjaniqs, mangonels, mangons, through which fire balls, fire-arrows, pieces of rock, stone, earthen or iron balls, scorpions and other poisonous reptiles were hurled against the enemy”.

Babur’s army was very well trained in making lightening raids, night attacks and in laying ambushes. His tactics were to first disorganize the enemy by archery fire and then charge with his guns. The Muslim troopers were fully armour-clad and used bows, made of steel or of two horns joined together with a metal clasp, shooting arrows at longer ranges. Because of their greater penetrating power, as some of them could pierce an elephant-hide, these arrows had deadly effect on the Indian soldiers.

At daybreak the Afghan army came straight on from Delhi. Babur’s flanking parties wheeled round and attacked the enemy in the rear and ordered his gunners to open fire, and then the main attacking force of the Afghans found themselves exposed to arrows on either flank and to bullets in front. The battle lasted till the afternoon when an arrow-shot killed Ibrahim Lodi who is acclaimed to be the only monarch of India who died fighting.

Panipat, no doubt, was a decisive victory but Babur had to face another formidable enemy, Rana Sanga, the Rajput chief and the ruler of Rajastan. The deadly conflict began at about half-past nine in the morning of the 17th March, 1527 A.D. at Khanua, and for a considerable period it appeared that the conflict would terminate indecisively. But unfortunately the Rana was severely wounded by an arrow and fainted. He was quickly removed from the battle-field to Baswa, a small town nearby, and when he regained consciousness after two hours, he learnt that the battle was lost.

In the memoirs of Humayun (1530–1556 A.D.), the second ruler of the Mughal Dynasty and the son of Babur, an interesting episode has been narrated by Jouher. In A.H. 946 (1539 A.D.) His Majesty was attacked by a war-elephant. His Majesty ordered Mir Bejke, who carried His Majesty’s double-barrelled blunderbuss gun, and Thatta Beg, who held the royal spear, to drive the elephant away but both of them were frightened. Then His Majesty snatched the royal spear from the hand of Thatta Beg, spurred on his horse and struck the elephant with such a force on his forehead that he could not draw out the spear again. In the meantime an archer who was seated on the enemy, Rana Sanga, unlike Ibrahim Lodi, was a distinguished warrior, an able general and a calculating politician. Though Khanua, near Agra, proved to be a tragic climax to his military career, he had terrified Babur who himself confesses it. Babur issued a farman (royal decree) that no one would drink wine during the war, and having disposed of all his gold and silver wine vessels, he poured of all the wine into a well. Ibid., pp. 16-17.

Babur again adopted the tulghama formation. He himself was in the centre, Chin Timur and Khusrua Kukiltash were on the right, his son Humayun and General Dilawar Khan were also on the right, Sayyid Mahdi Khwaja was on the left, and on the extreme right and left were the flanking parties; the artillery line was commanded by Nizam-ud-din Ali Khalifa. Ibid., p. 17.

The Tezkereh Al Vakiat (literally “Private Memoirs Humayun”) was written in Persian by Jouher, the most faithful officer of Humayun who remained with His Majesty all the time. The Lucknow copy of the manuscript, translated into English by Charles Stuart, contains the minute details from 1530 A.D., when Humayun ascended the throne till 1556 A. D., when he died. This English version from where the following reference have been borrowed was first published in 1832 A.D., and reprinted by Kumar Brothers, Hauz Khas, New Delhi in 1970 A.D.
elephant discharged an arrow which wounded His Majesty in the arm. His Majesty, finding himself helpless, took to flight.\textsuperscript{140}

No Indian king has suffered so many arrow-wounds in his life as Humayun had. In A.H. 947 (1540 A.D.), while crossing a village an arrow was shot at him. Humayun had a narrow escape but Mirza Yadgar (who was married to the aunt of Humayun), riding a horse on the left of the Sultan, was wounded.\textsuperscript{141} The same evening Humayun halted at Fatehpur Sikri, near Agra, when arrow came from the front and the Sultan was slightly wounded.\textsuperscript{142} In A.H. 947 (1540 A.D.), Humayun, dethroned by Sher Shah (1540-45 A.D.), was moving from place to place as a fugitive with his pregnant wife Hamida Banu Begum (the mother of celebrated Akbar, the Great Mughal) and seven horse-archers when he was attacked by the Afghan forces. Humayun, who himself was an adept archer, with his seven cavaliers fought so well that the Afghan forces had no option but to fly.\textsuperscript{143}

It was a paradox that the arrows which harassed Humayun all his life were ultimately responsible for making him the Emperor of India again. In A.H. 962 (1555 A.D.), a decisive battle between the Afghans, the then rulers of India, and Humayun, the exiled king, was fought during the night on the bank of the Sutlej river. "The enemy (Afghans)", says Jouher, who himself participated in this war, "having in their retreat set fire to some villages and enabled our (Mughal) troops, by the light of the fires, to pierce with our arrows: thus by the grace of God we obtained a second victory."\textsuperscript{144}

The use of the bow persisted throughout the Mughal period in spite of fire-arms having become more popular, better made and better handled. Taksha kamana mentioned in the \textit{Ain-i-Akbari}\textsuperscript{145} has been defined as a small bow by Blochmann, and kamana-i-gurohah as the pellet bow. Kamatha\textsuperscript{146} of the same manuscript was the long bow generally used by aboriginal bhils and navak was a pipe through which an arrow was shot. In the second battle of Panipat (A.D. 1556), Hemu, the Hindu adversary of Akbar, was about to win when an arrow struck his right eye forcing him to fall down from his howdah. Hemu was arrested and later on killed. This enabled the Mughals to rule over India for about three centuries more.

The arms and equipments of the Maratha army (17th—18th centuries A.D.) were of a heterogenous character. While they accepted new arms, they did not reject the old ones. Consequently, the weapons used by the Maratha soldiers represent all stages of development and some of them were certainly handed down from the early Stone Age. Marathas were excellent slingers and archers. Krisnaji Anant Sabhasad in his book, \textit{Life of Sivaji}, written in 1695 A.D., has described the property of the great Chhatrapati (Sivaji) and mentions "4000

140 \textit{Ibid.}, p. 18.  
141 \textit{Ibid.}, p 23.  
143 \textit{Ibid.}, p. 40.  
144 \textit{Ibid.}, p. 114. In 1556 A.D., after defeating the Afghans under Sikanar Suri (the descendant of Sher Shah Suri), a short time before his death, Humayun occupied the throne of Delhi.  
146 \textit{Ain-i-Akbari}, list I. III. No. 39.
D. Tanged
In this type a stem or tang is added for insertion into the shaft (fig. 166).

E. Barbed
Its two sides were projected. Sometimes we have barbed and tanged arrow-head also (fig. 169).

F. Triangular
As the name indicates, it was triangular in shape (fig. 168).

All these are pointed and in them the apex of the wedge is used for penetration.

G. Chisel-edged
Unlike the above mentioned types, in this category the wedge is reversed and the base forms the cutting edge. This form was very less common in India.

It is difficult to say why the wedge has been so universally adopted as the right form for arrow-heads. It is neither very simple nor natural. The natural form would be merely a sharp and hardened continuation of the shaft. The addition of a wedge would seem to impede penetration rather than to assist it. "This has suggested me", says C.J. Longman, "the probability that the typical arrow-head form may have been copied from some convenient natural object which was used for the purpose before the art of manufacturing arrow-heads from stone was invented. One class of objects which would be found in great plenty at once suggested itself viz., the teeth of land or sea animals. A comparison between the engravings of sharks' teeth and the triangular and the barbed forms

5 Perhaps the 'tanged' should hardly be regarded as a separate class as barbed, triangular, etc., arrow-heads are all found with and without the tang.

6 This was one of the most popular types and has been very widely used.

7 Sometimes the edges of all the three sides are serrated. This is a striking feature in the teeth of many sharks. "This device of doubtful utility in an arrow-head is hardly likely to have occurred to the mind of primitive man, unless it was suggested by some existing natural object from which he was copying". C.J. Longman and H. Walrond, op. cit., p. 22.
of arrow-head seems to suggest something more than a coincidence."  

The arrow-heads of the Harappan culture have been discussed earlier.

The recent excavations at Ujjain have yielded some interesting arrow-heads from pre-'North Indian Black Polish' levels. The use of iron arrow-heads began in India in about 1000 B.C. which is the beginning of iron age in India. Three main types have been unearthed from Ujjain i.e., (i) tanged and leaf-shaped, (ii) tanged and bud-shaped with circular cross-section, and (iii) multi-bladed. These arrow-heads have been reported from the 'North Indian Black Polish' levels (600 B.C. to 200 B.C.) at several other excavated sites in India: at Bahal, Ter, Kaushambi, Hastinapur, Shishupalgadh Maheshwar, Eran, etc. They have again come from the levels of the 2nd–1st century B.C. and early centuries of the Christian era from Hastinapur, Nasik, Besnagar, Sambhar, Nevasa, Prabhas Patan, Tripuri, etc. The arrow-heads from these sites range in length from 1 inch to 5¾ inches. The two basic types viz., leaf-shaped and triangular-barbed, both in socketed and tanged varieties, were constantly met with in all these cases. At Ujjain these have been found at all the three periods: (i) 750–500 B.C. (ii) 500–200 B.C., and (iii) 200 B.C.–500 A.D. At Hastinapur they appeared in periods III (600 B.C.–300 B.C.) and IV (200 B.C. to 300 A.D.). At Maheshwar-Navadatoli they occur from period IV (400 B.C.–100 B.C.) to period V (100 B.C.–100 A.D.). So also at Nasik, Vaishali, etc., they come from the periods ranging 600 B.C. to 500 A.D.

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8 C.J. Longman and H. Walrond, op.cit., p. 22.
9 See the 'arrow-heads' in the second chapter entitled 'Weapons in the Harappan Culture'.
10 For a detailed study see The Iron Age in India by N.R. Banerjee (Delhi, 1965).
12 Ibid. p. 134.
13 Ibid., p. 134.
The arrow-heads unearthed from Kaushambi\textsuperscript{14} are of the eleven types. The following types, however, need special mention:

(i) Leaf-shaped with two curved hooks at the junction of the blade and the tang.

(ii) with projected points flanked by three bladed hooks.

(iii) With turned blades (if turning is not accidental).

The iron arrow-heads excavated from Adichannallur (Tinnevelly district, South India) have been grouped under the following heads:

A. Taking the characteristics of the blade only, they are (i) concave in the middle, and (ii) convex in the middle.

B. Taking the characteristics of barbs only, they are (i) with incipient barbs, (ii) with straight barbs, (iii) with curved barbs, and (iv) ‘flying fish’ type with artistically curved blade.

C. Taking only the angles of the base of the blade in relation to the stem.

\textsuperscript{14} Ibid., p. 135. These arrow-heads of iron and bone found from S.P. II.5 onwards have been grouped into eleven forms by its excavator G.R. Sharma. One of them has a knife-blade and lozenge cross-section. These sharp and broadbladed varieties must have been useful in cutting bowstrings of the enemy as well as the limbs of the human body.
(stem being always the base of the angle), (i) with outturned base i.e., obtuse-angled, (ii) with straight base i.e., right-angled, and (iii) with inturned base i.e., acute-angled.

D. Narrow leaf-shaped.

The popularity of socketed stems for the arrow-heads was definitely due to the device of making the socket (by following the hammered metal sheet), which was widely used in the case of spear-heads, etc.

With the disintegration of the Mauryan empire in the 2nd century B.C., the Greeks, the Shakas, the Parthians and the Kushanas (1st century A.D.) emerged as great powers one after the other. They occupied areas of north-western and western India. The excavations at Taxila (and a few other sites in the Gandhara region) have yielded a good number of arrow-heads of the reigns of these dynasties.

The arrow-heads excavated from Taxila were mostly double-tanged and have been divided by John Marshall, the excavator, into eight different types, viz.,

(i) Flat, with lozenge cross-section, (ii) Flat, with triangular cross-section, (iii) Flat, with rhombic cross-section, (iv) Barbed, (v) Conical, (vi) Three-bladed, (vii) Flat, with square cross-section, and (viii) Four barb-bladed.

These arrow-heads generally have long tangs. Since the reed arrows were generally preferred by the Iranian and Central Asian warriors, it may reasonably be inferred that these ‘double-tanged’ arrow-heads, as Marshall called them, were an adaptation of the western socketed type rather than of the eastern one. It is equally possible that they were introduced in Gandhara by the Bactrian Greeks. Since the lower one is the real tang to be inserted into the shaft, the above one is only for show (in the form of socketed stem, but solid). It gives the impression that the former has entered the latter. Marshall, therefore, feels that it is a compromise between the ‘tanged’ and the ‘socketed’ varieties. Both the tangs had already made the weapon quite long and,

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Fig. 179
Weapons depicted on Indian coins.

1. Wheel with three arrows and three crescents.
2. Discus (chakra).
3. Slightly bent and feathered arrow.
4. Simple bow with arrow.
5. Curved and feathered arrow.
7. Double trident (trishula).
8. Karttikeya holding a shakti (spear).
9. Warrior with a sword and a shield.
10. Warrior holding a shield.
11. Trident with a battle-axe (trishula-parashu).
12. Spear (bhāta).

Obverse of two groups. The variety of class II of the rare inscribed coins includes a wheel and bow and arrow. Bow here is of a very simple type with curved stave and straight string. It is a common type found on early Andhra coins from Kolhapur (Maharashtra) (fig. 179, below). Variant II of class II of the Taxila coins include a wheel and a bow and arrow.

The Indo-Bactrian and the Indo-Greek kings (3rd—2nd centuries B.C.) gave importance to these bows and arrows. These, along with a few other weapons, figure frequently on their coins. Two types of bows are noticeable: (i) simple, and (ii) composite. The simple bow was

29 A. Cunningham, Coins of Ancient India (London, 1891), pp. 60—61.
30 E. J. Rapson, C.A.W.K., pp. 5—9, plates I—IV.
31 A. Cunningham, op. cit., III. 14.
perhaps made of bamboo and the composite of steel. On the Indo-Greek coins, Apollo is shown with bow either resting on the ground or he is holding it in one of his hands. On some of his coins, king Artemidoros is seen standing in *vikata* posture, while on a few others he is seen in *samapada* position. In the former, the left leg of the king is advanced and is bent from the knee; the right leg remains straight. In the latter posture he is standing erect with both legs held together. On some coins the feathered arrows have also been noticed. They are mostly pointed and barbed. Several specimens of these coins bearing bows and arrows can be seen in the Punjab Museum, Lahore and in the State Museum, Lucknow. On the copper coins of Apollodotus, Apollo is seen standing left, holding bow in his left hand and an arrow in the right. Similarly, on the copper coins of Zoilus, Apollo is facing right holding an arrow with both hands. A quiver is hanging on his back. The coins of Maués also portray Apollo as an archer. On a copper coin of Demetrios, Artemis is shown standing with a bow in the left hand and drawing an arrow from the quiver with the right. Apollo as an archer again appears on the reverse of the silver coins of Eukratides.

On a coin of Vashisthiputra Pulmavi of the Satavahana dynasty, a crude-string bow with a barbed arrow ready for use has been depicted. An identical bow and arrow is seen on the coins of Gautamiputra Shatakarni of the same family. On the lead coins of the three rulers of the Andhra dynasty, discovered from Kolhapur, is seen a bow with its string downwards fitted with an arrow pointing upwards. On the coins of Bhumaka, who preceded Nahapana, the depiction of arrow, discus and thunderbolt can be compared with the reverse coin device of bow and

32 For details see the chapter 'Modes of Shooting' of this book.
33 Lahiri, *op.cit.*, plate X.8.
arrows occurring on some coins struck conjointly by Spalirises and Azes I. On the coins of the two rulers of the Kshaharata dynasty, viz., Bhumaka and Nahapana, the depiction of bow and arrow along with thunderbolt is noteworthy.

The coins of the Gupta period show frequent depiction of bows and arrows. The ‘Archer Type’ is one of the rare types of Samudragupta’s (335—375 A.D.) coins, but it became the most popular type in the reign of his successor Chandragupta II (380—414 A.D.). It continued to be so till the end of the Imperial Gupta dynasty (6th century A.D.). The king, in this type, is shown holding an arrow in one hand and a bow in the other. On the ‘Tiger-slayer Type’ coins of Samudragupta and Kumaragupta I, the kings are portrayed stretching the strings of their bows to the ear in order to shoot the tigers leaping at them. The ‘Archer Type’ coins of Chandragupta II were prepared in large numbers. As many as 798 such pieces were found in the ‘Bayana Hoard’ alone. The king, on this coin type, has usually a bow in his left hand and an arrow in the right. Sometimes the position is reversed. The representation of a quiver is seen in the 11th sub-type of this variety of coins. The ‘Lion-slayer Type’ (variety—D), ‘Horseman Type’ (variety—C) and the ‘Tiger-slayer Type’ show bow and arrow. The legend on the ‘Archer Type’ of Kumaragupta I has a remarkable reference to archery. The same legend is repeated on Skandagupta’s ‘Archer Type’ as well. The ‘Horse-rider Type’ in gold and the ‘Archer Type’ in copper of Chandragupta II and Kumaragupta I are equally interesting. The coins of Narasimhagupta, Kumaragupta II, Budhagupta, Vishnugupta, Vinayagupta and Prakashaditya, the later Gupta kings, contain valuable material for the study of Indian archery.

SCULPTURAL EVIDENCE

Bow and arrow occur in the Shunga sculptures of Bharhut and Sanchi. In the sculptural remains of the Bharhut stupa are found representations of procession of foot-soldiers carrying bows and arrows. In the lowest architrave of South Gateway of the Great stupa at Sanchi, a battle-scene is beautifully carved and the soldiers are seen attacking the enemy with stones, bows and arrows.

Depiction of bow can be seen in the Nagarjunakonda railings of the third century A.D. These bows are long in size and form a link between bows of the Mauryan (4th century B.C.) and the Gupta (5th century A.D.) periods. A very fine bronze image of about 300 A.D., belonging to the Ikshuvaku period, is displayed in the Nagarjunakonda Museum. A Prince (probably Siddhartha) is shown standing at ease with a bow in his hand. On one of the pillars from the Amaravati stupa (early 3rd century A.D.) we find representations of long bows which can be compared with those occurring in the early Orissan caves.

Bows and arrows are profusely illustrated in the sculptures of the Gupta period. In the Dashavatara temple of Deogarh (5th century A.D.), Uttar Pradesh, panels showing Rama and Lakshmana in hermitage, ‘Lakshmana disfiguring Surpanakha’ and ‘Ahilya’s redemption’ contain good specimens of bows and arrows. Similar Ramayana panels showing Rama and Lakshmana with bows and arrows have recently been discovered at Nachna (Madhya Pradesh). A terracotta panel from Ahichchhatra (U.P.) depicts a fight with bow and arrow between

39 Ibid., No. 237, p. 68, plate IX.
41 Ibid., plate VI, 9, 10.
42 Ibid., plates VII, 12; XII, 5.
43 Ibid., No. 1175.
44 Ibid., plate XXXIV, 21.
45 A. Cunningham, The Stupa of Bharhut, plate XXXII.
47 Karl Khandalvala, Indian Sculptures and Paintings, plate XII, No. 31.
48 C. Sivaramamurti, Indian Bronzes, p. 13, plate L.
Yudhisthira and Jayadratha (5th–6th century A.D.). Another panel from the same site shows a lady archer stretching a long bow. A quiver is hung on her back (fig. 183). The actual specimens excavated from Bhita, Sahetha-Mahetha, Vaishali, etc., are similar to those depicted in the art.

FIG. 183 A Lady Archer; a quiver filled with arrows is seen on her back. Reproduced from a terracotta panel from Ahichachchhatra (U.P.). (after V.S. Agrawal)

On a stone sculpture, now preserved in the Batavian Museum, Java (c. 8th century A.D.), Dharmapala has been depicted holding a bow. In a panel at Borobudur of the same date, Prince Siddhartha is portrayed taking part in an archery tournament and competing with other Shakya lords.

Vishnu-Trivikrama in the Adivaraha cave (7th century A.D.) at Mahabalipuram; and panels of Mahisasuramardini from Mahabalipuram (7th century A.D.), Ellora (8th century A.D.), Bihar (Pala, 11th century A.D.), and Orissa (late 11th century A.D.) usually depict bow along with other weapons. Tripurantaka (8th century A.D.) in bronze in Gautam Sarabhai Collection, Ahmedabad shows Shiva with hands in the attitude of carrying bow and arrow, even though the actual bow is missing. Shiva, while slaying Taraka, in a panel from Ellora (8th century A.D.), carries a very long bow. A bronze (early Chola, 11th century A.D.) showing Rama, Lakshmana, Sita and Hanuman, now in the Government Museum, Madras is one of the most remarkable Rama-groups in bronze. Rama here is shown as a prince in all his glory, in an attitude of carrying a bow and an arrow.

The Khajuraho sculptures depict bow as a weapon of war. Its length was slightly less than the height of a man. It was kept along around the left shoulder. When the arrow was to be discharged, its lower end was firmly fixed on the ground and the shoulder of the archer was knelt while using it. In all the scenes depicting a bow, the weapon appears only in the hands of the foot-soldiers. The figures, however, are limited in number which makes it clear that this famous weapon of the great epics had lost its former popularity in the Central India in the Chandella period (12th-13th century A.D.).

One of the finest representations of bow and arrow of the 12th century A.D. is from Dilwara temple where the Jain goddess Chakreshwari is holding a bow in her left hand and a barbed arrow, pointed downwards, in the right. Some dancers, portrayed here, carry both stretched and unstretched bows with barbed arrows. The soldiers on frieze from Bhubaneswarha, the famous Konarka war horse; the late Chola specimens from Madurai; and the Hampi sculptures furnish good examples of bows and arrows of the post-12th century A.D. In a sculpture preserved in the National Museum, New Delhi, King Narasimhavarman has been shown practising

51 E. B. Havell, Indian Sculptures and Paintings (1928), p. 38, plate XVII.
52 K. M. Munshi, Saga of Indian Sculptures, plate 82.
53 Ibid., plates 84-85.
54 C. Sivaramamurti, op. cit., p. 39, plate XXVIII.
bow. Many feathered arrows have pierced an object. The lower frieze depicts warriors holding shields, swords, and quivers filled with arrows.

**PAINTINGS**

Indian paintings present a picturesque view of contemporary life. Men, women, birds, animals, trees, arms and armour, etc., have been painted with animated grace. It is an art of sensuous refinement in which the charms of courtly living and the liveliness of the common people are portrayed lucidly. From the paintings it is possible to reconstruct social, economic, political and military conditions of the period. Thus from the paintings portraying hunt, warfare, etc., we get the idea of weapons in use; their technique and style; their origin and development.

![Image of various arms](image)

**FIG 184** Various arms like swords, shields, spears, javelins, harpoons, daggers, etc., gathered from the paintings on the walls of the rock-shelters and prehistoric caves: specially noteworthy are the archers, different kinds of simple bows and arrows. (Courtesy Wakankar)

Paintings assignable to the prehistoric period in India are scanty. These are primitive records of hunting and fighting scenes crudely drawn on the walls of the caves in the Kaimur Range, Central India. Examples of the cave paintings of the Late Stone Age are found in the Vindhya hills. A hunting scene, depicted graphically, has been located in the caves in Raigarh where a number of people are trying to secure a bison. The rock paintings of the Mirzapur caves, similarly, contain bows and arrows together with other weapons. The earliest datable paintings are in the Jogimara caves which show the long spears and bows and arrows. In one hunting scene, the arrow has pierced right through the animal’s body.

Archery proved to be a great source of inspiration to the artists of Ajanta. There it has been painted not less than twenty times. Both in Cave I and Cave II, bow and arrow is depicted. Cave XVII is full of such paintings. In the depiction of Chhadanta Jataka, the six-tusked elephant is being watched by a couple. The male figure holds a bow and sheaf of arrows.

The story of the Mahakapi Jataka painted here shows the king of Banaras being escorted by a number of soldiers armed with swords, spears, daggers and bows and arrows. Three soldiers are seen shooting arrows at the monkeys.

In cave No. XVII, the Sharabha Jataka is painted and the king with his minister is seen going out for a hunt, riding spirited horses and carrying quivers filled with arrows attached to the saddles of both the horses. Shyama, while filling water from a lotus pond for his blind old parents, was hit by an arrow shot at him by mistake by the king of Banaras. Sinhala with his army is seen shooting arrows at the forces of a demon. Quivers with arrows are seen attached to one side of the howdah. One quiver bears a pair of leather straps and is tied to the back of a king who is hearing from his queen the dream story of the golden deer. Archery is well depicted in plate LXIX—a b of Yazdani’s book where the hunter, foiled in

64 Yajdani, Ajanta, part. IV (Text), p. 33.
65 Ibid., plates. X, XI-a, XII-a-b.
66 Ibid., plates X, XI-a, XII-d, XIII-a.
67 Ibid., p. 34.
68 Ibid., p. 74.
69 Ibid., p. 92.
70 Ibid., p. 101, plate LXVIII-a.
his attempt to capture the sacred bear, asks his followers to shoot. One of them has drawn his bow and shot an arrow which has struck the body of the bear.\textsuperscript{71}

In the wall paintings of the Bagh caves\textsuperscript{72} in Central India, arrows are occasionally painted. Here we find a bow painted blue.

Besides wall paintings we have a few painted manuscripts of palm leaves and of paper, which are in the typical Western Indian style of the 12th to the 14th centuries A.D. A few painted manuscripts of Pala School (10th to 12th centuries A.D.), now preserved in the National Museum, New Delhi, depict simple bows and feathered arrows.

In one of the miniature paintings from the \textit{Jaina Kalpasutra} we find Trishala relating her dreams to Siddhartha, who explains their significance and assures her that the dream presaged the birth of a son. The king is seated on a throne and holds in one of his hands a bow and in the other an arrow.

Babur was a soldier-scholar. As a writer and poet he possessed fastidious and critical tastes. He has bequeathed a delightful record of his activities in his memoirs, popularly known as \textit{Babur-Nama}. Illustrated copies of \textit{Babur-Nama} are in the British Museum, London; the Victoria and Albert Museum, London; the Louvre Museum, Paris and the Hermitage Museum, Leningrad. The fifth and the last copy is in the National Museum, New Delhi. It has 183 paintings and it contains the names of 48 painters. It was illustrated in the 42nd year of Akbar. In one painting, the scene of the first battle of Panipat (1526 A.D.) has been painted with its minutest details. Here Babur protects his vanguard by rows of 700 movable carts which were tied together by ropes of hides. Small breast-plates of iron are seen arranged in succession in between the wagons to shield the musketeers. Behind the artillery is stationed the advance-guard. Babur himself is seen in the centre, flanked by his valiant soldiers. Some of the soldiers riding the horses are carrying bows and arrows. The bows are kept inside the bow-cases and a quiver filled with arrows is hung on the right shoulder of each soldier.

In one scene Babur, riding a caparisoned horse, is directing the war. His units detour on the right and left and on reaching the enemy's rear, begin to shower rains of arrows on them. The Indian elephants are depicted with their \textit{mahouts} (drivers) shot down or galled with arrows and the beasts wounded and thus forced to run back treading and trampling their own men.

In one illustrated leaf of the \textit{Babur Nama}, a horse-archer has dismounted his horse and, sitting on the ground, he has stretched the bowstring to its full length. With his simple bow, the archer seems to have checked the whole line of the enemy. The arrow-head is almost touching the grip and a quiver packed with arrows is tied at the right waist.

A painting, datable to the early 18th century A.D., belonging to the Rajasthan School depicts a battle with bows, arrows and other weapons. On the upper part of this painting a horse-rider is fighting with a sword while his bow and arrows are kept together inside a case and the same is tied round his waist. Another cavalier is aiming at him with his bow and arrow. In the lower part of this miniature painting two warriors are shown riding an elephant. Both of them are shooting with their bows at a frightened cavalier, and one of their arrows has actually pierced the neck of the horse and has penetrated almost upto its nock.

The National Museum, New Delhi has in its collection one painting of the Rajasthan School ascribable to the mid-18th century A.D. It shows a magnificent horse in black and its rider in white. The cavalier is holding a bow in his right hand and the rein of the horse in the left. A quiver is hung at the waist. The feathers and a portion of the arrow are visible.

\textsuperscript{71} I\textit{bid.}, p. 103.
\textsuperscript{72} \textit{Garde, etc.}, The \textit{Bagh Caves} (1927), p. 52.
An inscribed painting of the Bundi School at present in the National Museum, New Delhi Collection, datable to the early 18th century A.D., portrays Rao Arjan ji of Narbad. The Rao is holding a naked straight sword in his raised right hand and a round shield in his left. He is seated on a carpet. The empty scabbard (out of which the sword is taken away) is hung on the left side; a dagger is tied to the waistband while two leather straps, hanging from the waistband, carry a decorated quiver. One-fourth portion of the arrows kept inside is visible. The bow, which is not seen, might have been kept on the other side.

A battle-scene painted in the Mughal style belonging to the early 16th century A.D., now in the National Museum, New Delhi, portrays a huge elephant trampling a cavalier. The torn and damaged sword, shield, bows, arrows and the quiver are seen lying helter-skelter.

Akbar’s reign (1556–1605 A.D.) was a period of renaissance in the medieval Indian history. The two styles, Persian and Indian, gradually began to fuse and in the course of time became one. The Zich-i-Jadid-e-Miraji Tajak, the Tuzuk-i-Baburi, the Ganga Dhar and many other manuscripts were translated and illustrated during this period. The Mahabharata was rendered into Persian by Naquib Khan, Abdul Qadir Bahaini and Sheikh Sultan and was named as Razmanama. A beautiful copy of this manuscript is preserved in the Sawai Mansingh II Museum, City Palace, Jaipur which contains several illustrations of war-scenes. Most of the weapons, specially the different kinds of bows and arrows, depicted therein have been borrowed from the contemporary Mughal army.

The Tarikh-i-Khandana-i-Timuria and the Badashahnamama, now in the Khuda Bakash Library, Patna, are indispensable for a student of military history. The Mughal bows, quivers, arrows, etc., have been painted in all dignity. The Dastan-i-Amir Hamza, at present in the Metropolitan Museum, New York, illustrated under the supervision of Mir Sayyid Ali and Khwaja Abdul Samad between 1567–1580 A.D., carries many war-scenes. A few of them illustrate the bows and arrows as well.

All the important types of weapons and accoutrements used in the time of Akbar can be found in the illustrated manuscript of the Ain-i-Akbari, a copy of which is displayed in the Prince of Wales Museum, Bombay. The technical names of the weapons and their use have been mentioned therein. Two kinds of bows, simple and long, and curved and short, are sketched here.

The Mughal painting reached its zenith under the patronage of Jahangir (1605–1627 A.D.). Every incident of his life was painted. In some he has been painted hunting the wild animals with bow and arrow. Shah Jahan (1627–1658 A.D.), though a builder, promoted painting too. Aurangzeb (1658–1707 A.D.), was a puritan and the painting rapidly declined in his reign. With the disintegration of the Mughal empire, capable painters migrated to Avadh, Hyderabad, Mysore and Bengal. In Rajasthan, painting continued to flourish. In most of the Rajput paintings war-scenes and weapons including bows, arrows and quivers can be easily discerned.

The National Museum, New Delhi has in its possession some rare manuscripts containing war-scenes. The Yusuf Zulekha, written by Maulana Abdul Rehman Jani in the 9th century A.H. (i.e., 15th century A.D.), contains battle-scenes in one of which the king is seated on a howdah fully equipped with bow and arrow and other weapons and is being escorted by his soldiers. The illustrated manuscript of the Khamsa-i-Nizami of Muhammed Mumin dated 996 A.H. (i.e., 1588 A.D.) contains dramatic war-scenes. Horse-archery is specially noteworthy. The camel-archery can be seen in the Laila Majnu written by Katib Mustafa.

The Shahnama of Firdausi is a treasure house with minor details of battle arrays, camping, drilling and modes of shooting with bows and arrows. The National Museum, New Delhi has several copies of this manuscript in its possession. The one dated 1060 A.H. (i.e., 1652 A.D.) is profusely illustrated.
The war tactics of the medieval Indian Sultans have been remarkably sketched in it.73 The soldiers as well as the horses and the elephants are fully armoured and are equipped with bows and arrows. The Mehr-o-Mushtari, Bhagwat Purana (Devanagari script), the Mahabharata (Udyoga Parva), 18th A.D.), the Durga century Shapta Shati (miniature copy), the Kalpasutra, Bhagwata Purana (late 18th century A.D.) are equally interesting illustrated manuscripts for the study of medieval Indian warfare in general and archery in particular. The history of the Nizams of Deccan (South India) has been described in the Tuzuk-i-Asafiyah (12th century A.H. i.e., 18th century A.D.). On folio number 47, the fighting forces are facing each other. A big fort is being bombardeed by the artillery and cannons on wheels. The archers shooting with their bows are also seen here. The Darab Nama containing the paintings of the Kashmir School, dated 1797 A.D., is an informative treatise on our subject. Several other references depicting archery can be seen in Indian miniatures. Some of them are listed below:

(a) A painting from Jaunpur in the Jaina Style of about 1465 A.D. shows a courtesan, Kosha, dancing on a heap of rice and her lover piercing a mango for procuring it for her with a chain of arrows.74

(b) “Crossing of the Ganges by the army of Kublai Khan”, of the Mughal School, dated 1595 A.D. and “Lovers on the Camel”75 in Mewar Style, dated 1608 A.D., contain beautiful examples of bows and arrows.76

(c) The Ramayana set of about 1610 A.D. of the Mughal period is a treasure house of archery depicting feathered, three-headed, crescent-headed, etc., arrows and bows of several varieties.

(d) “Raja Zorawar of Bikaner”, c. 1740 A.D., is painted as sitting on a prancing steed with his courtiers. One of them is having a bow on his back and the quiver is attached to the saddle.77

(e) In one Kishangarh School of painting of c. 1780 A.D. Krishna is shown seated, with a lotus in his hand and with his half-brother Balarama, in the camp at Kundulpur after abducting Rukmini, the daughter of a local raja, who was affianced to Shishupala, another king. A quiver, full of arrows with three straps, is lying near Krishna along with chakra, shankha, gada, and padma. The association of bow and arrow with Krishna is rather rare in Indian art.78

(f) A beautiful example of a lady archer is seen in the pre-Kangra kalam at Guler of c. 1755 A. D. where Saki, the queen of Govardhan, is riding a white charger accompanied by a posse of maids. Among the weapons carried by the maids are a matchlock and a bow and arrows.79 That horse-archery continued in India at least up to the late 18th century A.D. can be judged from a painting displayed in the Archaeological Museum, Red Fort, Delhi, depicting “Dara with his army”.80 Dara, the brother of Aurangzeb, is riding a horse and is holding a bow and arrow.

(g) Prithviraj Chauhan has been painted carrying a bow in the

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73 Warner and others, Persian Miniature, plate 14.
74 Narasimbhajini Phia Library, Baroda.
75 Zubor Hajek, Miniatures of the Mughal School (1960), p. 327, plate 3.
76 Gopi. Krishna Kanoria Collection, Calcutta.
77 National Museum Collection, New Delhi.
78 Maharaja of Kishangarh Collection, Kishangharh.
79 National Museum Collection, New Delhi.
80 Archaeological Museum, Red Fort, Delhi.
right and arrow in the left hand. He is shooting in the garudekrama pose.\(^{81}\)

(h) The National Museum, New Delhi, has in its possession at least three miniature paintings of the Bundi School, all datable to c. 1775 A.D. The one titled *Raga Vibhāsa* shows a hero embracing his beloved and at the same time stringing the bow. In the second painting a lady archer has just dismounted her horse and is about to take bath in a river. Her costumes and a quiver filled with arrows are hung by the branch of a nearby tree. A male horse-rider, also carrying a similar quiver filled with arrows, is watching her at her bath. In the third painting a horse-rider, unable to control his galloping charger, has dropped his *jamadhara* (*H*-shaped dagger), his bow and his quiver filled with arrows, on the ground.

(i) A battle in which bows and arrows have been widely used is painted in a miniature painting displayed in the State Museum, Patiala.

(j) The beautiful creation of the artist Chetu of the 19th century A.D. depicts "The rape of a Yadava woman."\(^{82}\) Many village boys have kidnapped the consort of Arjuna who with his reputed *Gandiva* bow is witnessing the disaster in a helpless condition.

In the numerous paintings, preserved in the different museums of India, bows and arrows have been often painted.

The Pahari, Deccani, Maratha and Sikh Schools of paintings are equally rich with war-episodes. A close study of these miniatures is sure to provide illuminating accounts of the bows and arrows of the then soldiers.

\(^{81}\) National Museum Collection, New Delhi.

\(^{82}\) E.B. Havell *op.cit.*, (1928), p.33 7. plate LXVIII.
CHAPTER VI
ARROW

PARTS

The Atharvaveda specifies the parts of an arrow as shalya (shaft), pirandhi (shaftment), shranga (point), kulamala (the nock or notch) and apaskanibha and apastha. The last two terms mean the upper and the lower part of the shaft respectively. The Aitereya Brahmana describes the different parts of an arrow as anika (point), shalya (shaft), tejana (nock) and parnani (feathers).

Ancient Indian literature refers to arrows of many types. The words ishu and sharya used for arrows have not been distinguished. In the later period the common name for an Indian arrow was teer or tir and bana. Didyu and didyut in the Rigveda denote ‘missile arrows’, both human and divine. Bhalla (like a spear), pradara (literally ‘to split apart’), vipatha (literally ‘to fly’) and vastastika are the other names assigned to the arrow. In the medieval ages the point was called paikan in Persian and bhal in Hindi; the shaft was termed kilk in Persian and sari in Hindi (both meaning ‘reed’) and the feathers were called par in Persian and pankha in Hindi.

POINT

The arrow-head, also known as ‘pile’ or ‘point’, was fastened to the shaft in three ways: (i) By a tang which fitted into the end of the shaft. This was always used with reed shafts. (ii) It was notched at the back and lashed to the shaft. (iii) It had a metal socket that fitted over the end of the shaft. With ‘target arrows’ it was often a pointed cap that fitted on the end of the shaft.

1 Shalya and tejana have sometimes been used for the upper end of the shaft and the nock respectively.
2 The area on the shaft to which the feathers are attached is termed as ‘shaftment’. Some native arrows of interior construction sometimes slit the shaft and put a whole feather into the slot so formed. This could be called a ‘feather socket’. W. F. Paterson, London, through correspondence.
3 It was called yaziri in Japan, vide, G.C. Stone, A Glossary of the Construction, Decoration and Use of Arms and Armor, reprinted (New York, 1961), p 672.
4 The nock is called hazy in Japan, vide, G.C. Stone, op. cit., p. 239.
6 ‘Shaft’ usually means the body of an arrow, sometimes the entire arrow. In this text the word has been used in its former meaning i.e., the body.
7 For various kinds of arrows and their parts used in the different parts of the world see G.C. Stone, op. cit., p. 75, figs. 92 to 94.
8 Isha has been mentioned in the drama V: kramoravshiyam, V. 7, composed by Kalidasa:

9 G.C. Stone has wrongly defined tir as ‘an arrow in Purbati, a Nepalese dialect’. It is a common Hindi name and is used for any kind of arrow. Tir and teer are evidently the same. In the 19th century A.D. the word ban (not bana) signified a rocket.
10 Pradara, vipatha and vastastika denote the arrows but their exact shape is not clear.
The shape of Indian arrow-heads varies almost without limit. The Dhanurveda classifies them into ten types:

1. **Aramukha** (literally ‘like an awl’). It was serrated and was best suited for cutting tough objects as serrated arrow-heads cut through hide, leather and flesh very effectively (fig. 185, left).

2. **Kshurapra** (literally ‘like a razor blade’). It was shaped like a spade-head and was mainly used for cutting arrows of the enemy and for aiming at the enemy’s hand (fig. 185, middle).

3. **Gopuchchha** (literally ‘like the tail of a cow’). It was leaf-shaped and was very common in all ages. It was good for general aim (fig. 185, right).

4. **Suchimukha** (literally ‘needle-shaped’). It was thin and pointed and was considered good in piercing the chain armour of the enemy (fig. 186, No. 3).

5. **Bhalla** (literally ‘spear-headed’). It was oval with broad head like that of a spear. This was useful for aiming at the chest. (fig. 186, No. 2). The three types i.e., Gopuchchha, bhalla and suchimukha were almost identical with very little variation.

6. **Dvibhalla** (literally ‘two-pronged’). It was two pronged and looked like two-headed. It was used for entangling or intersecting arrows of the enemy (fig. 187, right).

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**Figure 185** Illustrations put to the names of arrows found in the Dhanurveda. Drawn from an old illustrated manuscript.

Left: **Aramukha** (serrated)

Middle: **Kshurapra** (like a spade-head)

Right: **Gopuchchha** (like the tail of a cow)

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**Figure 186** Illustrations put to the names of arrows found in the Dhanurveda. Drawn from an old illustrated manuscript.

1. **Batsadanta** (like a calf’s teeth)
2. **Bhalla** (spear-head like)
3. **Suchimukha** (needle-shaped)
4. **Ardhachandra** (crescent-shaped)

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12 **Dhanurveda Samhita**, verses 64-65:

13 **Ibid., verse 66**:

14 An ancient type of Russian arrow with a broad, shovel-shaped head was known as *sresni* cf. G.C. Stone, *op. cit.*, p. 581. It was a very popular type during the *Muhabharata* war and very often such arrows have been described as cutting enemy’s hand or their arrows. *Mahabharata*, 3.230.13; 3.255.24; 7.37.22. Kalidasa, too, mentions that Taraka, the demon, had struck Kumara, the hero of the drama, with many *kshurapra* arrows discharged from his bow which was drawn up to the ear.

15 **Dhanurveda Samhita, op. cit., verse 67**:

16 Such arrows are used even now in fishing by the aborigines.

17 **Bhalla** and *vatsadanta* arrows have been applauded in the *Adiparva* of the *Mahabharata* (3.16.24). Kalidasa says, “Prince Raghu almost covered the earth with the bearded heads of the enemies, cut off with the triangular *bhalla* arrows; it looked as if the honeycombs are surrounded by bees.”

18 *Cf., karimata*, a forked arrow-head of Japan. It was sometimes very large. One of them was 6 inches long and 5 inches across the point. G.C. Stone, *op. cit.*, p. 336.
7. **Batsadanta**19 (literally ‘like the teeth of a calf’). It was said to be of the shape of a calf’s teeth and exceedingly sharp (fig. 186, No. 1).

8. **Ardhachandra**20 (literally ‘crescent-moon’). It was shaped like half-moon and was used for aiming at the throat and the forehead (fig. 186, No. 4).

9. **Karmka**21 (literally ‘like the petal of a flower’). It had a peculiar circular head (fig. 187, left).

10. **Kakatunda**22 (literally ‘like the beak of a crow’). It was globular in shape and pointed and could pierce the chain mail (fig. 187, middle).

Apart from the above mentioned types, many kinds of arrow-heads are referred to in the Sanskrit literature.

**Trishula**23 (literally ‘like a trident’) was three-pronged. It had the head like a trident having a straight point and a crescent. In one panel of the Hazara Ram temple, Hampi, South India, of the 13th century A.D., a foot-soldier is shown shooting a trishula-headed arrow against a charioteer (Compare with fig. 190).

**Anjalika**,24 mentioned for the first time in the *Mahabharata*, was very broad and sharp. It remained popular for some time but its use was discarded at a later date hence no mention of it in the historical period.

**Sarpakar** (serpent-headed) arrows mentioned in the *Ramayana* and the *Mahabharata*25 seem to be a poetic fancy or these might have been decorative pieces. Hopkins has tried to compare these with the poisoned arrows, but it does not sound valid since we have other words for poison and poisoned arrows.26 The blazing and the flaming arrows of the same text, discussed separately, were smeared with such material that they used to set things, they hit, on fire.

Kautilya27 has classified arrows into five categories:

1. **Venu**
2. **Shara**
3. **Shalaka**
4. **Dandasona**28
5. **Naracha**29

23 One of the arrows often shown in the hands of the Javan gods is also called trishula Cf., Raffles, op. cit., I, p. 295, plate 296-7; G.C. Stone, op. cit., P. 630.

24 *Mahabharata*, 7.37.22.

25 *Mahabharata*, 3.61.10.

26 There are other words found in our literature to denote a poisoned arrow-head, such as alakta, digdha, and lipta.


28 नेत्रकवारकालकित्स्मात्स्मकः इति।

29 It has been discussed in detail under the ‘shaft’.
Another word used by Kautilya is karpana which literally means "a staff to be thrown by hand". It was a kind of dart and not an arrow as is commonly misunderstood.

Kalidasa borrowed many names from his predecessors and mentioned a few rather unknown types also. The most original term is patrina (literally 'feather') which seems to have been used for the feathered arrows. Ashug was a dreadful arrow but its shape is not clear. Sayaka has been associated with Shiva in his Rudra form where he holds it with his Pinaka bow but from the depiction on the sculptures it seems a spear-headed barded arrow-head. Shilimukha, like ardhanchandra, was a crescent-shaped arrow meant primarily for cutting the neck (fig. 188).

The word tir is given at No. 15 of the list in the Ain-i-Akbari. Its another name was siham. Tukah or tukkah was the name of an arrow without a head. One such arrow was shot in anger by king Azam Shah at his General, Zulfikar Khan, at Jajau on the 18th June, 1707 A.D. Steingass explains the word as "an arrow without a point, but with a knot at the end." The following names of arrows have been found in the Dastur-ul-Insha:

1. Gherah i.e., broad-headed. (fig. 191, middle)
2. Do-muhanah i.e., two pointed or barbed (fig. 191, right).
3. Tarah-i-mah i.e., fullmoon or circular head (fig. 189).
4. Tarah-i-halal i.e., crescent-shaped head (fig. 188).
5. Tarah-i-badam i.e., almond-shaped head (fig. 191, left).
6. Tarah-i-toko. The meaning is not clear.

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30 Kautilya, Arthashastra, Book II, chapter 18.
31 Kalidasa, Kumarsambhava, i.6,9.
32 Kalidasa records that Prince Raghu in the battle with Indra shot a sayaka, into Indra's arm, which was marked with the name of the former:...
33 See the sculptures of Shiva displayed in the National Museum, New Delhi.
34 Kalidasa, Raghuvarsha, VII. 49:
35 Abul Fazl, Ain-i-Akbari, I, p. 110, fig. 14 a on pl. XII.
7. *Sih-bhalah* i.e., three-pronged or trident-shaped.

![Image of Sih-bhalah](after D. Elmy)

8. *Tarah-i-ikhorni*. The meaning is not clear.

9. *Tarah-i-khar* i.e., thorn-shaped or needle-shaped. (Compare with fig. 186, No. 3).

10. *Tarah-i-khaki*. It has been defined by Steingass\(^\text{39}\) as a kind of arrow but its details are not given.\(^\text{40}\)

![Image of Tarah-i-badam, Ghera, and Do-muhanah](after D. Elmy)

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In the 18th century A.D., the kinds of arrows in use among the Pathans of Farrukhabad\(^\text{41}\) were as follows:

1. *Lais*. According to Shakespear\(^\text{42}\) it was a practising arrow.

2. *Qalandara*. Its meaning is not clear.

3. *Kohar-tarash*. Its meaning is not clear.

4. *Ghera* or *gherah* i.e., broad-headed. (fig. 191, middle)

![Illustrations put to the names of the arrows found in the Dastur-ul-Insha](after D. Elmy)

5. *Nuktah*, or perhaps *na-katta*\(^\text{43}\) (literally 'non-cutting' or headless arrow. (Compare with fig. 192).

6. *Thuth*, or perhaps better, *thonth* i.e., with a beak.

7. *Ankaridar* i.e., with a bent head, shaped like a saddle-maker's needle. *Ankari* means a hook.

Thomas Williamson found some very broad arrow-heads in use in the West

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\(^{39}\) F. Steingass, op. cit., p. 974.

\(^{40}\) *Khaki* literally indicates the colour similar to the police uniform colour. It may mean 'reed' and not the shape of the arrow-head.

\(^{41}\) *Journal of Asiatic Society of Bengal*, vol. XLVII, p. 332.


\(^{43}\) *Cf.*, Egerton, *op. cit.*, p. 137, note preceding No. 710 where a blunt and heavy arrow used in Sind has been described.

In the 'Babar-Nama' ang was an arrow for the bird shooting (folio, 19). The forked arrow was called *tir-giz*. This was a short-flight arrow also used for shooting small birds (folio 135).
Bengal in the late eighteenth century A.D. There was one of crescent shape more than four inches across at the barbs. Though they did not penetrate easily, yet when they happen to graze a limb, they cut desperately. When discharged among bodies of troops they were found to do amazing mischief.  

In Travancore an arrow with a point of hard wood was used. It was called bitla.  In Rajasthan were popular the arrows like Japanese boson, with a round on the end from which a sharp point projected. The arrows with ‘broad head’ were used either for big game or for injuring an enemy. The head was quite broad and barbed. (Compare with fig. 195, A to D.)

Different kinds of arrow-heads as gathered from the sculptures, coins, paintings or actual excavations have already been discussed. (see figs. 194 to 197.)

**SHAFT**

The body of the arrow is known as ‘stele’ or ‘shaft’. Most of the arrows have cylindrical shafts, except when they are made of reed which always has a slight taper.

A. Reed Shaft

The Dhanurveda, on the basis of the shaft, divides the arrows into three categories: (i) the one heavier towards the point was called stri (female), (ii) the one heavier towards the nock was named purusha (male), and (iii) the one equal throughout was termed as napumsaka (impotent). The first type was said to have been suitable for cutting the strong objects; the second could have been thrown at a greater distance and the third form was for practice only. Commenting on this W.F. Paterson says, “The arrow heavier towards the nock (i.e., purusha) is interesting. This may apply to a ‘flight arrow’. Those now used for competitive distance shooting, which follow the Turkish design, have their centre of gravity a little behind mid-point of the shaft. They are also very light. Most arrows, of course, have slightly forward point of balance.”

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44 Thomas Williamson, Oriental Field Sports, folio 1807; William Irvine, op. cit., p. 98.
45 Egerton, op. cit., p. 80; G. C. Stone, op. cit., p. 119.
47 Iron arrow-heads of eleven types, described earlier, have been found at the excavations of Kaushambi alone. G. R Sharma, The Excavations at Kaushambi 1957-59, (Allahabad, 1960), pp. 45-47.
48 The description of a Turkish shaft, applicable to Indian shaft as well, needs mention here. “They (the Turkish arrows) are largest at about one-third of their length from the nock and smallest at the head. The diameters are roughly as 16 at the head, 22 at the nock, and 32 at the largest part. They are almost cylindrical between points at about one-quarter and one-half their length from the nock. There is a slight curve here but it is too slight to measure without micrometer calipers. This shape offers the least possible resistance to the air”. G. C. Stone, op. cit., p. 72.
49 Dhanurveda Samhita, op. cit., verses 62, 63.
50 Through correspondence with the author.
B. METAL SHAFT (Naracha)

Mention here may also be made of naracha which was completely of iron. These have very often been referred to in the classical literature.\(^{51}\) According to the Mahabharata five big feathers were attached to the naracha and only the strong and skilled archers were expected to use these arrows. It is surprising to note that no naracha has so far been found during the course of widespread archaeological excavations extending over a long period of time. Secondly, it would not be easy to shoot an iron arrow to a worthwhile distance. Even if a singularly strong man could make use of one with a singularly strong bow at short range, its efficacy would be as dubious as its accuracy.\(^{52}\)

These arrows may nevertheless have existed. One such naracha of the 18th century A.D. is on show in the Arms Gallery, National Museum, New Delhi and another at the Government Museum, Madras. Arrows made of black iron are specially mentioned in the Dronaparva.\(^{53}\) The

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\(^{52}\) S. D. Singh, Ancient Indian Warfare with Special Reference to the Vedic Period (Leiden, 1965), p. 105; Vasishtha, Dhanurveda Samhita, verse 73; Sharngadhara Paddhati No. 1787; cf., Dhanurveda Samhita, verse 73.

\(^{53}\) Mahabharata, 7. 28.4 : "कालिकापालकर्मानि"
Virataparva speaks of large shaft (vipatha), flighted with vulture's feathers, whetted on stone and sharp-pointed, wholly made of metal. The term nalika may also denote a hollow metal arrow, though it has been differently interpreted by the different authors. Elephants were often resisted with arrows of iron. Arjuna killed an elephant with a stout naracha which penetrated the animal’s body right up to the feathers.

The Karnaparva refers to the narachas steeped in oil. They may have been lubricated to pierce surely and smoothly.

We also come across the ardha-naracha or half-arrow. W.F. Paterson believes that these might suggest the use of arrow-guides.

Arrows or darts used with the arrow-guide in war were about half the normal arrow.

**NOCK**

The ‘nock’ or ‘notch’ were mainly of two types: the ‘plug nock’ and the ‘splinter nock’. In the case of the ‘plug nock’ the head was fixed in the usual way, the shaft cut to the appropriate length and the nock-end of the shaft was tapered internally. The nock was then glued and inserted into the shaft. Then the whole thing was bound fast by sinew. This sinew binding was carried up to the lips of the nock for strength and as far forward as six or seven inches along the shaftment. The shorter ‘plug nock’ was usually of bone, ivory or wood, and here, the shaft was simply cut across and the

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54 Ibid., 4:38.26: “स्थायितः: स्थृतः.”
55 Ibid., 3:170:17; 5:51:3 has “कौण्डलिकाः” Karni seems to mean eared or barbed.
57 Ibid., 8:14:29 “स्थायितः अपेन्द्र” We find the mention of naracha in the Ramayana, the Arshashastra (Book II, Chapter 18), the Jatakas; cf., Cowell. The Jatakas, Nos. 68 and 522; the Agni Purana, 245.12 and a multitude of other works.
58 S. D. Singh, op. cit., p. 106.
59 Through correspondence with the author. For ardha-naracha see Mahabharata, 7:37:22.
plug glued and inserted into the hollow shaft, a binding of sinew holding it firmly in place.®

The second type is an effective substitute for the bulbous nock, the mandatory requirement for arrows used with the composite bow, and is found only on the arrows of middling and inferior quality. Two thin slivers or ‘splinters’ of wood are bound either side of the shaft. As the arrow-maker needed only a knife, glue and sinew as tools, these types were very quickly made. Such arrows were also used with a bow having a flat bamboo string.

The description of the Turkish arrow-nock given by G.C. Stone applies to the Indian nock as well. He says, ‘In the Turkish arrows it (nock) is made of two pieces of wood having a natural curve that makes the opening at the end considerably smaller than close to the shaft so that ends have to be sprung apart to admit the string. This is done to enable the archer, even on horseback, to carry an arrow in place ready for instant use. The pieces of the nock are glued and lashed with sinew to the shaft and it is much stronger than the usual horn nocks.’®

FEATHERS

There is almost always a fourth part of an arrow—the feathers, which are glued or tied to the shaft, to steady its flight. In some parts of India, very long reed arrows were used without feathers; only, however, at a very short ranges. The feathers were usually placed as nearly as possible in the line of the shaft.®

The Dhanurveda has prescribed the feathers (also known as ‘flights’) of crow, swan, shashada, hawk, krauncha, peacock, vulture and tittibhi birds for this purpose.® The Shiva Dhanurveda, similarly, recommends the feathers of the following birds: heron (kanka), goose (hamsa), brown (shashada), osprey (matsyada-krauncha), peacock, vulture and wild cock (kukkutu).® The Mahabharata® mentions all these and the feathers of flamingoes besides. The Virataparva speaks of shuka-patra (parrot feathers). Feathers of kanka and peacock® have been mentioned in the Karnaparva.® It was possible to do this because of the low crop generally given to flights. The ‘fletching’ (fixing of the feathers to arrows) has been described in the Aitareya Brahmana and in the Raghuvamsa® as well.

The average length® of these feathers was six angulas or five inches, but for arrows to be used on a bow of horn, the feathers of ten angulas or eight inches have been recommended. These were tied with sinew or thread on the back at the rate of four

61 This was a very old practice. The butt, known as punkha, is often referred to as gilded. Compare, for example, Mahabharata, Virataparva, 48.15, where we have hema-punkha; Raghuvamsa, III. 64, which mentions savarna-punkha. Maisey’s pl. XXII shows that some of the arrows represented at Sanchi are provided with butts.
63 Ibid., p. 72, fig. 92.15.
64 In the Aitareya the arrows of Kamadeva, the God of Love, are said to have been decorated with coloured feathers of several birds.
65 Dhanurveda Samhita, verse 60:

66 Vulture’s feathers (gardhra-patra) are mentioned in the Dronaparva, 119. 42; 125. 28, etc., of the Mahabharata. The Virataparva speaks of large shafts (vipatha) flighted with vulture’s feathers.
67 Kalidasa describes mavi-patrina sarena i.e., the arrows fitted with the peacock feathers. In the Raghuvamsa, III. 56, it is said, “Raghu (the hero) with his arrows decorated with peacock feathers brought down the flag of Indra”:
68 In the Atharvaveda the arrows of Kamadeva, the God of Love, are said to have been decorated with coloured feathers of several birds.
69 Dhanurveda Samhita, verse 60:

The forbidden feathers are recorded in the Kodandamandana, II as follows:

70 The length of the feathers varied greatly. It is from barely an inch to as much as ten inches. In general it was from three to five inches.

71 The forbidden feathers are recorded in the Kodandamandana, II as follows:

72 Vulture’s feathers (gardhra-patra) are mentioned in the Dronaparva, 119. 42; 125. 28, etc., of the Mahabharata. The Virataparva speaks of large shafts (vipatha) flighted with vulture’s feathers.
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88 The forbidden feathers are recorded in the Kodandamandana, II as follows:

89 Vulture’s feathers (gardhra-patra) are mentioned in the Dronaparva, 119. 42; 125. 28, etc., of the Mahabharata. The Virataparva speaks of large shafts (vipatha) flighted with vulture’s feathers.
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Feathers were sometimes coloured. The gold and silver flights (also called ‘vanes’) were sometimes used in India. Some Turkish flight arrows, used in India during the 13th-14th centuries A.D., are said to have single vanes from feathers arranged in spirals to cause the arrow to rotate.

Many of the aboriginal tribes in India used large iron-heads and, therefore, had to use larger flights to balance or steady the arrow in flight. Quite a large number of the cruder war arrows have large untrimmed feathers, usually three. A peculiarity of some of the northern Indian arrows, as pointed out by D. Elmy, is that the forepart of the flight (perhaps an inch or so) is left unsheared, giving the arrow a distinctive look.

Rougher shafts had the feather-rib pared or stripped and the flights sewn on with sinew. Whole, uncut feathers were simply bound to the shaft on others, while one arrow in the collection of D. Elmy has holes in the shaft into which the ends of the feathers are tucked. Flights of the middling and superior arrows were stripped. This facilitated fletching since the flights were carried right up to the nock and needed flexibility to mould to the bulbous nock. The feathers in general were from three to five inches.\(^7^6\)

**MEASUREMENT**

**A. Arrow**

The size of the arrow-head made of flint and used during the prehistoric age and those made of copper and bronze and used during the protohistoric (Harappan) period have already been recorded. No complete arrow has so far been excavated. The length of arrows in India have varied from about 16 inches to nine feet; in general it was about half the length of the bow. The *Dhanurveda*\(^7^7\) has, similarly, prescribed that the bow should be of the length of the user, and the arrows half of the length of the bow. As six feet was about the maximum length of the bows, the arrows issued to the armies in ancient India were made three feet long and cut off for those that required shorter ones.

The *ishu*\(^7^8\) of the Vedic period was five span or three feet long. The *Dhanurveda* also says that an arrow should measure two cubits or five angulas (i.e., four inches) less than two cubits.\(^7^9\)

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\(^7^1\) The number of feathers used in India has varied from 1 to 5. Some arrows had two feathers, most had three of which one was of a different colour from the others and was placed upward when shot. A few Indian arrows had four feathers, two of which were always much narrower than the others, and were placed horizontally when used. Sometimes, though very rarely, five arrows were also tied. For methods of tying see *Dhanurveda Samhita* of Vashistha, verse 62; Sharngadhara Paddhati, Nos. 1772, 1773; Agni Purana, 245. 13; cf.,

\(^7^2\) In the South Seas, and in some parts of South America, very long reed arrows are used without feathers; G. C. Stone, *op. cit.*, p. 72.

\(^7^3\) G. C. Stone, *op. cit.*, p. 75, fig. 94, No. 7 is a Japanese arrow that has both straight and spiral feathers.

\(^7^4\) A few Japanese arrows have four feathers, two of which are always much narrower than the others and are placed horizontally when shot. H. S. Cooper, *The Art of Attack and Development of Weapons* (Ulverston, 1906), p. 189, says that the Veddas of Ceylon use five feathers.

\(^7^5\) D. Elmy, *op. cit.*, p. 9.

\(^7^6\) The length of the feathers varies greatly. In some of the flight arrows it is barely one inch long while some of the tribal arrows have 12 inches long feathers. According to P. C. Chakrabarti, *op. cit.*, p. 157, “The feathers were generally trimmed six inches long, but those stuck up in arrows meant to be shot from a horn bow measured ten angulas”; cf., Yashirtha, *Dhanurveda Samhita*, verse 61; Sharngadhara Paddhati, Nos. 1772-3.

\(^7^7\) The Shiva *Dhanurveda*, a later version of the *Dhanurveda* with certain modifications, prescribes the length of an arrow as two cubits. It says that the best arrow measured twelve mustis (literally ‘fist’; one fist is equal to three inches), the mediocre measured eleven mustis (i.e., 33 inches), and the inferior only ten mustis (i.e., 30 inches). *Nitiprakashika*, I, 17; IV. 28-9 recommends that an arrow should be three cubits long. In the *Shatapatha Brahmana*, VI. 5, 2, 10, the length of an arrow is stated to be five spans, i.e., about three feet. (Cf., *Vedic Index*, vol. I. p. 82). In the *Mahabharata*, *Dronaparva*, 164.18, the normal length of an arrow is said to be equal to that of an axle of the war-car.

\(^7^8\) Rigveda II. 24:8; VIII. 7.4; *Arhataveda*, I. 13, 4; *Vajasaneyi Samhita*, XVI. 3, etc.

\(^7^9\) *Dhanurveda Samhita*, *op. cit.*, verses 33, 34:
be equal to that of the smallest finger. About the arrows used in the 326 B.C., by the Indian archers against the forces of Alexander, Arrian says, “Their (Indian) arrows are little less than three cubits long, and fly with such force that neither shield nor breast-plate nor any armour is strong enough to withstand them.”80 The arrows engraved in the bas-reliefs of Sanchi (2nd–1st centuries B.C.) appear to be from three to five feet in length.81

The Dronaparva of the Mahabharata82 describes a class of arrows ‘one span long’ which were meant for fighting at close quarters. Commenting upon it W. F. Paterson says, “I cannot see any archer trying to shoot in a normal way with an arrow only one span in length. Either they were for use with the arrow-guide, but against this I know of no mention of such an instrument at this early period, or possibly they were hand thrown darts. The argument against the archer trying to use it from a bow specially in the heat of battle, is the likelihood of his overdrawing and shooting it into his own hand or the bow. If the bow was only drawn about one foot, there would be so little power behind the shot that the arrow could hardly have been effective.”83 A dozen tiny arrows measuring 6 inches (total length) including 1½ inches blade, at present displayed in the Arms Gallery, National Museum, New Delhi, are nearer to this Vedic type. These are ‘bolts’84 and were used in some kind of crossbow85 like instrument. These have been described separately. During the Mughal period such arrows were called nao86 and were shot through a pipe called nawak.87

The arrows of the 17th–18th centuries A.D., at present displayed in several museums of India, generally measure 2 feet 4 inches. Egerton, however, describes an arrow as 6 feet long. It was used at Lucknow in 1857 A.D. against the British forces by the natives. It had a broad, leaf-shaped head and an unfeathered shaft, notched at the end.88

Some arrows during the Mauryan period (269–237 B.C.) were said to be as long as nine feet. The problem as to how such long arrows were carried is partly solved by a reference in the Arthashastra.89 In the chapter entitled ‘The Training of Elephants’ of this book mention is made of ‘arrow-bags’ which were evidently large bags hung from the elephant howdahs to contain extra supplies of arrows. Commenting on this W.F. Paterson says, “While it seems very reasonable to have ‘arrow-bags’ for elephants, native archers in Amazon basin and Pacific islands also carry very long arrows.”90

The diameter of ancient Indian shafts ranged between ½ inch to nearly ⅛ inch.91

80 Mc Crindle, Ancient India, p.73.
82 Mahabharata, Dronaparva. 123.53 ff; cf., valastika. Ibid., 7.98.50.1.
83 Through correspondence with the author.
84 ‘Bolt’ was the arrow for the crossbow. “They are very much shorter and heavier than the arrows for the long bows. The heads are usually square (careau) and the names ‘careau’ and ‘quarrel’ are derived from the French names for the shape.” G.C. Stone, op. cit., p. 125, fig. 164. The Indian bolts, however, are pointed.
85 One crossbow is at present displayed in the Alwar Museum, Alwar, Rajasthan.
86 Steingass, op. cit., p. 1382, defines nao as a small arrow used for shooting birds, with a notch on one side, and nawak as a trough, a pipe, or a tube through which an arrow is projected. It was a crossbow. According to William Irvine, “Nawak” was a pipe through which an arrow was shot. As I understand it, this was either a crossbow, or formed in some way a part of the ordinary bow. It was not, I think, a mere blow-pipe, like those used by the Malays for their poisoned arrows; as mentioned by Egerton, 97, 98, Nos. 263-268. Those specimens of the pipe are 6' 6" to 7' 6" long and the arrows used with them 12 inches long”, op. cit., p. 96.
87 सततिनव के दोहे || नाओ नावक के रेत || देवन में छोटे छोटे वाघ करा गोलियां ||

88 Egerton, op.cit., p. 130, No. 605.
89 Through correspondence with the author.
90 For various excavated arrow-heads see G.N. Pant, Bharatiya Astra-Shastra (Hindi), (New Delhi, 1976), pp. 66-67, figs. 1 to 51.
B. Point

The collection of about one hundred iron arrow-heads, excavated from the urn-burials of Adichannallur (district Tinnevelly), include socketed and long-bladed arrow-heads with an average length of five to six inches. This long-bladed type could not become popular in the later times, since it involved some extravagant use of the metal. The type, in earlier stage, was manufactured at various places such as Anantpur (length 3½ to 5 inches), Chelabera (6 to 6-3/8 inches), Savandurg Kstavana (6 inches), Bhita (5 inches), Padpat (3 inches) and Nagari (5 inches).²³

Plutarch has given the measurement of a barded arrow-head with which Alexander was wounded in 326 B.C. in the fortress of Mallois. He says, “An archer let fly an arrow which transfixed his (Alexander’s) cuirass and pierced to the bone around his breast and there stuck fast, the shaft as it projected from the wound aggravating the pain, while the iron of the barbs measured four fingers in breadth and five in length.”²⁴

The average length of a Mughal arrow-point was five to six inches. Egerton, however, has mentioned an arrow used for killing birds with a crescent-shaped head which is 4½ inches wide.²⁵ The crescent-shaped naracha of the National Museum, New Delhi, referred to earlier, has 6 inches wide head. Its total length is 24.6 inches.

MATERIAL

A. Shaft

The shafts of arrows were generally made of shara (reed) and bamboo which is clear from the term vainava (i.e., belonging to the forest).²⁶ D. Elmy rightly observes that most of the shafts in India, in all ages, were made of reed which is a species of bamboo. Despite its fragile appearance, it made a strong enough arrow when reinforced at the tang area of the arrow-head.²⁷

Sayyid Aminuddin wrote in his Kulliyatur Rami²⁸ that the Sultan of Gujarat obtained seed in order that lakhauri arrow could be grown in his country, and that, afterwards, Gujarat became famous for its arrows.²⁹ Egerton remarks that the Bhutanese utilised a very small species of bamboo for their arrow, remarkable for its straightness and strength and which grows at elevations of over 10,000 feet.

In Bengal two kinds of arrows were used: the first of reed and the second, against tigers, was of wood. A hole was bored for the tang which was forced into the hole while red-hot.³⁰ It is a common practice among some aboriginal tribes of India even today to insert a sharpened foreshaft of hard wood into a light reed.

The shafts (and sometimes the full arrow) made of metal, specially iron, have already been discussed.

B. Point

Ancient arrow-heads have been manufactured from various substances notably bone, horn, stone, and after the use of metal was discovered, of bronze, iron, and finally steel.³¹

92 S. P. Gupta, op. cit., p. 136. Iron arrow-heads with five inches long blade are still in use in some tribal communities of India.
94 Egerton, op. cit., p. 78, No. 18.
95 The Shiva Dhanurveda contains a few rules regarding the preparation of a shaft. cf., Dhanurveda Samhita of Vashishta (Bengal edition), pp. 14-15, verses 56-59; Sharngadhara Padhathi, Nos. 1768-1770, For vainava see Mahabharata, 7.74.8.
97 Archer’s Guide (1833).
98 D. Elmy, op. cit., p. 5.
99 Ibid., pp. 5-6.
100 Kautliya, Arthashastra, Book II, Chapter 18, mentions arrow-heads made of metal, bone or wood so “as to cut, rend or pierce”; cf., P. C. Chakravarti, op. cit., reprinted (Delhi 1972), p. 157.
The tradition of the use of bone arrow-heads in the chalcolithic (stone-copper) period found at Mohenjo-daro, Chanhu-daro, Lothal and Navadatoli, was more strengthened in the historical period. The variety in shape, the largeness in production, the vastness of the area of distribution—all combined to make this native tradition the most important, popular and highly utilitarian. The raw material of bones, in almost finished form, was easily accessible to the craftsmen at all places, possibly free of cost. Again, it is easy to cut and polish bones and produce sharp points. The most significant thing is that this tradition was never broken in India. Right from the 3rd millennium B.C. to the 2nd millennium A.D. bone arrow-heads have been used in this country.

The bone arrow-heads have been excavated at Ujjain in periods ranging from 750 B.C. to 250 B.C., at Prabhas Patan, Taxila, Maheshwar, Eran, Ter, Nasik, Rupar (where it is called as 'stilus'), etc., from the ‘North Indian Black Polish (NBP)’ levels (600 B.C. to 200 B.C.), at Sonepur, in Bihar in the levels of periods III to V (i.e., 150 B.C. to 100 A.D.), at Karad, Tripuri, Kolhapur from the levels of Andhra period (i.e., 2nd century B.C. to 2nd century A.D.), at Kaushambi, Bangarh, Vidisha, Hastinapur, etc., from the different levels of the 5th-6th centuries A.D. and at Rupar from period V (800 A.D.—1000 A.D.). At Ujjain and Nasik two big hoards, of several thousand of bone arrow-heads each, belonging to the 3rd-2nd centuries B.C., have been found.

The recent excavations at Atranjikhera (Uttar Pradesh) have clearly shown that iron was known in India in about 1000 B.C. It is possible that the iron arrow-heads belonging to the period of the Mahabharata war may be excavated in the near future.

POISONED ARROWS

The Rigveda refers to the arrow-heads smeared with poison. These were mostly of horn and were distinct from other metal-headed arrows. In one hymn (mantra) it has been said, “O Bravo! wherever you see the devils (asuras) kill them with your poisoned (shishana) arrows.” The Atharvaveda, too, speaks of such arrows and indicates vegetations as the source of poison. It is called digdha.

The Dhanurveda has illustrated the technique of making an arrow poisonous. According to it, “The rocksalt from the peepul should be ground in the cow’s urine and paste made. This paste should be smeared over the arrow-head and then heated in fire. It will then become blue, like the colour of the neck of the peacock, and poisonous.” Such arrows were said to have pierced the strongest armour and killed the most formidable enemy.

Manu condemns the use of fiery and poisonous arrows in civilized warfare.


104 The words denoting a poisoned arrow were alakta, digdha and lipa. Rigveda, VI. 75.15, has poisoned (alakta) arrow with a head of horn (ruru-shirsni).

105 Ibid., X. 87.6:

106 Atharvaveda, IV. 6; V. 18.8-15 “कृद्दिंश किरिह” V. 31.4.

107 Dhanurveda Samhita, op. cit., verses 71-2:


110 For iron the word ayas has been used in the Rigveda, cf., IV. 2. 17; V. 62. 7; VI. 75. 15; VI. 3. 5; VI. 47. 10; V. 30. 15; X. 99. 6 etc. For the antiquity of iron see N.R. Banerjee, The Iron Age in India (New Delhi, 1965), pp. 101-157; Lallanj Gopal, ‘Antiquity of Iron in India’; Uttar
indirectly proving thereby that these were known and used.\textsuperscript{108}

**INSCRIBED ARROWS**

Sometimes the shaft of an arrow bore the name of the archer inscribed upon it. In the *Mahabharata* war arrows bearing names of the shooters were released in large numbers. Arjuna’s arrows were “well tempered, tied with sinew and engraved with his name.”\textsuperscript{109} Sometimes the figure of Ganesha, the elephant-god, was seen embossed on an arrow-head (fig. 198). Possibly, an arrow-head so inscribed was the first shot in battle, so that it might bring good luck to the user.

The practice of inscribing name is referred to in the *Dronaparva*, the *Patala Khanda* and also in the *Rajatarangini*.\textsuperscript{110}

\textsuperscript{108} *Manusmriti*, 7.90:

\textsuperscript{109} Drona’s arrows, too, are said to be incised with his name; *Mahabharata*, 7.98.51. cf., *Ramayana*, *Yuddhakanda*, 44.23.

\textsuperscript{110} *Mahabharata*, 7.54. 7-8.; *Dronaparva*, 169.36; *Patala Khanda*, 29.88; *Rajatarangini*, VIII, 1678.

Kalidasa\textsuperscript{111} refers to the inscribed arrows. Raghu shot several arrows, with his name inscribed on them, at the *asuras* (devils). The arrows of the *asuras* were, similarly, engraved. Arrows of Prince Ayu, the hero of the drama, were recognised by the King from the name inscribed upon it.\textsuperscript{112}

Inscribed arrows have been referred to in the literature of the medieval period. The old practice of engraving the owner’s name continued for a very long time.\textsuperscript{113} Many arrows of the 16th-17th centuries A.D. preserved in the armoury of Tanjore and those displayed in the Government Museum, Madras (Tamilnadu) bear testimony to this fact.

**FIG. 198** Figure of Ganesha inscribed on an arrow-head. Drawn from the actual specimen.

*(after D. Elmy)*

**FIG. 199** Examples of Indian four-fletch arrows.

1. It was probably shot from a *makta* (self bow) with a flat bamboo string, hence its wide nock.
2. The decorated and feathered portion.
3. Splinter nock.
4. Inserting the nock.
5. The tanged nock.
6. Details of nock.

*(after D. Elmy)*

\textsuperscript{111} Raghuvamsha, III. 35; VII. 38:

\textsuperscript{112} Kalidasa, *Kumarasambhava*, 17. 4;

\textsuperscript{113} M. J. Walhouse, “The Old Tanjore Armoury”, *Indian Antiquary*, vol. 7, p. 195.
CRESTING

Arrow cresting was known to the ancient Indian archers. Painted arrows are referred to in the Ramayana and the Mahabharata.

The reed arrows, pointed with iron-tips, were painted with different ornaments. Sometimes they were lacquered and then painted all over. In certain cases only a few inches near the point and a few inches above the nock were painted. The nock, made of bone and ivory, was sometimes engraved.

In the Harshacharita, datable to the 7th century A.D., mention is made of gilded arrows.

The points of the arrows, as already discussed, were variously designed and some of them bore the impressions of gods and goddesses (fig. 198), hunting scenes, and floral and creeper designs (fig. 199).

Egerton has described a few arrows produced at Lahore, most probably in the late 18th century A.D., as “arrows with reed shafts, painted and gilt at the feathered ends, various shaped points, with ornamental mounts of steel inlaid with brass and copper, length 2 feet, 4 inches.” A few other arrows, again from Lahore, had “black reed shafts painted and gilt and tipped with ivory, flat points of perforated steel work.”

There are many arrows extant which show that in its lowest form the Indian arrow was colourful, and at its highest it was a miniature work of art. Due to its construction, the Indian arrow often carried more cresting, than is normally found on its European counterpart. The tang and the nock areas were sinew-wrapped. Sinew would, if left unprotected from damp, tend to fray, and it was a logical conclusion to paint over it. Occasionally even the nodules were bound and painted. Different areas of India had their own regional designs.

PROHIBITED ARROWS

The Dronaparwa gives a list of forbidden weapons and mentions inter alia arrow-heads made of monkey-bone, cow-bone and elephant bone. One or more of the following defects are likely to be found in an arrow which was prohibited. According to the Dhanurveda, the arrow should not be too thick or too thin. It should not be the product of a vile land or short of joints, nor should it be weak or split. Damaged, repaired, having holes or with burnt shaft, having defective nock or improper point—such arrows should never be used.

114 Bana, Harshacharita, VII.
115 Egerton, op. cit., p 120, Nos. 603-604.
117 Ibid., p. 9 and the illustrations on the same page.
According to the Risala-i-Tir-o-Kaman, the defective arrow can be recognised when it has one or more of the following defects:

1. Too wide a nock.
2. A weak, crooked or imperfect shaft or a shaft not properly hafted.
3. The top end of the butt of the shaft hollow.
4. Not feathered properly.
5. Not used with a proportioned bow.
7. Too heavy or with an imperfect point.

**FLETCHERS & BOWYERS**

The fletchers (also called bowyers) or bow-and-arrow-makers were a separate guild in ancient India during the time that bows and arrows were used for military purposes and there were many laws regulating their privileges and products. In Vedic times the smith was not only a metal worker in the general sense but an arrow-smith as well, and a person of some consequence. He made the arrow-head which was then passed on to a guild of arrow-makers who made up the weapon. There existed even at that time, a regular profession of arrow-making called *ishukrt* or *ishukara*, literally 'the maker of arrows'.

The smith who produced the objects of *ayas* (iron) is called *karmara* in the Rigveda.
FIRE ARROWS

Arrows having ignited matter wrapped round their tips have been described in the Ramayana. The Mahabharata, too, makes often reference to the fire arrows. The Smrti writers did not think that the use of fire-arrows in war was fair and the practice was also condemned by the religious caste. Despite this the fire and the fire arrows were widely used.

In the Arthashastra, Kautilya gives three different recipes for preparation of fire arrows. It stresses the use of incendiarism in warfare, even to using birds and monkeys as fire-carriers. The Aitereya Brahmana describes an arrow with fire on its tip.

The Manasollasa has recommended the use of arrows carrying burning material, specially against the elephants. The vegetable oil struck by which the enemies caught fire.

In the early medieval period some arrows were headed with hollow brass balls perforated with three or four holes which were filled with inflammable composition. These were shot burning on to the roofs and into the houses. This practice was culled from the Arab invaders who used naphtha as an inflammable agent on their arrows.

A further device was the red-hot arrow-head. It was heated in small charcoal braziers and quickly shot. The aboriginal tribes of Kols and Santhals of Bengal and Bihar shot wild animals, specially bear, with red-hot arrows believing them to be more efficacious than a cold blade, and, no doubt, they were.

Two types of metallic arrows were used, the naracha (already discussed) and the nalika, the latter often being barbed. The nalika might have been heated and discharged from a hollow tube, since its all metal construction fitted it admirably for this role.

TRIBAL ARROWS

The arrows used by the aborigines living in India today are very simple. Arrows of the "Adis" of NEFA are generally of two kinds known as cpug (having both the shaft and the point made of bamboo) and yengmo (the shaft is made of bamboo and the point of iron). These arrow-heads are smeared with poison which is commonlyaconite and is collected from the creepers like talo and mane. The "Sherdukpons", living mainly in the two villages of Rupa and Shergaon (NEFA), use poisonous arrows which are carried in quivers of bamboo tubes. The arrows of the "Akas" tribe (NEFA) is called moo. These are of two

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127 Kautilya, Arthashastra, Book XIII, chapter 4. In the Mahabharata, 4.55.23, is recorded banma juvitenam i.e., flaming arrows. This may be metaphorical, though one would assume that the metaphor is derived from actual practice.

128 Manasollasa, verse 1213, compare also verses 1065 and 1067. The agneyastra or fire weapons of the epics (cf., Mahabharata, 1.234.7, etc.) might have been fire arrows and not the fire arms.

129 Rajatarangini, VII. 982-3.

130 For naphtha see the fourth chapter, footnote No. 66.

131 D. Elmy, op. cit., p. 10.

132 The naracha has been discussed in earlier paragraphs.

133 Nalika has sometimes been interpreted as 'gun'.
types *i.e.*, those for shooting birds and those for shooting big games and also enemies.

The “Grasias” of Bombay and Rajasthan use reed arrows. The point varies from $2\frac{1}{2}$ inches to $2\frac{3}{4}$ inches. At one end the iron head is fixed and on the other side two thick stripes of wood and four pieces of feather in a cross section are tied with thin string and then glued together. The “Santhals” of Orissa use the arrows made of *dulchar* (a kind of reed) on which a point of bamboo is fixed. A feather of fowl in an angular slant is fitted to regulate the movement. When hunting big games, they use arrows with triangular heads of iron.

The “Murers”, a hill tribe in Bihar, call *abro* to their arrows. The “Mumars” of Raipur district (Madhya Pradesh) are expert archers. Their boys get regular training in archery from early childhood in shooting small birds, hares, squirrels, etc., with small wooden arrows. The “Kumars” even kill rats with arrows to supplement their food. Two types of arrows known as *dophias* and *chhobas* are used in fishing.

The “Bhils” of Rajasthan are reputed arrow shooters. The very name “bhill” means a ‘bowman’. The point, called *binkhi*, is of steel and is very neatly tied to a bamboo shaft. Feathers are invariably used. The bamboo shaft having a round steel head is called *dosnu* which strikes birds without breaking their skin.

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FIG. 202 Arrows used by the aborigines.
1. For big games.
2. The arrow made entirely of bamboo; used by the children.
3. Triangular-headed and feathered in the middle.
4. Chhoba used in fishing.
CHAPTER VII

BOW

PARTS

Bow is the oldest, the most used and most widely distributed of projectile weapons. The simplest and commonest kind of bow is a piece of wood tapering in both directions from the middle and having the ends connected by a string shorter than the wood. The side of the bow away from the archer when shooting is called the ‘back’, and is usually nearly flat; the opposite side is called the ‘belly’, and is generally more rounded. The middle of the bow is called the ‘handle’ and the ends the ‘tips’. The latter are frequently made of horn. The notches for the string are called ‘nocks’.1

Several names for the different parts of the bow are given in the Sanskrit literature.2 Artani denotes the nock or notch to which the bowstring is attached.3 The bowstring was called jya or guna.4 Bracing or stringing of bow was called alan;5 knocking the arrow to the string pratidhara;6 the bending of a bow ayam and the shooting of a shaft api.7 The sound of a bowstring was called jyaghosha8 and the twang sounded sweet to the warrior. The curved shape of the bow was called vakra and the staff was known as danda.

BOWSTRING

The Dhanurveda Samhita discusses at length the materials suitable for bowstrings. The silk was the best. According to it, “Forty-eight strands of pure silk threads should be

FIG. 203 Bows gathered from the Gupta gold coins (5th century A.D.).
Left : Two semi-circular pieces joined with a piece of metal which forms the grip.
Right : Same as above without string.

twisted to the thickness of the little finger. The length of the bowstring should be equal to that of the stave." It further states that, "the bowstring should be glossy. To attain the gloss, silk thread should be dipped in deer-fat." The cow-fat and the buffalo-fat have also been recommended. A freshly killed cow’s ear flesh could have also been used for the bowstring. It has been advised that, "a bowstring should be made of good fibres, and should be a little less firm than the seasoned bamboo fibre."10

In case the silk was not available, the next best things were the sinews of the deer, the entrails of the buffalo or goat, cotton threads, seasoned bamboo bark, etc.11

Kautilya12 has prescribed murva (‘sanseviera roxburghiana’), arka (‘calotropis gigantea’), sana (hemp), gavedhu (‘coix barbata’), venu (bamboo bark) and snayu (sinew) for bowstring.13

During the Mughal period the string was called either zih or chillah.14 Its another name suggested by F. Steingass16 was roda which meant a catgut or sinew used as a bowstring. In Hindi it was called panach, panchak, or pratyancha—all

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9 Dhanurveda Samhita, translated by Kshemraj Shrikrishnadasa Shreshthina (Bombey, Shaka 1840, V. S, 1975), verses, 50-51:

10 Ibid., verses 54-55:

11 Ibid., verses 52-53:

12 Kautilya, Arthashastra, Book II, Chapter 18.

13 The legend of the death of Vishnu, told in the later Samhitas and Brahmanas, expressly contemplates that Vishnu was leaning against his strung bow which cleaved his head by the sudden springing apart of the two ends when the bowstring was gnawed; cf., Maitrayani Samhita, IV. 5. 9; Panchavimsha Brahmana, VII. 5.6: Shatapatha Brahmana, XIV. 1.1.7 et seq. Another word sometimes used for the bowstring was pinge. Hillbrandt, however, considers it a musical instrument; cf., Rgsveda, VIII. 69.9.

14 William Irvine, op. cit., p. 93.

meaning bowstring. Another local name given to it was dori i.e., ordinary thread or rope. During this period the strings were made of strong threads of white silk laid together until of the thickness of the goose quill. Hansard describes, "Whipping of the same material was then bound firmly round for a length of three or four inches at the centre, and to this middle piece large loops of scarlet or other colour were attached by a curious knot. These gaudy loops formed a striking contrast to the white silk." Thomas Williamson, however, says that the string was composed of numerous thin catguts laid together without twirling, then lopped with silk in the middle at the ends.

SELF BOW

A bow made from a single piece of wood is called a ‘self bow’; and one made of several pieces glued together a ‘built bow’; and one made of wood or bone with sinew stretched on the back a ‘backed bow’. The bow made of wood, horn and sinew was called a ‘composite bow’.

From the earliest time (i.e., the Late Stone Age) till today the ‘self bow’, also called the ‘simple bow’, has been in use in India. Although no bow of pre-or protohistoric period has been discovered so far yet the graphic representation or bows in the rockshelters and on the walls of the prehistoric caves (fig. 100) prove that these were the self bows made of one simple piece of wood or bamboo.

The cross-section of self bows varies greatly; most are considerably wider than they are thick, the back being flatter than...
the belly. Some are almost round, while others have a wide, shallow groove in the back. The self bow used by the islanders of Andaman and Nicobar has a handle of an ordinary size and becomes much wider and thinner and tapers to the tips. In some the limbs are nearly five inches wide in the middle. As a rule the handle of the bow is so placed that the arrow is held very close to the middle of the length.

COMPOSITE BOW

The composite bows have practically been popular all over the world. Such bows are built up of a wooden core that is merely a support to hold the other parts together, a horn belly and a sinew back. This type of bow is said to have originated in Turkey and the Turks made the finest bows and arrows ever produced. However, from the accounts of the Sanskrit literature it is clear that some of the composite bows used by the ancient Hindus were also of very superior quality.

20 The ‘self bows’ used by the aboriginal tribes of India have been discussed in detail separately.
21 G. C. Stone, op. cit., p. 130.
22 “Their (Turkish) bows will send the light arrows intended for them further than any others and are much smaller and lighter than any others of anything like equal power. They are also very durable and many over one hundred years old are still in serviceable condition. The better Turkish bows are generally signed and dated”. G. C. Stone, op. cit., p. 133, fig. 171.

FIG. 208 From the Gupta gold coins (5th-6th centuries A.D.)
Left: Probably a ‘built bow’. The two sides of the stave seem to be of horn. The grip, may be of metal, is slightly curved. It is also known as ‘reflex bow’.
Right: A ring seems to have been provided on the grip to facilitate handling.

FIG. 209 From the Gupta coins (6th-8th centuries A.D.)
Example of probably ‘built bow’. The grips in both the cases seem to have been joined separately and they look like balls.

TYPES

In India three bows have been regarded supreme: (i) Pinaka or Ajagava of Shiva, (ii) Sharnga of Vishnu, and (iii) Gandiva of Arjuna. Other famous bows were Kodanda, the personal bow of Rama, and Vijaya, the favourite bow of Karna.

Kautilya has divided bows into the following categories, out of which three were composite bows and one self bow:

1. Karmuka—It was made of tala wood.
2. Kodanda—It was made of chapa wood and, therefore, sometimes itself is called chapa.

24 Dhanurveda Samhita, op. cit., verse 33.
25 Ibid., verses 44-45:
26 Mahabharata, 4.56.4.
27 Ramayana, Balakanda, cantos LXVI, 8-12.
28 S. D. Singh, op. cit., p. 103.
29 Kautilya, Arthashastra, II. 10.
3. *Druna*—It was made of bamboo. It was a self bow.

According to Kalidasa, *karmuka* was preferred by the charioteers who “with their *karmukas* (bows) shot the arrows forcefully and pierced the bodies of the enemies so sharply that the latter could not move from their places. From a distance they were looking alive although they were killed.”

Again, “Stretching his *kodanda* to his ears the daitya (devil) chief Taraka discharged arrows towards Kumara, the hero, which spread on all sides.”

The famous bow which was the decisive factor in Rama’s marriage with Sita was of *kodanda* variety.

Another celestial bow was the *Dhanush* of Parashurama. After Rama had broken the bow belonging to Lord Shiva, Parashurama, the destroyer of *kshatriya* race and a great militant-saint, challenged Rama to string the bow of Lord Vishnu also. The moment Rama stretched the bow, all the spiritual powers of Parashurama were reduced. Rama discharged the arrow from the bow and Parashurama, now powerless.

4. *Dhanusha*—It was a common name for all kinds of bows.

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**FIG. 210** Bows gathered from the Indian stone sculptures.

1. Straight grip and straight tips. Different parts seem segmented.
2. Same as No. 1; the joints are not visible.
3. Bow with the grip receding inward.

(National Museum, New Delhi Collection)

**FIG. 211** From the early medieval sculpture.

Probably a *kodanda*.

(National Museum, New Delhi Collection)

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Kalidasa, *Kumarasambhava*, 16.46:

Kalidasa, *Kumarasambhava*, 17.20:

Kalidasa, *Kumarasambhava*, 16.46:

Kalidasa, *Kumarasambhava*, 17.20:

This bow originally belonged to Shiva who had destroyed the sacrifice of King Daksha with this bow. Later on he passed it to Brahma, the Creator, who gave it to King Devarata and finally it reached Janaka, the father of Sita. King Janaka proclaimed that Sita would be wedded to a prince who could string that bow. Rama not only strung the bow but when he tried to pull it, the bow broke into two at the middle which proved the superhuman power of Rama.

Ramayana, canto LXVII, 13-23.

It is said that Lord Shiva and Lord Vishnu became arrogant on account of the celestial bow with each of them. So much so that one day they were ready to combat with each other. Seeing this the smaller deities intervened and both of them surrendered their bows. Lord Shiva, as stated above, gave it to Brahma and Lord Vishnu gave it to Rishika, the king of Videha who in his turn bestowed the heavenly gift on his own son Jamadagni. Jamadagni, having done some wrong, was cursed and became incapable of using the bow. He, therefore, passed it on to his son Parashurama.

Ramayana, LXVI, 10-24.
and ashamed, left the field and spent the rest of his life on Mount Mahendra as a saint. Both these heavenly bows were manufactured by Vishwakarma, the divine master artist.

In the Sanskrit literature various names have been allotted to a bow. According to the Amarkosha, it can be called dhanusha, chapa, sharasana, kodanda, karmuka, ishuwasa, kalaprastha, gandiva, etc. In Hindi these are called vishikhashana, kamath, kubada, ripusantana, kaman, sharng or sranga, hari, gau, dhanu, dhanuhi, etc.

Panini in his Ashadhyayi has mentioned dhanusha and karmuka. He derives the meaning of karmuka from karma (‘action in the field’). Sayana, however, derives it from krimuka, name of a tree. Panini refers to another variety of bow which was made of tala wood and was itself called tala. He mentions a specially big bow called mahesavasa.

The common name found for a bow in the works of Kalidasa is dhanu. Other words found are kodanda, druna, chapa, sharasana and shranga. The last one was made entirely of horn.

34 Amarkosha, quoted by Mahendra Kumar, Pauratsya Dhanurveda (Vrândaban, V.S. 1913 i.e., 1919 A.D.), p.38.
35 Panini, Ashadhyayi, III, 2.21.
36 Ibid., V. 1.103.
37 Shatapatha Brahmana, VI. 6.2.11.
38 Panini, op. cit. 4.3.152: ‘ताला दधुषं ततात्विदं दधुषं’
It is also mentioned in the Mahabharata.
39 Panini, VI. 2.38.
40 ‘The various arrows discharged in the battle by Shiva’s son Karttikeya, drawing his dīnya to his ear, cut all of a sudden into pieces the shafts of Taraka, the enemy of gods’; Kumarasambhava, 17.22:
41 Kalidasa, in conformity with the previous writers, says that druna was made completely of bamboo. Its stave and string were of bamboo and its tips were tied with bamboo strips.
42 Sharasana literally means ‘the upholder of shara (arrow). In the drama Shukumala, Matali requests the King, ‘The asuras (devils) have been made your target for the arrows by Indra; let this sharasana bow be stretched forth against them’:
43 This bow created a terrific sound. Raghu, the hero, waged a furious battle with the ‘westerners.’ There was so much dust in the battle-field that the adversaries could be spotted out only by the twang of their shranga bows:

Kalidasa, Shakumala, 6.29.
Kalidasa, Raghuvamsha; IV. 62.
Throughout the Mughal period the Persian bows had dominated the Indian battle-field.\textsuperscript{44} Says Egerton, “The bows and arrows of Persia are celebrated throughout the East. The concave side of the bow (convex, when strung) is lined with several strings of thick catgut, to give it elasticity and force. The material of which the belly of Persian bow is made is buffalo or wild goat’s horn jet black, of a fine polish; glued to this is a thin slip of some hard wood little inferior in toughness, which serves for the back. The extreme points are fashioned to resemble a snake’s head, the loops of the cord having appearance of being held within its extended jaws. The horn is left plain, while the wooden back is decorated with rich arabesques. Birds, flowers and fruit are represented on its surface in varied colours intermingled with gilding and the grip of the bow is marked by broad bands of the same metal separated by figures of flowers and fruit.”\textsuperscript{45}

The personal bow of Shah Jahan (1627–1658 A.D.) at present displayed in the Dogra Art Gallery, Jammu is of steel and is inscribed. The two steel bows of the late Mughal period (18th century A.D.), exhibited in the National Museum, New Delhi are profusely decorated and inscribed.\textsuperscript{46}

The bows used by the horse-archers were generally made with double curve.\textsuperscript{47} In the catalogue of the Z.S. Collection are described two steel bows, said to have been made at

\textsuperscript{44} The Mughal bowmen were considered to be specially expert with their weapon, as Bernier says, “a horseman shooting six times before a musketeer can fire twice.” F. Bernier, \textit{Travels in the Mogul Empire 1665-8}, edited by A. Constable (1891), p. 48 cf.; W. Irvine, \textit{op. cit.}, p. 91.


\textsuperscript{46} Arms Gallery, National Museum, New Delhi.

\textsuperscript{47} Vide, the illustrated manuscript of the \textit{Babar-Nama} in the National Museum, New Delhi Collection.
Gwalior, Madhya Pradesh. They are of the double-curved design and are covered on both sides with richly damascened gold ornamentation in which are traced inscriptions in Hindustani (Indian language) verse showing them to have belonged to the Emperor Bahadur Shah (1707 A.D.—1712 A.D.) of the Mughal dynasty. Translated by Garcin de Tassy, member of the Institute of France, the verses are, "When Bahabur Shah applies an arrow to his bow puts in its mouth the finger of astonishment with the arrow of the Milky Way."48

The Rajputs, a martial race, were till recently, divided into thirty six royal tribes. They were all brought up to the use of the arms. Every village had its gymnasium where instruction was given morning and evening in the use of weapons and the practice of bow. The bow here was called kaman.49 One Rajput bow in the Alwar Museum, Alwar, Rajasthan has a curved Parthian shape. It is made of horn and is painted in various colours. It is bound with gold brocade called kimkhaba. It was manufactured in the late 18th century A.D. in the Alwar itself. Its total length is four feet, two inches.50

The Rajputs of Oudha resisted the force of the East India Company with their bows and arrows in 1857 A.D. Describing their condition Sleeman says, "The principal landholders (i.e., the Rajputs) are in open resistance to the Government, have each armed and disciplined bodies of 2000 foot and 500 horse and the command of as many as they like of passies armed with bows and arrows. The latter are village watchmen and at other times robbers of the lowest class. They use the bow and arrow especially, and are said to be able to send an arrow through a man at a distance of 100 yards."51 The bow was made of horn, with double curve. When drawing it, they supported it on the ground and bent it with their toe and right hand. A Rajput bow has thus been described by Egerton, "Kaman, bamboo, painted in green and gold, velvet covered grip. Gut cord, bound with silk, length 5 feet, 9 inches."52 It was made at Gwalior. A 19th century bow, made at Bikaner, is preserved in the Bikaner Museum, Rajasthan. It is made of horn, is lacquered and painted in brown and gold, and it measures four feet.

48 Egerton, op. cit., p. 114, note to No. 457.
49 Ibid., p. 105.
50 Ibid., p. 108, note to No. 366.
51 Ibid., p. 109.
52 Ibid., p. 114, note to No. 457.
MEASUREMENT

E.W. Hopkins points out that in the Mahabharata the bow is “several times spoken of as talamavra or palm-long, which, when compared with the numerical qualification employed in shadratni, may probably be interpreted as six cubits in length.”

The Dhanurveda has explicitly said that a bow should be shorter, lighter and less heavy than its bearer. The bow measuring five and a half cubits was recognised to be the best. The second best measured nine vītastis (i.e., 4½ cubits) and the ordinary bows were six and a half vītastis (i.e., 3½ cubits) long. These measurements were for metallic and wooden or bamboo bows only. The horn bows of ancient India were generally of six vītastis (3 cubits) in length.

The Shiva Dhanurveda contains the following rules regarding the length and size of a bow: “A good bow is that which is a little less strong than its bearer. For that which is precious is not the bow, but the Bowman. If he is troubled by the bow, he cannot shoot with ease (lit. does not see his target). Hence the size of a good bow should be in proportion to the strength of its bearer.”

The most accurate description of the early Indian bows can be obtained from the sculptures of Sanchi (2nd–1st centuries B.C.). “In one of the bas-reliefs”, says Cunningham, “there is the representation of a siege, probably undertaken to recover possession of some holy relic. The soldiers wore a tight fitting dress and kilt; the arms are a sword and bows and arrows... the infantry usually carried a bow of the same length with the bearer.” This agrees with the bas-reliefs of the Bhilsa Topes, which represent nearly all the foot-soldiers as archers.

54 E.W. Hopkins, op. cit., verse 32-33.
55 The Shiva Dhanurveda states, “Twentyfour angulas make one hasta (cubit) and four hastas make one bow (dhana). If the bow used by man be of this length, it should be considered auspicious”. According to some authorities, however, the bow should measure nine vītastis (4½ cubits).” cf.:
57 The arms represented on the Bhilsa Topes are bows and arrows, daggers, swords, spears with triangular heads, axes, battle-axes, tridents, and infantry and cavalry shields.
Arrian\textsuperscript{59} says that the Indian foot-soldiers in the fourth century B.C. carried a bow made of equal length with the man who bore it. “This they rest upon the ground, and pressing against it their left foot thus discharge the arrow, having drawn the string far backwards, for the shaft they use is little short of being three yards long.”\textsuperscript{60}

Perhaps these long bows were not found very useful that is why in the subsequent period, as is revealed from the miniature paintings, the bows were much shorter than the bearer and do not appear to have been more than four feet in length.

The Mughal bow,\textsuperscript{61} as a rule, was about four feet long. Most of the bows described by Egerton, except the Rajput one measuring five feet, nine inches, described earlier, are four feet long. However, the bamboo or hard wood bows still used by the aboriginal tribes of this country are abnormally long, ranging from five feet to six feet, two inches in length.\textsuperscript{62} A very broad bow of wood, presented by the King of Travancore to the British Government, measured only three feet, eleven inches in length and five and a half inches in width.\textsuperscript{63}

**MATERIAL**

The earliest bow must have been a very simple instrument made of bamboo, cane or wood. At a later stage horn became popular. Pinaka of Shiva, Gandiva of Arjuna and the Sharrga of Krishna were made of horn.\textsuperscript{64} Bows of ram’s horns are mentioned in the \textit{Jatakas}. Such bows were found specially useful for the warriors on the elephants, while the cavaliers and foot-soldiers generally carried bows of bamboo and wood.

In search after materials to improve the casting power of the bow, man would naturally be struck by the elastic properties of the horns of animals. The combined testimony of the \textit{Epics}, the \textit{Jatakas} and the \textit{Arthashastra} of Kauṭiya proves beyond doubt that the horn bow had come into use in India before the beginning of the Christian era. “Probably the bow of pure horn”, says P.C. Chakravarti, “was the link between the wooden bow and the composite bow of a later age. In making a bow of horn, whether of a pair of horns or of a single large horn, like that of a buffalo split up to make the two limbs, the bow when made and unstrung would naturally take the shape of the horns when growing on the animal’s head. It would at once be seen that the only way to get any spring from the bow would be to bend them the reverse way of the natural curve. Thus we have the reflex bow.”\textsuperscript{65}

This particular characteristic of the horn bows, \textit{viz.}, that they were drawn in the reverse direction to the curve which they assume when unstrung, will explain some of the otherwise inexplicable stories recorded in the \textit{Epics}.\textsuperscript{66}

Three principal materials for the construction of the bow-stave have been generally prescribed. The \textit{Agni Purana} supplies us with the following account, “Bows are made of three things \textit{viz.}, metal, horn and wood. The string of a bow is likewise made of three substances, \textit{viz.}, rattan (vamsa), hemp (bhanga) and hide (tvac). The best bow is four cubits long, the medium bow three and a half cubits, and the inferior bow only three cubits. The bow-stave is to be so prepared that

\textsuperscript{59} Cf., the story of the defence of Massaga, Aornos and the capital of the Malloi, as recorded by Arrian and Curtius Rufus.

\textsuperscript{60} Arrian, \textit{Indika}, XVI ; J. W. McCrindle, \textit{The Invasion of India by Alexander, the Great} (London, 1896), p. 108.

\textsuperscript{61} Irvine confirms this view. He says, “The Moghul bow (kaman) was about four feet long, and generally shaped in a double curve. The bow was of horn, wood, bamboo (sie), ivory, and sometimes of steel.” op. cit., p. 92.

\textsuperscript{62} Egerton, \textit{op. cit.}, p. 82, note to No. 81.

\textsuperscript{63} Ibid., p. 81, note to No. 80.

\textsuperscript{64} According to the \textit{Shiva Dhanurveda}, “The weapon par excellence of Vishnu is his horn bow, it was made by Vishvakarma and it measured seven \textit{vitasitas} (3 1/2 cubits). The horn bow used by man for long many years is six and a half \textit{vitasitas} (3 cubits) in length,” p. 11. verses 10-34; Sharrnadara Paddhati, Nos. 1742-1745; 1748; 1750.

\textsuperscript{65} P.C. Chakravarti, \textit{The Art of War in Ancient India}, reprinted (Delhi, 1972), p. 154.

\textsuperscript{66} The stories emphasise the inability of renowned heroes to bend and string certain bows. Compare, for example, the \textit{svayamvara} episode of Draupadi in the \textit{Mahabharata}.
it may not have any unevenness from its centre to the extremities. In order that it may be firmly held, a spare piece of wood should be fixed at the centre of the bow-stave. The ends of the bow should be made thin and tapering so as to resemble the eye-brows of a handsome woman. Metal and horn bows should be made either of iron or horn separately or of the two substances conjointly. The horn bow should be well-shaped and decked with gold. Bows which are crooked or have cracks or holes in them are not good. The metal bow is to be made of gold, silver, copper and black iron (steel). Horn bows made out of the horns of buffaloes, sharabha and rohisa are praiseworthy. Bows are also made of sandal wood, rattan, sal wood, dhanyana (a kind of 'hedyserum') and kukubha ('pentaptera arjuna'). But the bow made of bamboo, which grows in autumn and which is cut and taken at that time, is the best of all.67

PROHIBITED BOWS

Features of defective bows have clearly been elucidated. A defective bow, according to the Dhanurveda,58 may have an adverse effect both mentally and physically and was, therefore, to be avoided. A bow having one or more of the following defects should not be used:

1. Very old and fragile,
2. Made of unseasoned wood or unripe bamboo or cane,
3. Pierced, perforated, damaged or repaired,
4. Very heavy or very light,
5. Burnt or knotted,
6. Having poor quality string, and
7. Inauspicious.

The bows of bamboo having four, six or eight joints were prohibited. Those having odd numbers of joints i.e., three, five, seven or nine were considered good.69

Every archer was advised to select a bow according to his strength, size, taste, practice, etc. The bow which had been used in the family by the ancestors could, no doubt, be worshipped but such a bow should not be used in the battle-field.

The bowstring, too weak or not making a good sound while it was strung, was not recommended. Similarly, the string should not be so tough that it might create chest pain.

DECORATION APPLIED

The bows made of ivory or horn were generally engraved. Hunting scenes, floral designs and the images of gods and goddesses were minutely carved out. Those of wood were sometimes painted at the back; others had small bells or flags or yak’s tails fastened to them. The ceremonial or ornamental bows were set with jewels.69

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68 Dhanurveda Samhita, op. cit., verses, 40-43.
69 "प्रतिपत्ति व तथा गदिः
Dhanurveda Samhita, op. cit., verse 36.
70 Mahabharata, 4.38.20 ff.
The bows of the rich and the powerful were frequently inlaid with figures of golden elephants, little insects, dots and other such decorations. Arjuna’s bow is described to have decked with gold.71

The Rajput bows of cane were first lacquered and then painted all over. Animals, birds, warriors, flowers and creepers have been drawn and painted in glittering colours.

The metallic bows of the Mughal India were generally decorated with gold and silver damascening. Both zarnishan72 and tehnishan73 styles of decoration are seen.

Those made in Hyderabad were sometimes ornamented with bidri74 work and the grips and nocks of some metal bows made in Jaipur in the 18th-19th centuries A.D., bear the traces of enamelling.75

Inscriptions were not altogether missing. Reference has already been made to the two inscribed bows of Emperor Bahubur Shah and the one each of Shah Jahan, and Shah Alam.76

One Indian bow described by Egerton77 is made of bamboo and is painted in green and gold. Its grip is covered with velvet. Another made of horn was lacquered and gilt.78

Describing the bows peculiar to Mysore in the time of Hyder Ali and Tipoo Sultan (1782—1799 A.D.), Egerton says, “Kaman (bow) made of buffalo horn and bear wood, painted and varnished with silk strings.”79

A four feet long bow of horn, made in Lahore (now in Pakistan), was lacquered and painted with floral arabesques in gold and colours.80 The string was silken. Another one of very elastic steel, made in Lucknow, was painted with arabesques.81

71 S.D. Singh, op. cit., p. 103.
72 True damascening in which the alloy is allowed to project instead of being flattened down (as in tah-i-nishan). The projecting inlay is frequently carved.
73 Also spelt tah-i-nishan. It means true damascening (literally deep incrustation). According to T.H. Hendley in this style, "The steel is warmed to a blue tint, then the subject is designed and cut in with a deep graver. Two-thirds of the diameter of the wire should be the depth of the hollow, and all natural roughness of the steel or iron should be left, so that the precious metal should adhere well. As the channel is hollowed out, the thick gold or silver wire, which should be pure (in the East it is usually without alloy) is introduced into it by a chisel or copper bodkin or probe, and pressed home, after which it is flattened with a plain hammer, or if it is wished to preserve a high relief, with one that is grooved on the face. It is carefully polished with a sweet lime which whitens it, and the colour is restored by careful bleuing by heat. Sometimes the polishing is done with agate burnishers. This is practically the whole process although it differs in detail in different places." Damascene Work in India (London, 1892), p. 7; cf., G.C. Stone, op. cit., p. 599. Often the projecting gold is chased or carved.
74 A kind of pewter stained black and inlaid with silver. It is frequently used for sword and knife hilts, bow-staves, utensils, etc., in India. It is named after Bidri, a city sixty miles northeast of Hyderabad, where it is made.
75 Enamelling, also called meenakari, is painting on metals with mineral oxides in such a manner that colours get firmly fixed. This is a time consuming process. In this process the chitera (designer) prepares the design, the sanar (goldsmith) prepares the article to be enamelled, the engraver (khudaikar) engraves the pattern and then the minakar (also spelt meenakar) applies the colour. The object is then polished, gently heated and cleansed by rapidly immersing in a strong acid made from fruit; vide, G. N. Pant, Studies in Indian Weapons and Warfare (New Delhi, 1970), p. 132.
76 Recently an inscribed bow of Shah Alam has been acquired by the National Museum, New Delhi. See the several plates of this specimen in this book.
77 Egerton, op. cit., p. 114, note to No. 457.
78 Ibid., p. 130, note to No. 595.
79 Ibid., p. 123, note above No. 574.
80 Ibid., p. 130, note to No. 593.
81 Ibid., p. 130, note to No. 598.
CHAPTER VIII

QUIVER

*Isudhi* (literally ‘arrow-holder’) was the name for quiver carried by Indian bowmen right from the Rigvedic period. The *Rigveda* records that it was slung on the back. “With many a son, father of many daughters, the warrior clangs and clashes as he goes to the battle. Slung on the back, pouring his brood, the quiver vanquishes all opposing bands and armies.” Unlike later days, the Rigvedic archer carried only one quiver at a time. The Epic warriors tied two quivers on the back and also carried them on the chariots and on the elephants. The frequent use of the term *isudhi* in dual number in many passages of the *Mahabharata* has led to believe that during this period two quivers were tied on a man’s back to ensure an adequate supply of arrows. The fact that Varuna presented a couple of quivers (*akshaya tunira*) to Arjuna supports this inference.

The other words used for quivers, in the ancient India, are *tunira* and *upasanga*.

2. *Rigveda*, VI. 75.5.
5. *Ibid.*., 5.152. 3; 4.40.4.
7. *Ibid.*., 4.40.4; 5.152.3.

from the context it appears that the *upasanga* usually connoted a large quiver fastened to a war-chariot or an elephant. Such quivers (better called ‘arrow-bags’) have been discussed earlier. *Tunira* was a comparatively smaller quiver of various designs.

The *Dhanurveda* clearly recommends that every archer of repute should carry two quivers (*isudhi and tunira*) each containing sixty arrows. In case sixty arrows could not be arranged then forty were sufficient but the moment the number of arrows, on account of their use, was reduced to twenty, fresh arrows should be supplied. In case of *narachas* (iron arrows) forty were enough and in their absence even thirty would do. Hopkins, however, believes that a quiver held from ten to twenty arrows. The National Museum has three quivers on show, the one like a tube contains 16 arrows; another one of cloth can carry 20 arrows; while the biggest quiver, made of wood and painted all over, can carry as many as 70 arrows. This quiver is two feet four inches long, four inches wide and has a lid to cover it. It is lacquered all over and then painted with scenes of the ten incarnations of Vishnu. It was manufactured in Rajasthan in c. 1820 A.D., and is one of the beautiful examples of Indian *tunira*.


According to Pischel, *Vedische Studien*, I, p. 17, the term *isukrt* in the *Rigveda* stood for quiver but, as has been explained earlier, it meant the ‘arrow-maker’.

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1.1:53.3; VI. 75.5; X. 95.3; *Atharvaveda*, 33.2; IV.10.6; *Nirukta*, IX. 13 cf., E. W. Hopkins, “The Social and Military Position of the Ruling Caste in Ancient India as Represented by Sanskrit Epic”, *Journal of the American Oriental Society*, vol. XIII, p. 274.
2. *Rigveda*, VI. 75.5.
5. *Ibid.*., 5.152. 3; 4.40.4.
7. *Ibid.*., 4.40.4; 5.152.3.
8 E. W. Hopkins, *op. cit.*, p. 274. The depiction on Sanchi reliefs seems to confirm this view; cf., Alexander Cunningham, *The Bhilsa Topes*, p. 215. According to Pischel, *Vedische Studien*, I, p. 17, the term *isukrt* in the *Rigveda* stood for quiver but, as has been explained earlier, it meant the ‘arrow-maker’.
In the Buddhist Jatakas quiver has been noticed on the coins of Zoilos in the mentioned as kanda. Quivers filled with different kinds of arrows are tied to the right backs of the soldiers depicted on the bas-reliefs of the great stupa at Sanchi (2nd-1st century B.C.). Its fastenings, apparently of leather straps, are passed over the shoulders, crossed in front and carried to the back. Another method, shown in the same group of carvings, show that quiver was worn on the right side of the back and fastened there by leather straps (fig. 232). These were passed over both the shoulders, crossed in front, and carried to the back where they were passed through a ring at the end of the quiver. They were then carried to the front and crossed again, the ends of the straps being secured by the loops to the upper straps. All this seems a very complicated way of carrying a comparatively light quiver, but this must have met the needs of the archer of that time or it would have been speedily discarded.

Quivers occurring on the coins of the Indo-Greeks and Scytho-Parthians are usually round, tapering at the bottom, broader at the top, and open-mouthed. The quiver with pointed bottom and fairly broad top can be noticed on the coins of Zoilos in the British Museum, London Collection. On the copper coins of Demetrius, Artemis is standing with a bow in her left hand and is drawing an arrow from the quiver with her right.

The Gupta monarchs have mostly been portrayed on their coins facing front or in profile, hence the quivers, which must have been hung on the back, are not clearly visible. On one ‘Standard Type’ coin of Chandragupta II, the illustration of a quiver is very clear from which the king is drawing an arrow with his right hand. The quiver is on the ground and several arrows are protruding from it. It is broad in the beginning, elongated in the middle and it ends in a round knob. On a terracotta panel from Ahichchhatra (U.P.), datable to the 5th century A.D., a lady archer has

been depicted holding the grip of a simple bow with her left hand and taking out a feathered arrow from the quiver hung upon her back (fig. 183).

*Tunira* finds mention in Kalidasa. In the *Malvikagnimitra*, the parivrajaka (attendant) narrates to the king, "there appeared a yelling band of brigands, whose sides are tied with quiver-straips, wearing tufts of peacock plumage hanging down to the heels, with bow in their hands."14

Quivers painted in the Jaina miniature paintings of Western India, ascribable to the 14th century A.D., have triangular mouths and are broader at the lower end. Here the arrows are kept with points upwards and nocks down (fig. 234). Sometimes, however, we do come across with a few illustrations of an Indian archer carrying his shaft-points uppermost in quiver, but this was merely for show. During war and chase the position of arrows was reversed.

The Persian name for a quiver is tarkash (figs. 239, 241, 244).15 It has been used for all kinds of usual quivers. Its another variety was *jaibah* (fig. 240).16 According to William Irvine,

"It was generally a flat case, broad at the mouth, one side straight and the other sloping to a point, provided with a strap for carrying over the shoulder. This broad shape is due apparently to the fact that the quiver was used to hold the bow as well as the arrows." The illustrated manuscript of the *Babur-Nama*17 in the Collection of the National Museum, New Delhi, depicts such *jaibahs* being carried by the cavaliers. This should, however, not be confused with *girban* or the bow cases which were exclusively for the bow.

The horsed-archer carried his bow and arrows in a different way. Quiver was worn handily at his wrist which kept the arrows to his hand and ready for instant withdrawal. Bow was carried at the waist, on the opposite side to quiver, inside a special case. This bow case was called *girban*. These quivers and bow cases form part of all oriental horsed-archer's equipage and were very comfortable to wear. They were generally made from goat's skin or

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14 Raghuvamsa, II. 30; VII. 56; cf., Malvikagnimitra, 5.10:


16 Ibid., p. 99.

17 The *jaibah* is also depicted in the *Razmanama*, the illustrated manuscript of Akbar's period (1556-1605 A.D.), at present in the City Palace Museum, Jaipur; and the *Tarikh-i-Khandan-i-Timuria*, the illustrated manuscript of the Mughal period, at present in the Khuda Bux Library, Paina, etc.
other soft skin overlaid with velvet, coloured cloth or brocade, and were beautifully decorated. Occasionally quivers were made of stiffened leather with raised or incised decorations.

As stated earlier, Amir Timur peopled his capital, Samarkand, with master craftsmen, including bow-and-quiver-makers, of all the nations.18

Two distinct types of quivers have been noticed in the National Museum, New Delhi Collection. The first is a narrow case and is elliptical in its cross-section. By its attachment to the belt it was made to hang rigidly and vertically down the side of the right leg. Its capacity was fifteen to twenty arrows and it was deep enough to take the nock. An Orissan ivory, datable to the 12th century A.D., depicts this type of quiver which is beautifully decorated with geometrical designs and carries several feathered arrows.

The second type of quiver, nearer to *tunira*, had a more open form and *was* used in Northern India. It was made of leather, velvet and brocade. However the, attachment to the belt was effected by tasselled cords or leather straps, which allowed greater adjustment. The capacity of this type of quiver was from forty to sixty arrows and it was normally worn with the shafts pointing to the rear.

Babur has often been painted carrying a *tarkash*19 and also presenting it to his faithful generals. On the 18th December, 1528 A.D., a grand feast was held at Agra. Most of the obedient generals like Khwaja Mir Sultan, Mulla Farrukh, etc., were given gold and silver coins by the quiverful (*tarkash-bila*).20

In the *Babur-Nama* another name for the quiver is also given. It was *saghdag*. Describing the army of Khan Dada, the Elder, at Farghana in 1502 A.D., Babur says, “All his men had adorned themselves in Mughal fashion. There they were in Mughul caps (*burk*), long coats of Chinese satin brodered with stitchery, Mughul quivers (*saghdag*) and saddles of green shagreen-leather, and Mughul horses adorned in a unique fashion.”21

The quiver-bearers,
called tarkash-band, have often been referred to.

In 1537 A.D., Bahadur Shah of Gujarat declared war against Humayun by shooting a headless arrow in the air. Soon after a compromise was made and Humayun presented his personal tarkash to Bahadur Shah. Again in 951 A.H. (1544 A.D.), Humayun, as an exiled ruler, visited Shah Tahmasp of Persia who, in order to humiliate Humayun, forced him to sit on the bare ground, seeing which one of Humayun's followers, Muhammad Kushky, immediately tore his quiver, made of leather, and spread it as a seat for his master to sit on.

In A.H. 955 i.e., 1548 A.D., Humayun laid the siege to the fort of Talican, near Kabul, which was at that time under the possession of his brother Kamran who had revolted against the Mughal Emperor. Some of the chiefs like Charaja Khan and others deserted Humayun and joined Kamran. When Kamran was defeated and the fort was captured, Charaja Khan and other deserters tied quivers round their necks, as a mark of shame and submission, and threw themselves at Humayun's feet who gladly pardoned them.

In the Ain-i-Akbari it is recorded that "Whenever His Majesty (Akbar) rides out, or at the time of the bar-i-Am or leavee, the sons of the amirs, and other mansabdars..."

22 Ibid. folio 296, translation, op. cit., 526; folio 311 b, translation, p. 551; folio 367, translation, p. 661.
23 R.S. Whiteway mentions that the gift of an arrow from the Mughal King's quiver was a security for peace. The King's quiver was also used as a symbol of authority. The instance given is from Mirat-i-Sikandari, where Humayun, in 1537 A.D., released Bahadur Shah's minstrel, and bound his own quiver round the man's loins. Clothed with authority, every prisoner that the minstrel claimed as his relation was released. Another instance of this practice is to be found in Tarikh-as-Sind written by Muhammad Masum, in the year 925 A.H. (1518 A.D.) where Shah Beg Arghun gave an arrow from his personal quiver to the qazi of Thatta; The Rise of Portuguese Power in India (1899), p. 249; William Irwin, op. cit., p. 99.
(chiefs) and ahadis (generals) carry the qur (symbol) in their hands and on their shoulders i.e., every four of them carry four quivers, four bows, four swords, four shields and besides they take up lances, spears, axes, pointed axes, piyazi war clubs, sticks, bullet-bows, pestles, and a footstool, all properly arranged. The price of a quiver during Akbar’s time varied from ¼ of a rupee to two gold mohurs (one mohur = 12 grams).  

Roe writes that the best gift for a Mughal Emperor would be an embroidered bow, quiver and arrows. Once Akbar had presented his khasa (special) quiver to Hussain Khan, one of his generals, on the latter’s performance in the second battle of Panipat (1556 A.D.). Emperor Aurangzeb (1658-1707 A.D.) bestowed upon Mustafa Khan, a quiver with enamelled fittings and another on Prince Mohammad Muazzam, as an evidence of the order in their favour. Similarly, Itikad Khan, one of the generals, received a quiver studded with precious jewels and Prince Bedar Bakht got a jewelled bow and an embroidered quiver.

ARROW-HEAD EXTRACTOR

In the Ramayana it is recorded that Ravana had shot several arrows and most of the soldiers of Rama’s army were severely wounded. In the night, after the day’s battle was over, Rama and Lakshmana drew out the arrows from the bodies of the soldiers with an instrument and thereafter applied some medicinal herb on the wounds. The arrow-head extractor was known as paikan-kash. The word literally means paikan i.e., arrow-head, and kash (derived from the root kashid.ind) i.e., to draw out. This implement was used to extract the arrow-heads from the body of the soldiers and was shaped like a pair of pliers.

Babur describes about one Haidar Mirza who was in his service for three or four years (A.H. 918 i.e., 1512 A.D.) and then he left the service. “People say he now lives lawfully and has found the right way (tariqa). He has a hand deft in everything, penmanship and painting, and in making arrows and arrow-head extractor (paikan-kash) and string-grips.”

27 G. N. Pant, op. cit., (Delhi, 1973), p. 43.
28 Ibid.
29 Ramayana, VI, 59, 145.
31 Muhammad Haidar Mirza Kurkan Daughlat Chaghatai Mughul was the author of Tarikh-i-Rashidi. He was born in 905 A.H. (1499 A.D.) and he died in 958 A.H. (1551 A.D.).
32 Babur-Nama, folio, 11 b, translation, op. cit., p. 22.
It has also been mentioned in the *Ain-i-Akbari.* Another instrument used for the same purpose was *tirbardara*, which is No. 18 of the *Ain i-Akbari* list. The price of a *tirbardara* was $\frac{1}{4}$ to $2\frac{3}{4}$ dams and that of a *paikan-kash* from $\frac{1}{4}$ to 3 rupees during the period of Akbar.

**SHOOTING GLOVE OR BRACER**

The battle-hymn of the *Rigveda* describes the warrior on his chariot armed with his bow and arrow and dressed in armour with a wrist-guard called *hastagraha* (literally ‘protection for the hand’) on the left hand. It was a kind of glove which gave protection to the fingers and knuckle from the blow of the string, when the arrow was loosed.

Its another form was known as *nagodarika*. According to P. C. Chakravarti, “It was a shooting glove used by the bowman for the protection of his fingers, and probably consisted of leathern finger-stalls sewn to corresponding straps.” In the *Mahabharata* it is described as *hastavapa* and *talatra*. The Epic evidence proves that it was made of iguana-skin. According to P. C. Chakravarti, without quoting the authority, has, however, asserted that the metal gauntlets were also used in the later ages.

During the medieval period a leather sleeve was worn on the left arm and was called *godha* or *godhu*. It was used only when the shooter was not in armour. Hansard speaks of one as a quilted half sleeve of common velvet or fine cloth which protected the arm from being bruised by the chord in its return. Two Central Asian *godhas*, one of bone and the other of iron, are at present kept in the Ethnographical Museum at Saint Petersburg.

36 *Mahabharata*, *Vamaparva*, 37.19; *Dronaparva*, 125.16, has *talatra* and *angulitra* and both these are differentiated from each other. *Hastavapa* is mentioned in the *Virataparva*, 55.54; *Dronaparva*, 106.24; *Bishmaparva*, 163.28, etc. See also Hopkins, *op. cit.*, p. 308, footnote.
40 Hansard Book of Archery, p. 137.
ARCHER'S RING

Mention may be made of a special kind of ring worn by the ancient Indian archer which was called *mudrika* (literally 'finger-protector'). During the Mughal period it was called *zihgir*. Hansard says, "The (Oriental) Bowman, contrary to the English or Flemish custom, draws altogether with his thumb, the forefinger bent in its first and second joint being merely pressed on one side of the arrow nock to secure it from falling. In order to prevent the flesh being torn by the bowstring, he bears a broad ring. Upon the inside of this ring, which projects half an inch, the string rests when the bow is drawn, on the outside it is only half that breadth and in loosing the arrow, the archer straightens his thumb which sets the arrow free."\(^{44}\)

Sometimes two thimbles, instead of a *zihgir*, were worn for this purpose on the fore and middle fingers of the right hand. These rings were called *sefin* in Persian language (in Hindi these are called *chhalla*, *mundari* or *angoothi*). Egerton\(^{45}\) describes to have seen the personal ring of Nadir Shah who attacked India in 1739 A.D., which was made out of a single emerald pierced for that purpose. The description of this ring is available in the *Daily Telegraph* which says that, "It was formed of a single emerald and was 2\(\frac{1}{2}\) inches across at the widest part and 1\(\frac{1}{4}\) inches in depth. It bore an inscription which, when translated, reads thus, ‘For a bow-ring for the King of Kings, Nadir (Shah), Lord of Conjunction, from the Jewel House it was selected, 1152 (A.H. i.e., 1739 A.D.).’"\(^{47}\) From the date, wordings of the inscription and the quality of the material, it is to be inferred that it was a part of the spoil carried away by Nadir Shah from Delhi in 1739 A.D. How did it reach Lahore is not clear but later on Lord Dalhousie (1848-1856 A.D.) got it as a part of Lahore booty.

These rings with one or more spare bowstrings were usually carried in a small box suspended at the Bowman’s side.\(^{49}\)

William Irvine\(^{49}\) informs that *zihgir* was also known as *shast* or *shast-a-wez* (literally ‘fastened to thumb’). An archer could shoot the arrow to a longer distance if he wore the *zihgir*, but it required skill and practice. "Mirat-ul-Istilah," however, records that the Hindu soldiers of the Mughal army preferred a thumb-stall made of leather.\(^{50}\)

G.C. Stone\(^{51}\) has figured as many as 78 archer’s rings of various countries including a few used in India.\(^{52}\) He observes, "Throughout the greater part of the East the method of drawing and loosing the bow differs radically from those used in Europe. In it the thumb is put around the string and a ring is worn on it to protect it from the pressure and the friction of the string, when it is drawn and released. It also allows of bringing the pressure at a single point, close to the nock, which makes the bow much more effective than the European method where three or four fingers are used to pull the bow."\(^{53}\)

In India the part of the ring that bears on the string is much wider than the other

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42 Mahabharata, Bhishmaparva, 106.24; Dronaparva, 35.23; 40.16; 43.14; Karanaparva, 19.40; Vanaaparva, 37.19, etc.
44 Hansard, Manufacture of Bows, p. 133.
45 Egerton, op. cit., p. 114; footnote.
46 Ibid.; William Irvine, op. cit., p. 94.
47 The Daily Telegraph, of the 10th November, 1898 A.D.; William Irvine, op. cit., p. 94.
49 William Irvine, op. cit., p. 94.
50 Mirat-ul-Istilah, folio 155 b.
52 Ibid., fig. 22. No. 14 of this plate is an Indo-Persian ring made of jade; No. 15, again Indo-Persian, is made of white jade; No. 16 is of jade inlaid with gold; No. 17 is of yellow and white agate; No. 19 is of light jade inlaid with jewels, set in gold; No. 22 is of rock crystal originally set with jewels, now picked out; No. 25 is of grey agate with straight white lines; and No. 27 is of mottled green jade. The rest of the rings in this plate belong to the other countries.
archer’s rings in India were made of any hard tough material—metals, horn, bone, ivory, tortoise shell and many kinds of stones like jade, agate, carnelian, crystal, etc. Jade, however, was the most popular. Jaipur and Delhi were the main centres for their ornamentation. Enamelling, gold inlaying and other decorations were employed. It was a common practice to adorn rings with jewels in gold setting. Some of the rings are so heavily ornamented and jewelled that it is doubtful if these were ever employed for their legitimate purpose. These were used only on festive days or on ceremonious occasions.

ARROW PULLER OR TIR-KASH

This instrument was used in drawing the arrows out of the quiver. Normally an archer draws an arrow from his right hand but sometimes, though quite rarely, this instrument is also used. It is called tir-kash (literally ‘arrow-puller’). The tir-kash displayed in the National Museum, New Delhi is an 18th century specimen, made completely of iron and is slightly bigger than an average arrow. It has a cylindrical body and a square head carrying a hook. The hooked portion is kept inside the quiver. With its help the arrows are raised a little, one by one, and then drawn by the hand.

GOSHA-GIR

The word occurs for the first time in the Babur-Nama. Babur, while fighting with Jambal in June, 1508 A.D., at Farghana was seriously wounded. He says, ‘I shot off the arrow (aug) on my thumb, aiming at Jambal’s helm. When I put my hand into my quiver, there came out a quite new gosha-gir given to me by my Khan Dada, the Younger. It would have been vexing to throw it away but before I got it back into the quiver, there had been time to shoot, may be two or three arrows.’

Annette Susannah Beveridge has explained that in archery the word gosha describes, in the arrow, the notch by which it grips and can be carried on the string, and in the bow, both the tip (horn) and the notch near the tip in which the string catches. Two passages in the Cyclopaedia of Archery, quoted by A.S. Beveridge, show gosha as bow-tips. One says, “to bend the bow, two men must grasp the two goshas.” The other reports a tradition that Archangel Gabriel brought a bow having its two tips (gosha) made of ruby. The same book directs that the gosha should be made of seasoned ivory. The Archer’s Guide, however, recommends mulberry wood for the purpose.

In the Cyclopaedia of Archery it is advised that a Bowman should never be without two things: his arrows, and his gosha-gir. “The gosha-gir may be called an item of the repairing kit, it is an implement for making good a warped bow-tip and for holding the string into a displaced notch. It is known also as the chapras, brooch or buckle and the kardang, and is said to bear these

54 William Irvine, op. cit., p. 95, informs that S. Weissenberg of Elisabethgrad, Russia (now U.S.S.R.), has devoted an article to the archer’s rings in the Mitteilungen der anthropologischen Gesellschaft in Wien, Band, XXV (1895), pp. 50-56. These were made of bone or stone. The figures of eight such rings are given there.


56 It is useful to remember, when reading accounts of shooting with the Turkish or Indo-Turkish bow, that the arrows (aug) had notches so gripping the string that they kept in place until released with the string; cf., Babur-Nama, folio 107, translation A.S. Beveridge, reprinted, volumes I and II in one format, (New Delhi 1970), p. 166, footnote.


58 A.S. Beveridge, op.cit., appendix ‘C’, pp. viii-IX.

59 In 1502 A.D., at Farghana, Khan Dada the Younger, presented to Babur, armour, cap, coat of satin and a bag. According to A.S. Beveridge, it was a bag for keeping spare bowstrings and archer’s rings and other articles of ‘repairing kit’. With the gift, it seems probable that the gosha-gir was given. Translation, op.cit., p. 160 ff.

60 It is also recorded that if no kardang is available, the straightening can be done by means of a stick and if the damage be slight only the bow and the string can be tightly tied together till the bow comes straight.
names because it fastens in the string. Its shape is that of the upper part of the Arabic letter jim, two converging lines of which the lower curves slightly outward. It serves to make good a warped bow without the use of fire, and it should be kept upon the bow-tip till this has reverted to its original state. Until the warp has been straightened by the gosha-gir; the bow must be kept from the action of the fire because it (composite of sinew and glutinous substance) is of the nature of wax.”

61 A. S. Beveridge, op. cit., p. vii (appendix ‘C’).

The gosha-gir could also have been used to straighten the middle portion of the bow (kaman-khana). In that case gosha-gir is called kurdang. It is, however, to be remembered that this implement could be used only when there were not two daur (curves) in the bow. In case of two daur, the bow could never be repaired without fire.

62 Daur here means warp. As many as three daur are mentioned in a bow.
CHAPTER IX

MODES OF SHOOTING

The Dhanurveda stipulates that a disciple must be conversant with all the methods of using bow and arrow. To begin with he should hit a flower with a blunt-headed arrow, and later on with a pointed head, he should hit a fish and a piece of flesh.  The following standing and sitting poses have been recommended.

STANDING POSES (STHANA)

Eight positions for shooting arrows while standing have been laid down in the Dhanurveda. The first is samapada where the archer has to stand erect with ankles, calves and thighs taut and the palms of hand and thumb touching. In the second posture, called vishamapada, the left leg is stretched out, right held back, and the body slightly bent. The first position has been represented at the Bharhut, on the famous medallion illustrating the Ruru Jataka (2nd century B.C.), where King Udayana is aiming an arrow at one of his innocent wives thinking her to be guilty.

The third position of shooting was called vishakha in which the archer had to stand on the tips of his toes with thighs together but feet nine inches apart. The ‘Future Buddha’, shown in the Bharhut relief, is holding his bow in this very position. In the fourth, or the alidha position, the left leg is bent while the right is stretched out obliquely. The knees are kept about nine inches apart. Kalidasa says that, “Raghu was looking more charming while fighting with Indra in the alidha pose.” Fine examples

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1 Dhanurveda Samhita, op. cit., verses 24-25.
2 Ibid., verse 80.
3 A. Cunningham, Bharhut.
5 Dhanurveda Samhita, op. cit., verse 79.
6 Ibid., verse 78. Garuda has often been depicted in the alidha pose; cf., B.N. Sharma, Rooplekha, XXXV, No. 182 (New Delhi), p. 31.
7 Kalidasa, Raghuvarsha, II. 57.
of this posture are from Pattadakala (7th century A.D.), and Borobudur (8th century A.D.) illustrating Avadana Jataka. \(^8\) Shiva as

In the sixth position \(i.e.,\) nishchatra, heels are to be placed together, the left leg is taut and the right leg is bent. In the Papanatha temple at Pattadakala (South India, 7th century A.D.) a good representation of this posture is seen.

In the seventh \(i.e.,\) vikata position, right leg is taut and the feet are wide apart. It is depicted in the Rani Gumpha Cave at Udaigiri (1st century A.D.). With the neck and head still, the chest out, and shoulders back, thus making a triangle, the posture eighth in number, is called dridha. Cave No X of the Ajanta portrays the tale of Shyamama who was shot dead by the King of Banaras in dridha position of shooting.

In Cave IX of Ajanta the story of the Mahakapi Jataka has been painted where the king, holding his bow in the chitravadushkara\(^1\) pose, is shown ordering his followers to shoot arrows at the monkeys. The chitravadushkara pose has not been included in the eight positions mentioned by the Dhanurveda.

'Tripurantaka' has often been portrayed holding his Pinaka in the alidha pose (fig 251). \(^8\) The National Museum, New Delhi, has recently acquired a unique image of Harithara (height 51 cms., accession No. 68.137) in which the deity is shown in the alidha pose. This sculpture of Pratihara dynasty of c. 10th century A.D., is the only example of Harithara in this pose. Pratyalidha, (fig. 248) the fifth posture, is the reverse of alidha. \(^10\) Pratyalidha is best illustrated in the images of Bodhisattva of Borobudur and Mahishasuramardini of Bihar. These two poses (alidha and pratyalidha) were found extremely useful in hitting a distant object.

In Cave IX of Ajanta the story of the Mahakapi Jataka has been painted where the king, holding his bow in the chitravadushkara pose, is shown ordering his followers to shoot arrows at the monkeys. The chitravadushkara pose has not been included in the eight positions mentioned by the Dhanurveda.

\(^8\) Jeannine Auboyer, op. cit., p. 3.
\(^9\) National Museum, Janpath, New Delhi, has in its gallery the sculpture of Shiva as 'Tripurantaka'.
\(^10\) Dhanurveda Samhita, op.cit., verse 77.
The Agni Purana mentions ten positions of shooting, adding mandala and dandayata to the Dhanurveda list.

SITTING POSES (STHANAKA)

Three sitting positions are referred to: (i) dardurakrama (literally ‘like a frog’), (ii) garudakrama (like the bird garuda), and (iii) padmasana (cross-legged). In the first pose, both the legs are bent with the knee almost resting on the ground (fig. 250). In the second pose, the left leg rests on the ground and the right is half bent (fig. 249). Prithviraj Chauhan, in a painting of the Rajasthan School datable to c. 1800 A.D., has been depicted shooting in this pose. In one of the sculptures from Konarka (13th century A.D.), at present in the National Museum, New Delhi, an archer has been engraved shooting in the garudakrama pose. The third pose was sitting cross-legged and comfortably in the padmasana style.

DRAWING THE BOW (SANDHANA)

Drawing the bow, named as sandhana, was effected in three ways: (i) adha-sandhana, (ii) urdhva-sandhana, and (iii) sama-sandhana.

- In the first posture, the bow was kept lower to the body (fig. 254). It was found useful in hitting the object at a distance.
- In the second pose, i.e., urdhva-sandhana, the bow was kept above the head (fig. 251). It was used in hitting a stationary target.
- In the last pose, the bow was kept parallel to the body (fig. 252). This pose was meant for piercing strong objects.

The Risala-i-Tir-o-Kaman recommends three ways of drawing the bow:

1. Changal-i-baz, literally ‘hawk’s claws’.
2. Muharraf, i.e., diagonally or slanting.
3. Murabba, i.e., square.\footnote{Vide, William Irvine, The Army of the Indian Moghuls, Indian edition (New Delhi, 1962), p. 102. It further says that the arrow should be held without moving, and the advanced foot kept flat on the ground, and while loosing the arrow the name of Allah should be uttered.}

**FIG. 251** Shiva as ‘Tripurantaka’ holding Pinaka, standing in the alidha pose. The bow is in urdhva-sandhana state. Stone sculpture, Early Western Chalukya, 8th century A.D., Aihole, Karnataka.

(National Museum, New Delhi Collection)

**HOLDING THE STRING (GUDAMUSHTHI)**

Holding the string, or releasing of the arrow, termed as gudamushthi, was done in five ways: pataka (like a banner), vajramushthi (like a thunderbolt), sinhakarni (like the ear of a lion), matsari (like a fish) and kakatundi (like the beak of a crow).\footnote{Dhanurveda Samhita, op.cit., verse 84.}

The pataka\footnote{Ibid., verse 85.} was the simplest form in which the arrow was held between the thumb and the first finger would surround the string, and latter was pulled by the pressure of the arrow. This was only possible with a very bow. Morse\footnote{E.S. Morse, 'Ancient and Modern Methods of Arrow Release', Bull Essex Int. (1885); G.C. Stone, op.cit., p. 134, fig. 173.1.} has termed it as ‘primary light release.’ In the sinhakarni\footnote{Dhanurveda Samhita, verse, 87.} pose the arrow was held as before but the string was pulled mainly by the tips of the second and third fingers which were placed against it. It was found useful in shooting arrows at a great distance. It is more or less similar to the ‘secondary release’\footnote{E.S. Morse, 'Additional Notes on Arrow Release', Peabody Museum (Salem, 1922). G.C. Stone, op.cit., p. 135, fig. 173.2.} of Morse (fig. 253, middle). The matsari\footnote{Dhanurveda Samhita, op.cit., verse 84.} very much like the ‘tertiary release’\footnote{G.C. Stone, op.cit., p. 135, fig. 173.3.} was similar to sinhakarni, the only difference being that the first finger was nearly straight and its tip bore on the string and pulled it (fig. 253, bottom).
It was thought to be useful in penetrating strong objects. In the vajramushthi, a ring was generally worn on the thumb which was passed around the string and under

**FIG. 253** Holding the string.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongolian loose, showing the position of the fingers.</td>
<td><img src="image1.png" alt="Image" /></td>
</tr>
<tr>
<td>Mongolian loose, showing the ring and the position of the thumb.</td>
<td><img src="image2.png" alt="Image" /></td>
</tr>
<tr>
<td>Secondary loose, showing the position of the fingers.</td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td>Secondary loose, showing the position of the thumb.</td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
<tr>
<td>Tertiary loose, showing the position of the fingers.</td>
<td><img src="image5.png" alt="Image" /></td>
</tr>
<tr>
<td>Tertiary loose, showing the position of the thumb.</td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
</tbody>
</table>

(after E. S. Morse)

the forefinger, the base of the finger pressing against the arrow. Morse calls it ‘Mongolian release’ but it was popular in India even before the Mongols invaded this country. In the kakatundi pose, the thumb and the forefinger were placed parallel with bowstring in between, thus looking like the beak of a crow. The so-called ‘Mediterranean release’ was never practised in India.

The Mughal Bowman drew with his thumb only, the bent forefinger being merely pressed on one side of the arrow nock to secure it from falling. Weissenberg says that the forefinger was pressed on the nail of the thumb to strengthen the pull without increasing the exertion.

**POSITION OF THE DRAW (VYAYA)**

The bowstring was drawn in five ways: (i) kaishika, (ii) satvika, (iii) vatsakarna, (iv) bharata, and (v) skendha. In the first pose the string was drawn up to the hair, while in other poses it was drawn up to the forehead, ear, neck and shoulder respectively. In the Vedic period bowstring was drawn back to the ear and then discharged. It was called karnayoni. Commenting on these postures W.F. Paterson says, “The Arab and Persian teaching, after the so-called “Great Masters”, gives three only: (i) between lip and chin, (ii) to the mouth, and (iii) to the cheek in line with the end of the nose. However, in the Hidayatur-al-Rami belonging to the Marquess of Bute, there are two miniature paintings after ff. 14, showing seven figures drawing to different positions. The positions appear to be (i) to the forehead or perhaps the eye, (iii) to the cheek or nose, (iv) to the mouth, (v) to the chin, (vi) to the neck, and (vii) to the collarbone, rather than to the point of the shoulder. We thus appear to have a mixture of Arab (or Persian) and Hindu teaching on this aspect.”

Thomas Williamson says that the bow was strung by placing one end under the thigh, and with both hands bringing the other end in due position, when the string was easily slipped into the groove made for it. Then the left hand gripped the stave which was kept opposite the right breast, just far enough from the body to allow clear action: the butt of the arrow was pressed to the string, the fore and the middle fingers of the right hand were then drawn steadily, until the head was near the forefinger of...
the left hand. The bow was always held perpendicularly.

**THE AIM (LAKSHYA)**

The aim has been classified into four types: (i) **sihira** (still), in which the object was stationary, (ii) **chala** (mobile), when the object was unsteady, (iii) **chalachala**, when the aim was sometimes still and sometimes unsteady, and (iv) **dvachala**, in which both the shooter and the aim were moving.

**THE RANGE (MAAR)**

Direct references to the range of arrow shoots are seldom available. The Dronaparva describes that the arrow could be discharged across as far as two miles (kroshanatikrante) but this is hardly credible. The Shiva Dhanurveda says that “the target placed at a distance of 60 dhanusha (240 cubits) and hit is the best, that placed at a distance of 40 dhanusha (160 cubits) is of medium quality, while one located only 20 dhanusha (80 cubits) apart from the bowman was inferior.” It may be inferred from this that the distance which an arrow could traverse with force and efficacy was about 120 yards, but the range of the flight of an iron arrow was about 90 yards only. According to Williamson the native archers of India (of the 18th century A.D.) rarely missed an object of the size of a tea cup at sixty or seventy yards. He himself repeatedly saw a man lodging an arrow in a common walking stick at that distance.

**MOVEMENT OF THE ARROW (GATI)**

The flight of an arrow has been allotted three names: (i) **suchimukha** (like a needle), (ii) **meenapuchchhi** (like the tail of a fish), and (iii) **bhramari** (like an insect bhramara). When it went straight, it was called suchimukha. In case its movement was zigzag it was called meenapuchchhi, and if it made a semi-circular movement it was called bhramari. If an arrow did not hit the aim and went either left, right, over, or under, it was called a ‘miss’ (lakshya-skhalana).

**THE OPERATION**

Thus mastering the above mentioned postures, the archer of the ancient India used to take bow in his left hand and gripped the middle portion of the stave with his left palm. He took the correct position (one of the eight standing sthanas or three sitting sthanakas described above), raised bow and placed the feathered and nocked arrow on the string which was held in one of the five prescribed ways (eudamushthi). Contracting the string (in one of the three sandhanas), it was pulled (in one of the five vyayas) till it was in line with his eyes and ear. Having positioned bow, arrow and string, the archer concentrated his attention on the aim (one of the four lakshyas) and released his arrow (gati) which was sure to hit (maar).

It is recommended that in the morning and afternoon the archer, while practising, should face the west while in the evening to the east. The idea was to keep the sun either at the back or on the right side. Shooting, except during war and chase, during the night was forbidden. Again, except in war, aiming while facing towards the north was not allowed. A few other things have also been recommended i.e., the archer should be physically and mentally fit and should

36 Thomas Williamson, Oriental Field Sports (1807), folio 87.
37 Dhanurveda Samhita, op. cit., verse 94.
38 Mahabharata, Dronaparva, 97.9.
39 Vasistha, Dhanurveda Samhita, verse 6.
40 Ibid., verse 7.
41 Vide, William Irvine, op. cit., p. 103.
42 Dhanurveda Samhita, op. cit., verse 35.
43 Ibid., verse 39. It has already been described that during the fourth century B.C. the Indian archers placed the bow on the ground, pressed it with their left feet and then discharged the arrow.
45 It is customary among the Hindus that when a person dies, his dead body is placed on the ground with his head towards the north; the heaven being in the north. In the same posture the dead body is carried, on the shoulders of four men, to the cremation ground and burnt there.
be free from all worries; both the shoulders should be at an angle. Once the string is drawn no portion of the body should move; the eyes should be fixed on the target; the advance foot (while standing) should be kept firm on the ground, and then taking the name of Lord Shiva, the arrow should be shot.

From the Gupta coins, bearing the figures of archers, the mode of shooting can be conjectured (fig. 254). The Gupta archer stood firm on the ground in one of the following positions: (i) with both legs together, (ii) with the legs wide apart, (iii) with the right leg taut and the left bent, and (iv) vice-versa. When not in use, the top end of the bow was held either in the left or right hand while the other end rested on the ground with bowstring facing either inward or outward. While wielding it, bow was generally held in the left hand and arrow in the right, but this position is found reversed on some coins which might suggest that the Gupta monarchs (depicted as archers) could wield the bow with the either hand.

About the mode of stringing Hansard’s views are worth quoting. He says, “When an Oriental wishes to string his bow he places himself firmly on his centre, and grasping the upper extremity of the bow in his left hand, passes the weapon behind the left leg and over the shin-bone of the right, then bending it by forcing the upper end round towards the opposite side, he slips the string which has been already secured on the lower horn into its place with the right hand.”

Fig. 254 Gupta monarchs depicted as archers on the obverse of their gold coins.

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47 Ibid., pl. XV, fig. 14.
48 Ibid., pl. XV, fig. 17.
49 Ibid., pl. XVI, fig. 4.
50 B.H.C., pl. IX, 2.
52 B.M.C.G.D., pl. II. 145; pl. VIII. 13; B.H.C., pl. XVI. 8-13.
The Risala-i-Tir-o-Kaman

The Risala-i-Tir-o-Kaman has prescribed twelve maxims which were to be observed by all the archers. Of these

Three required firmness:
1. Hold the grip of the bow tight,
2. Keep the forefinger firm, and
3. When the arrow is let fly, keep the advanced foot firm.

Three things required easiness:
1. The left foot should be kept easy,
2. The left side should be kept easy, and
3. The other fingers should be kept easy.

Three things required straightness:
1. The body should be erect,
2. The forehead should be held up, and
3. The elbow should be straight.

The last three things should be single:
1. Use one side,
2. Use one eye, and
3. Keep both the hands in one direction.

The same manuscript says that in shooting a horseman 200 yards away, the archer should aim at his cap; if the horseman is 100 paces away then his mouth should be aimed at, but if the rider is only at the distance of 50 steps his saddle should be the aim; by so doing the archer will hit the horseman at his chest.*

THE ARCHER (DHANURDHARA)

The archers have been classified into many groups: (i) the one who could pierce leather, pitcher and terracotta ball with his arrow was called dradhaghati (literally ‘piercer of strong items’), (ii) the one who could easily hit a moving object was termed dradhabedhi (literally ‘determined shooter’), (iii) the archer cutting arrow or the bowstring of the enemy was banachchhedi (literally ‘arrow-breaker’), (iv) the one whose arrow went clear through a piece of wood was called kashtha-chchhedi (literally ‘wood piercer’), (v) the one who could hit a small point marked at a distance was known as chitrayoddha (literally ‘minute-observer’), (vi) the one who could hit an unseen object on the basis of the sound only was shabdadbedhi (literally ‘to hit at the sound’), (vii) the archer who could pierce two wooden balls, thrown in the air, with two different arrows shot together was dhanurdhara (literally ‘expert in bow’), (viii) the one who could wield bow with both hands was designated as savyasachi (‘expert in the real sense’), and (ix) the one who was well-versed in more than one of the above mentioned arts was called sarvasadhaka (literally the ‘wielder of bow in all ways’).57

The expert archers, being quite rare, have always been assigned an honourable place. The very first Indian archer was Lord Shiva. All the noted knights of the Ramayana such as Rama, the hero (fig. 246), and his three brothers (Lakshmana, Bharata and Shatrughana) his father Dasharatha, and his twin sons, Lava (fig. 247), and Kusha (fig. 248), were expert archers. Among the demons, Ravana was a sarvasadhaka. His brothers Kumbhakarna and Vibhishana, his son Meghnatha, and most of his generals could create havoc with their bows and poisoned arrows. In the Mahabharata, Arjuna (one of the ‘Five Pandava’ brothers), Eklavya (the aboriginal bhil), Duryodhana (the Kaurava chief), Bhishma (the old general known as ‘Grandfather’), etc., have always been renowned.

Coming to the historic period we find Poros (who fought against Alexander in 326 B.C.), Chandragupta Maurya (the founder of Maurya dynasty in the 3rd century B.C.),

56 Ibid., p. 102.
Samudragupta (335-375 A.D.) and Chandragupta Vikramaditya (380-414 A.D.) of the Gupta dynasty, Pulkeshin II (early 7th cent. A.D.) of the South, Jayapal (1001 A.D.) and Anandpal (1006 A.D.), who fought against Mahmud Ghazni, Prithviraj Chauhan, who fought against Mohammad Muizzuddin Ghori in 1192 A.D., etc., were famous archers. All the great Mughal rulers (1526-1707 A.D.), Gobinda Singh (the tenth Guru), Shivaji, the Maratha ruler (1674-1680 A.D.), etc., were equally great archers.

In the medieval period an archer was called tirandaza (literally 'arrow-thrower'). The word ogchi, quoted by Horn, has a dubious meaning. During the Mughal period and in the later days, archer was called kamanadara (literally 'bow-holder'). The charkhchi-bashi were the men using cross-bows.

TARGET (ABHYASA)

It has been advised in the Dhanurveda that a skilful archer should shoot about 400 arrows per day; 200 in the morning and the rest in the evening. In case it was not possible, then 300 or at least 200 arrows should be shot every day. The most suitable months for practice were winter (October to January) and spring (February to April). In six months one can learn all about this science and in twelve months he can become an expert archer. It is stated that an archer should place the arrow on the bowstring with the same care as if he is tucking a flower on the hair of his beloved; his arrow-head should cause the same pain to the enemy as if the latter has been bitten by the snake; he should guard his bow and arrows as he guards his own sons and daughters. And again, the king wishes for wisdom, the trader for the wealth but an archer only wishes for a good bow and good arrows and perfection in this science.

The target was called todah or tudah which literally meant 'a heap'. In order to secure perfection in the use of bow and arrow, a mound of earth was erected into which the archers shot a number of arrows every day. Its use was not confined to the Rajputs as has been stated by Egerton but it was a general practice. Nadir Shah (1739 A.D.) had, similarly, erected a tudah into which he used to shoot five arrows every afternoon. James Fraser says, "khak todah is a heap of fine mould well sifted and beat strongly in between two stone walls. It is five feet high, three feet thick, and from three to four feet broad. The front of it is very smooth and even beat hard with a very heavy trowel. One who is well skilled can shoot his arrows into it quite to the head; whereas one that shoots ill (be he never so strong) can't put a third part in," Another word for a target was hadaf.

MOUNTED ARCHERY

In the early and late Vedic period it was the usual practice with the warriors to shoot arrows from the chariots. The Mahabharata and the Ramayana contain several references to this fact. Even in the days of Magadhan supremacy we find men shooting arrows from chariots and elephants. Surprisingly, there is not a single mention of Indian archers mounted on a horse before the Kushana period. This was one of the chief reasons of the loss of the battle of Hydaspes. It may rightly be surmised that the archers mounted on horses came with the Scytho-parthians in India. The coins of king Azes I, Azisiles, Azes II and Satrap Zeonis depict horsemen with bows. Kalidasa mentions elephant-and-horse-archers.
Dasharatha could conquer a large territory from his chariot with a single bow and arrow. In one terracotta plaque from Ahichchhatra, earlier referred to, king Yudhishthira is shown fighting with Jayadratha; the two warriors contest with bows and arrows, riding their chariots. Gupta coins furnish ample evidence of mounted archery. The coins of Chandragupta II, Kumaragupta I and Prakashaditya depict them as archers mounted on horses. But the art of horse archery did not take roots in Indian soil. Introduced by the Scytho-parthians and continuing for a time as a sickly exotic, it whithered away shortly after the Gupta period. There are, however, some evidence like the horse-archers depicted on early medieval stone sculptures. The terracotta plaque discovered from Paharpur belonging to the Pala period also exhibits such scenes. The practice of horse-archery was revived again by the Arabs in India and then it became very popular during the next few centuries.

CONCLUSION

In India in almost every war recorded, either Puranic or historical, bows and arrows loom large. The Hindus cultivated archery most assiduously. Bow was the weapon *par excellence* and bowmen constituted an invariable concomitant of ancient armies. In view of the importance of archery an elaborate course of training was prescribed for those who aspired to occupy important positions in the military services of the state. For the bow, as is the modern rifle, was a weapon of precision, and the effective use of it was a fine art. A number of treatises on *Dhanurveda* were composed which discussed how bows and bowstrings were prepared, what materials were best suited for making of arrows, arrow-heads, quivers and arm-guards and diverse cognate topics. Bow was successfully used by all the classes of warriors *i.e.*, foot-soldiers, cavaliers, elephant-riders and charioteers. Its use persisted throughout. In spite of fire arms having become more common, better made, and their handling better understood, the bow and arrow accompanied the warrior till the middle of the 19th century A.D. Its use is not altogether extinct even now. The aboriginal hill tribes and a few expert *dhamurdharas* still use this weapon with great accuracy and success.
GLOSSARY OF WEAPONS

Adha-sandhana, A mode of shooting arrows. In it the stave is kept lower to the body (see the Dhanurveda, the Rigveda).

Agneya, Fire arms mentioned in all the Sanskrit works dealing with weapons.

Agnidiptamukha, Fire arrows (see the Ramayana).

Aindra, The missile of Indra (see the Ramayana).

Aindrachakra, The discus of Indra, referred to in the Nitiprakashika in the list of muktamukta weapons.

Aisika, An arrow (see the Ramayana).

Ajagava, The personal bow of Shiva. Another bow held by him was Pinaka (see the Dhanurveda Samhita).

Alaksya, A missile which could not be seen in its flight (see the Ramayana).

Alidha, A mode of shooting arrow (see the Dhanurveda, the Nitiprakashika, the Raghuvamsa, etc.).

Alan, Stringing of the bow (see the Vaisaneyi Samhita).

Amogha, A never failing mythical arrow (see the Dhanurveda Samhita).

Amukta, A category of weapons which are not separated from the hand (see the Dhanurveda Samhita, the Nitiprakashika, the Ashtadhyayi, the Manasollasa, etc.).

Anika, The point of arrow (see the Dhanurveda Samhita, the Aitareya Brahmana).

Anjalika, A broad and sharp arrow (see the Dhanurveda Samhita).

Ankusha, Elephant-goad. It is mentioned in all the Sanskrit texts dealing with weapons.

Ankushadhara, The holder of elephant-goad (see the Matsya Purana).

Apaskanibha, Part of an arrow (see the Aitareya Brahmana).

Apstha, Part of an arrow (see the Aitareya Brahmana).

Apratihata, A very strong shield (see the Arthashastra).

Aramukha, An arrow having serrated point like a saw (see the Dhanurveda Samhita).

Ardhabahu, A pillar measuring half of bahu; used in the siegecraft (see the Arthashastra).

Ardhachandra, A crescent-shaped arrow-head (see the Nitiprakashika, the Dhanurveda Samhita, the Raghuvamsa, etc.).

Ardhanaracha, A small arrow, half of naracha, made of iron (see the Mahabharata).

Ardea, A web (see the Ramayana).

Ardra, A missile for drenching. It is referred to in the Nitiprakashika under muktamukta category of weapons.
Arhani, A thunderbolt (see the Ramayana).
Ark, Calatropis Gigantea.
Artmi, Notch of the bow (see the Rigveda).
As, shooting of the shaft (see the Vijasaneyi Samhita).
Astara, A missile like a boomerang. It is included in the muktamukta group (see the Nitiprakashika).
Asi, Common name for a sword (see the Ashtadhyayi, the Raghuvamsha, Bhasa, the Vishnu Purana, etc.).
Asidhara, A sheath (see the Kathaka Samhita).
Asidhenu, A dagger (see the Harshacharita).
Asipatha, Hacking the way with a sword (see the Mahabharata).
Asiputrika, A dagger (see the Harshacharita).
Asiratha, A mythical weapon (see the Ramayana).
Asiyashti, A sharp sword (see the Arthashastra).
Ashtasra, An octagonal club (see the Nitiprakashika).
Avila, A missile like an ewe (see the Nitiprakashika).
Avya, An arrow or a dart (see the Ramayana).
Ayam, The bending of bow (see Vajasaneyi Samhita).
Ayas, Iron (see the Mahabharata, the Ramayana, etc.).
Ayoguda, Iron balls hurled with a sling. According to V.R.R. Dikshitar it means ‘iron bullets', and R.P. Tripati takes it for ‘iron chains'. Jambha used ayogudas against the devas in the Devasura wars (see the Matsya Purana).
Ayudha, It is a general name used for weapons as a whole.
Ayudhagara, arsenals.
Ayudhajivis, A warrior-tribe mentioned by Panini in his Ashtadhyayi.
Badha, Soldiers who could kill the elephant with their swords (see the Harshacharita).
Bahu, Two pillars placed opposite each other to be pulled down when the enemy entered (see the Arthashastra).
Bana, An arrow (see the Dhanurveda, the Epics, the Puranas, etc.).
Banachchhedi, An archer who could cut the bowstring of the enemy (see the Dhanurveda Samhita).
Banasana, A bow (see the Brihatsamhita).
Benu, Bamboo bark for bowstring (see the Arthashastra).
Bhagwat Mahachakra, A form of Sudarshana chakra which was worshipped by Bali and his wife (see the Vamana Purana).
Bhalla, An arrow-head like a spear (see the Dhanurveda Samhita, the Matsya Purana, etc.). Some texts have taken it for ‘spear' (see the Kumarasambhava).
Bharata, A mode of shooting arrow (see the Dhanurveda Samhita).
Bhawana, A mythical weapon (see the Matsya Purana).
Bhindipala or Bhindivala, A form of spear (see the Raghuvamsha, the Dhanurveda, Bhasa, etc.).

Bhramari, The flight of an arrow which goes like the insect bhramara (see the Dhanurveda Samhita).

Bhujali, A short sword still used by the Gurakha and Nepali soldiers. Its another form is khukhari. It is depicted in the Ajanta paintings.

Bhujanga, The missile used in the Devasura war (see the Matsya Purana).

Bhujapalika, A dagger (see the Harshacharita).

Bhusundi or Musundi, A mythical weapon (see the Matsya Purana).

Bibhitaka, A missile that breaks through, pierces or penetrates (see the Ramayana).

Brahma, The missile of Brahma (see the Matsya Purana).

Brahmapasha, The noose of Brahma (see the Ramayana).

Brahmasira, A missile depicting the head of Brahma (see the Matsya Purana).

Brahmastra, A mythical weapon (see the Raghuvamsha).

Chakra or Cakra, The discus. Its another variant was Sudarshana chakra used by Vishnu and Krishna (see Bhasa, the Arthashastra, the Vishnu Purana, etc.).

Chala, A target in which the object to be hit is mobile (see the Dhanurveda Samhita).

Chalachal, A target in which the object to be hit is sometimes stationary and sometimes moving (see the Dhanurveda Samhita).

Chala-yantra, Movable machine (see the Arthashastra).

Chapa or Capa, A kind of bow (see the Brihatasamhita).

Charma, A shield of leather (see the Arthashastra and Bhasa). Charmana has occurred in the Matsya Purana.

Chaturashra, A quadrilateral club (see the Aushanas Samhita).

Chhuri, A knife (see the Manasollasa).

Chhurika, A dagger (see the Harshacharita).

Chikshepa, Flinging of a spear (see the Matsya Purana).

Chitraqushkara, A pose of shooting arrow (see the Ajanta paintings).

Chitrayoddha, One who could hit a point at a distance (see the Dhanurveda Samhita).

Chhurapra or Kshurapra, An arrow-head like a razor (see the Dhanurveda Samhita, the Nitiprakashika, etc.).

Dadurkrama, Shooting an arrow while sitting like a frog (see the Dhanurveda Samhita).

Daitiya, The missile used by the asuras (see the Nitiprakashika)

Daityastra, A mythical weapon of the asuras (see the Nitiprakashika).

Danda or Dunda, A staff or stick (see the Ramayana, the Vishnu Purana, the Matsya Purana, etc.).

Dandachakra, A mythical weapon (see the Ramayana).

Dandanabha, Danada - navelled (see the Ramayana).

Dandasara, A crescent-shaped arrow (see the Arthashastra).

Dantakanta, A tooth-shaped weapon (see the Nitiprakashika).

Dao, A tribal weapon still used by the Nagas and other aboriginal tribes of Assam.
Darana, A splitter (see the Ramayana).

Darpana, A drying up missile (see the Ramayana).

Dashaksha, A missile with ten openings (see the Nitiprakashika).

Dashashirsa, A ten-headed missile (see the Nitiprakashika).

Datra, A sickle (see the Matsya Purana).

Devadanda, A pole with nails (see the Arthashastra).

Dhana, A missile affording wealth (see the Nitiprakashika).

Dhanarati, A wealth producing missile (see the Nitiprakashika).

Dhanya, A missile affording rice (see the Nitiprakashika).

Dhanu, A bow of horn (see the Arthashastra).

It has been referred to in various Sanskrit texts.

Dhanurbhrtah, Expert in archery. The sons of Rukmakavacha were dhanurbhrtahs (see the Matsya Purana).

Dhanarudra, An archer who could use all types of bows in all ways (see the Mahabharata, etc.).

Dhanurveda, The science of archery. It is known as the upaveda of the Yajurveda.

Dhanusha, A bow made of bamboo (see the Nitiprakashika, the Brihatasamhita, etc.).

Dhanushkarta, A bow-maker (see the Dhanurveda Samhita, the Vaisaneyi Samhita).

Dhanushakara, A bow-maker (see the Dhanurveda Samhita, the Vaisaneyi Samhita).

Dhanvina, An archer (see the Dhanurveda Samhita).

Dharma, The missile of Dharma (see the Ramayana).

Dharma-chakra, The discus of Dharma (see the Nitiprakashika).

Dharma-danda, The danda of Dharma (see the Nitiprakashika).

Dharma-nabha, A sacred navel (see the Ramayana).

Dharma-pasha, The noose of Dharma (see the Nitiprakashika).

Dharmamula, A kind of sword (see the Mahabharata).

Dhrista, An active weapon (see the Ramayana).

Dhriti, A missile giving forbearance (see the Ramayana).

Didyu, An arrow used as a missile (see the Atharvaveda, the Vajsaneyi Samhita).

Didyu, An arrow used as a missile (see the Rigveda).

Dirghasi, A heavy sword (see the Mahabharata).

Drauna or Druna, A bow made of bamboo (see the Dhanurveda).

Dradhbedhi, An archer who could hit a moving object (see the Dhanurveda Samhita).

Dradhaghati, An archer who could pierce leather, etc. (see the Dhanurveda Samhita).

Dridha, A shooting pose of arrow (see the Ajanta paintings).

Drshtra, A shaft-shaped missile (see the Nitiprakashika).

Drathanabha, A navel-shaped missile (see the Nitiprakashika).

Drusana, A kind of club (see the Arthashastra, the Epics, the Nitiprakashika, etc.).

Durasada, An unassailable sword (see the Mahabharata, etc.).
Dvaichal, A mode of shooting arrow in which both the shooter and the object to hit are moving (see the Dhanurveda Samhita).

Erka, A weapon like a thunderbolt (see the Matsya Purana).

Gada, Club. It has been referred to in the Nitiprakashika, the Epics, the Puranas.

Gadamandala tatvajneh, A person skilled in the club-fighting (see the Mahabharata, the Agni Purana).

Gadamarga visharada, An expert in club-fighting (see the Mahabharata).

Gada-karma, Clubmanship. Twelve such games have been described in the Agni Purana.

Gandiva, The personal bow of Arjuna which created havoc in the battle (see the Mahabharata, Vishnu Purana, etc.).

Gandharavastra, The missile of Gandharvas (see the Matsya Purana, the Ramayana, the Nitiprakashika, etc.).

Garudakrama, Shooting an arrow while sitting like the bird garuda (see the painting of Prithviraj Chawhan in the National Museum, New Delhi).

Gati, Movement of an arrow (see the Dhanurveda Samhita).

Garudastra, The missile of Garuda (see the Matsya purana).

Gavedhu, Coix barbata.

Gopuchchha, Arrow-head like the tail of a cow (see the Dhanurveda Samhita).

Gosapanapashana, The stones thrown with the help of a rod (see the Arthashastra).

Gosira, A kind of spear (see the Nitiprakashika).

Guda, According to R.P. Tripathi it was a strategem for capturing the elephants. Dikshitar interprets it as iron bullets. Gudas are mentioned in the Matsya Purana.

Gudamusthi, A method of holding the bowstring. Five ways of gudamusthi have been mentioned in the Dhanurveda.

Guna, Bowstring (see the Rigveda, the Atharvaveda, the Vajasaneyi Samhita).

Hala, Ploughshare. It was the ayudha of Balarama (see the Brihtsamhita, the Vishnu Purana, the Epics, etc.).

Hastaghna, A hand-guard to protect the fingers from the bowstring (see the Rigveda).

Hastikarna, A hand shield (see the Arthashastra).

Hastavapa, A hand- Armour. This was a kind of gloves (see Kalidasa).

Hataka, A rod having three or four pointed edges (see the Arthashastra, Bhasa).

Hayashirsa, A horse-shaped missile (see the Nitiprakashika, the Ramayana).

Heti, A missile (see the Ashtadhyayi).

Howdah, or howda The wooden saddle placed upon the back of an elephant. It has been mentioned in all the Sanskrit texts dealing with weapons.

Huda, An iron club (see the Matsya Purana).

Isikha, A missile (see the Ramayana).

Isu, The common name for an arrow (see the Rigveda, the Atharvaveda, the Vajasaneyi Samhita, etc.)

Isu-dhanva, Bow and arrow (see the Aitareya Brahmana).

Isu-dhanvina, The holder of bow and arrow (see the Taittiriya Brahmana).
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Isudhi, An arrow-holder i.e., quiver (see the Rigveda).

Isukara, An arrow-maker (see the Rigveda Samhita).

Isukrata, An arrow-maker (see the Rigveda Samhita).

Jrambhaka or Jrmbhaka, A wide-mouthed missile (see the Vishnu Purana).

Jya, Bowstring (see the Vajasaneyi Samhita, the Brihatasamhita, etc.).

Jyakara, Maker of bowstring (see the Vajasaneyi Samhita).

Jyamurvi, A kind of hemp for bowstring (see the Dhamurveda).

Jyotisha or Jyotisma, A lustrous missile (see the Nitiprakashika).

Kainkana, A missile (see the Matsya Purana).

Kaiishika, pulling the bowstring up to the hair (see the Dhamurveda).

Kakatunda or Kakatundi, The arrow-head like the beak of a crow (see the Dhamurveda Samhita).

Kala, The missile of Death.

Kalachakra, The discus of Death (see the Matsya Purana).

Kaladanda, The danda of Death (see the Matsya Purana).

Kalanabha, The navel of Death.

Kalahpasha, The noose of Death (see the Nitiprakashika).

Kampana, A missile (see the Matsya Purana).

Kamaruchi, A missile acting to the whims of the operator (see the Nitiprakashika).

Kanaka, An arrow mentioned in the Jaina canons.

Kanaya, An metallic rod (see the Arthashastra).

Kandarpa, A missile creating sex desire (see the Ramayana).

Kanakastra, A missile like the feathers of a heron (see the Nitiprakashika).

Kankana or Kinkini, A missile like a bracelet (see the Nitiprakashika).

Kanchuka, A jacket for the soldiers (see the Arthashastra).

Kanapa, Quiver, cf, Jatakas.

Kanthachchedana, A yantra (see the Arthashastra).

Kanthatrana, An armour for the neck (see the Arthashastra).

Kapalastra, A missile shaped like human skull (see the Nitiprakashika).

Karanti, A dagger; also karapalika.

Karnika, An arrow (see the Matsya Purana).

Karapalika, A dagger.

Karapana or Karpana, An arrow to be thrown by hand (see the Arthashastra).

Karnika, Arrow-head like the petal of a flower (see the Dhamurveda).

Karauli or Karoli, A dagger. Its other forms were karanti, karapalika, etc.

Karawala, A kind of sword.

Karoti, A helmet (see the Brihatsamhita).

Karavira, A sword (see the Nitiprakashika, the Ramayana).

Kartanaka, A dagger (see the Rigveda).

Karidanta, A weapon made of the tusk of an elephant (see the Vishnu Purana).

Kartani or Kartari, A dagger (see the Harshacharita).

Krapanapani, The sword-bearer (see the Harshacharita).
Krishnayasa or Karshanayasa, Iron, cf., Chhandogya Upanishada.

Karmuka, A kind of bow made of tala wood (see the Arthashastra).

Kasa, A whip (see the Ramayana).

Kashthachehedi, An archer who could pierce the wood (see the Dhanurveda Samhita).

Kasu, A long spear, cf., Panini. It is also mentioned in the Rigveda.

Kasutari, A form of short spear mentioned by Panini in his Ashtadhyayi.

Katara or Katar, A dagger.

Katar, A knife.

Kauksheyaka, A sword with a sheath (see the Ashtadhyayi).

Kavacha, Armour. It was also called varmana or sannaha (see the Matsya Purana).

Kavata, A wooden board to protect the body (see the Arthashastra).

Kayatana, An armour (see the Vishnu Purana).

Khadanga, The fire arrows used by the Arabs in India.

Khadga, A broad sword (see the Mahabharata, the Ramayana, etc.).

Khadga-dhenuka, A dagger. Its other variants were asi-dhenuka, asi-purika, kartarika, etc. (see the Harshacharita).

Khadga-lakshana, Varahmihir has devoted a full chapter on khadga-lakshana (characteristics of sword) in his Brhatsamhita.

Khanda, A long and broad sword specially favoured by the Rajputs. It is depicted in Orissan and South Indian sculptures.

Khanga, A powerful sword (see the Harshacharita, the Vishnu Purana).

Khangagrahi, A swordsman (see the Harshacharita).

Khaniitra, A spade (see the Arthashastra).

Khetaka, A shield (see the Brhatsamhita).

Khukari, A broad and short sword still used by the Gurakha and Nepali soldiers. See also bhujali.

Kinkini or Kankana, A missile like a bracelet (see the Nitiprakashika).

Kitaka, A shield, cf., Arthashastra.

Kodanda, A kind of bow made of chapa wood. The famous bow used by Rama was kodanda.

Kosha, Sheath (see the Harshacharita, the Brhatsamhita).

Koshakarini, Female scabbard-maker (see the Harshacharita).

Kwnodaki or Kaunodaki, One of the two maces presented by Vishvamitra to Rama. The other was Shikhari (see the Ramayana).

Kreunchastra, A heron-like missile (see the Nitiprakashika).

Krpana, A long sword still used by the Sikhs.

Krti, A dagger (see the Rigveda).

Krtiya, A mythical weapon (see the Vishnu Purana).

Kshepani, A pellet-bow (see the Raghuvamsha, the Ramayana, etc.).

Kshura, A dagger (see the Brhatsamhita, the Ramayana).

Kshuraka, A dagger (see the Brhatsamhita).

Kshurika, A knife (see the Brhatsamhita).

Kshurapra or khsurapra, Razor-shaped arrow-head (see the Arthashastra).

Kuddala, A pick-axe or a spade (see the Arthashastra, the Matsya Purana).

Kukshi, A sword with a shield (see the Ashtadhyayi).

Kulamala, The neck of the point of arrow to which the shaft is fixed (see the Maitrayani Samhita, the Atharvaveda).
Kulisa, A battle-axe (see the *Mahabharata*).

Kunapa, A spear according to Macdonell (see the *Matsya Purana*).

Kunta, A kind of lance (see the *Nitiprakasika*).

Kurpasa, Covering for elephant trunk (see the *Arthashastra*).

Kuta, A poniard (see the *Ramayana*).

Kutasalmali, A mythical weapon (see Kalidasa).

Kutamudgara, A concealed hammer (see the *Ramayana*).

Kuthara, A battle-axe (see the *Arthashastra*, the *Matsya Purana*, etc.). It was the ayudha of Parashurama.

Laguda, A cudgel (see the *Nitiprakasika*, the *Matsya Purana*).

Lakshya, Target (see the *Dhanurveda Samhita*).

Lakshya-skhalana, An arrow that misses the aim (see the *Dhanurveda*).

Langal, The weapon of Balarama (see the *Vishnu Purana*).

Lavitra, A sickle (see the *Nitiprakasika*).

Loha, 'Copper' in the early age. Later on it meant 'iron'.

Lohitamukhi, A blood-stained weapon (see the *Ramayana*).

Mahabahu, A missile having big arms (see the *Ramayana*).

Mahachakra, Big and strong chakra (see the *Mahabharata*, the *Matsya Purana*).

Mahakhadga, Very big and strong sword (see the *Mahabharata*).

Mahanabha, Big navel (see the *Mahabharata*, the *Ramayana*).

Mahaprasa, Big spear (see the *Mahabharata*).

Mahashakti, Big spear embellished with gold and silver decoration and sometimes with bells (see the *Mahabharata*).

Mahasi, Big sword.

Maheshavasa, A very big bow (see the *Ashtadhyayi*, the *Matsya Purana*).

Makara, A missile shaped like a crocodile (see the *Nitiprakasika*).

Manasa, A spiritual missile (see the *Nitiprakasika*, the *Ramayana*).

Manavastra, The missile of Manu (see the *Nitiprakasika*).

Mandala, sword-fight. Twenty sword-fights have been described in the *Mahabharata*.

Mandalagra, A sword having a crescent-shaped hilt (see the *Arthashastra*).

Marga, Sword-fight. Its another name was mandala.

Mathana, A churning missile (see the *Nitiprakasika*, the *Ramayana*).

Matsari, Holding the bowstring like a fish (see the *Dhanurveda Samhita*).

Mausala or Musala, A pestle (see the *Nitiprakasika*, the *Vishnu Purana*, etc.).

Mausalastra, A club-shaped missile (see the *Nitiprakasika*).

Maushtika, A fist-sword (see the *Nitiprakasika*).

Mayadhara, A missile (see the *Nitiprakasika*).

Mayastra, A missile of illusion (see the *Nitiprakasika*).

Mayukhi, A staff with a hilt (see the *Nitiprakasika*).

Meenpuchchhi, The flight of an arrow like the tail of a fish (see the *Dhanurveda Samhita*).

Modaki also Kaumodaki, The club of Rama (see the *Ramayana*).
Mohā, A missile producing spell (see the Ramayana, the Nitiprakashika).

Mohana, An enchanting missile (see the Ramayana, the Nitiprakashika).

Mudgara, A hammer (also see kutamudgara) (see the Nitiprakashika, Kalidasa, the Matsya Purana, the Arthashastra, etc.).

Mukta, One of the four main divisions of weapons. The other three were muktamukta, yantramukta and mantramukta (see the Dhamurveda, the Nitiprakashika, the Agni Purana, etc.).

Muktamukta, The category of weapons which were sometimes separated from hand, sometimes not. Twenty weapons have been included in this list by the Nitiprakashika.

Murva, A kind of hemp for bowstring (see the Arthashastra).

Mushtipasana, A weapon mentioned in the Arthashastra.

Musundi or Bhusundi, An eight-sided cudgel (see the Nitiprakashika, the Ramayana, the Mahabharata, etc.).

Nabhaka, A missile like the nave of a wheel (see the Nitiprakashika).

Naft, Fire arrows used by the Arab invaders in India.

Nagapasha, A noose like a serpent (see the Vishnu Purana).

Nagastra, A serpent-shaped missile (see the Nitiprakashika).

Nagodarika, Bracer or archer’s gloves (see the Arthashastra).

Nalika, An iron tube for throwing small arrows. Shukracharya takes it for a gun (see the Shukranitisara).

Nandana, A missile (see the Ramayana).

Nandanastra, A joy-producing missile (see the Nitiprakashika).

Napunsaka, An arrow equal throughout in weight (see the Dhamurveda Samhita).

Naracha, An arrow completely of iron (see the Nitiprakashika, the Raghuvamsha, the Manasollasa, etc.).

Narayana, The weapon of Narayana (see the Nitiprakashika).

Narayanstra, The missile of Narayana (see the Nitiprakashika).

Narasimha, The missile of Narasimha (see the Nitiprakasika, the Matsya Purana).

Nirasya, A missile producing disappointment (see the Ramayana).

Nisangina, A swordsman.

Nischatra, A shooting pose depicted in the Pattadakal temples.

Nishkuli, A missile like an ornament (see the Nitiprakashika).

Nistrimsha, A sword of thirty angulas (see the Arthashastra).

Nivita kavacha, Impenetrable armour (see the Ramayana).

Padnasastra, Sitting cross-legged for shooting an arrow (see the Dhanurveda Samhita).

Painakastra, The bow of Shiva (see the Nitiprakashika).

Paishachstra, A devillish missile (see the Nitiprakashika).

Panimukta also called mukta. It includes the weapons which were separated from the hand (see the Brhatsamhita).

Pammaga, A kind of noose (see the Vishnu Purana).

Parajayanka, A water machine to put out fire (see the Arthashastra).

Parangamukha, A missile with downward face (see the Nitiprakashika).

Parasu, A battle-axe (see the Nitiprakashika, the Ramayana, etc.). It was the ayudha of Parashurama.
Parashva, A missile (see the Ramayana).

Parashvavadha, A kind of battle-axe (see the Brhatsamhita).

Parigha, A club with iron nails (see the Vishnu Purana, the Ashtadhyayi, and the Ramayana).

Parikshepa, A mode of fighting with a club (see the Mahabharata).

Pasha, Noose (see the Nitiprakashika, the Vishnu Purana, the Brhatsamhita, etc.).

Pashupatastra, The missile of Shiva (See the Nitiprakashika).

Pataka or Pataki, Holding the bowstring like a banner (see the Dhanurveda).

Patha, A kind of missile (see the Ramayana).

Patra, A barbed arrow (see the Brhatsamhita).

Patta, An upper garment (see the Arthashastra).

Patrina, A feathered arrow (see the Raghuvamsha).

Patita, A kind of spear (see the plays of Bhasa, the Arthashastra, and the Nitiprakashika).

Pavira, Lance according to the Rigveda. The Nirukta, however, takes it for a thunderbolt.

Pavirava, Lance (see the Arthashastra).

Paviravanta, Lance-bearer (see the Rigveda, the Vajasaneyi Samhita and the Arthashastra).

Peti, A kind of shield (see the Arthashastra).

Pinaka, The bow of Shiva. It was made of horn. Its another form was Ajagava (see the Epics, the Puranas, Sculptures, etc.).

Pinga, Bowstring according to Sayana.

Pirandhi, Feather-socket (see the Atharvaveda).

Pradara, Literally 'to split apart'. A name for an arrow (see the Nitiprakashika).

Praharana, General category of weapons.

Praharana-krida, Military sports (see the Brhatsamhita).

Prakshepa, A mode of fighting with a club (see the Mahabharata).

Pras, A spear (see the Epics, the Nitiprakashika, etc.).

Prasmana, A soothing missile (see the Nitiprakashika).

Prastaka, A barbed arrow (see Kalidasa).

Prasrapana, A missile causing extreme pain (see the Nitiprakashika).

Pratidha, placing of an arrow on the string (see the Dhanurveda).

Pratiharadara, A missile (see the Ramayana).

Pratiharstra, A missile to counteract attack (see the Nitiprakashika).

Prayavidha, A shooting pose discussed in the Dhanurveda Samhita and illustrated in the sculptures of Borobudur, Java.

Purusha, An arrow heavier towards the notch (see the Dhanurveda Samhita).

Rabhasa, A quick missile (see the Nitiprakashika).

Rajju, A kind of noose made of rope (see the Matsya Purana).

Rakshakii, The spears used by the charioteers (see the Mahabharata).

Rati, A mythical weapon capable of creating sex desire (see the Ramayana).

Raudra or Rudra, The weapon of Shiva (see the Ramayana).

Rishti, A kind of spear (see the Rigveda). The Matsya Purana takes it for a sword. It has been referred to by Bhasa also.

Rochani, A weapon (see the Arthashastra).

Ruchira, A restorative missile (see the Nitiprakashika and the Ramayana).
Sadhanuh, Prthu is described as sadhanuh. He was born with a bow and arrow (see the Matsya Purana).

Samhara, The missile of restraining (see the Nitiprakashika).

Samana, The conciliatory weapon (see the Nitiprakashika).

Sama-sandhana, A mode of shooting in which the stave is kept parallel to the body (see the Dhanurveda).

Samapada, A mode of shooting arrows (see the Nitiprakashika).

Samavarta or Samavartana, The rolling missile (see the Nitiprakashika).

Saubhara, A missile (see the Matsya Purana).

Sandhana, Holding the bow (see the Nitiprakashika).

Sanghati, A stone-throwing machine (see the Arthashastra).

Sanidra, The missile of Indra (see the Nitiprakashika).

Sandapana, The tormenting weapon (see the Nitiprakashika). According to the Ramayana one of the arrows of Kamadeva bore this name.

Sari, A type of arrow (see the Nitiprakashika).

Sarachirmali or Sarichirmali, A missile like a garland (see the Nitiprakashika).

Sarpa, Serpentine missile (see the Ramayana).

Sarpanatha, Serpentine missile (see the Ramayana).

Sarvadamana, All-subduing missile (see the Nitiprakashika).

Sarvanabhaka, Serpent-shaped missile (see the Nitiprakashika).

Sarvatobhadra, Machine used in the siegecraft (see the Mahabharata).

Sarvayas, Iron (see the Mahabharata).

Sarya, An arrow (see the Dhanurveda Samhita).

Sastrapana, Imbruements of sword (see the Brhatsamhita).

Satana, A missile (see the Matsya Purana).

Satpatra, A missile with hundred cavities (see the Nitiprakashika).

Satvika, In this mode of shooting the string is pulled up to the forehead (see the Dhanurveda).

Satya, The missile of Truth (see the Nitiprakashika).

Satyakirti, The missile of Truth (see the Nitiprakashika).

Satyavakra, A hundred-mouthed missile (see the Nitiprakashika).

Saumanasa, A floral missile (see the Nitiprakashika).

Saurya or Saura, The missile of Sun (see the Nitiprakashika).

Savitra, A missile (see the Matsya Purana).

Savyasaechi, An archer who can use the bow with both hands (see the figures on the Gupta coins).

Sayaka, A kind of arrow (see the Kumarasambhava. In the Mahabharata it has also been used in the sense of a sword embellished with bells. A bow according to Bhasa.

Seer, Like a ploughshare (see the Vishnu Purana).

Sana, A hemp (see the Arthashastra).

Shabdadeha, An archer who could hit the aim accurately at a sound without seeing the object. Prithviraj Chawhan was a shabdadehi.

Shaila, The rocky missile (see the Nitiprakashika).
Shailastra, Stone-throwing machine (see the Vishnu Purana).

Shakti, Spear. It has been referred to in various Sanskrit texts.

Shakuna, The vulture-shaped missile (see the Ramayana).

Shalaka, An arrow (see the Arthashastra).

Shalya, A shaft (see the Nitiprakashika).

Shanku, A weapon of war (see the Matsya Purana).

Shara, An arrow (see the Ramayana, the Arthashastra, the Dhanurveda Samhita).

Sharasana, A common name for bow (see the Ramayana, etc.).

Sharasani, A Bowman (see the Matsya Purana).

Sharasanga, An arrow (see the Matsya Purana).

Shastra, General name for weapons.

Shastra-vidya, The science of weapons.

Shataghni, A projectile used in siegecraft.

Shailasila, A missile (see the Nitiprakashika).

Shikharasrastra, A missile (see the Ramayana).

Shileshu, A sharp arrow (see the Ramayana).

Shilimukha, A crescent-shaped arrow (see Kalidasa).

Shirastrana, A helmet (see the Arthashastra).

Shishana, A poisoned arrow (see the Rigveda and Kalidasa).

Shirs, A frigged missile (see the Nitiprakashika).

Shoshana or Shosanam, The drying up weapon (see the Nitiprakashika).

Shosun Patta, A kind of broad Rajput sword (see sculptures).

Shrigarbha, A sword affording wealth (see the Mahabharata).

Shranga or Sharnga, The personal bow of Vishnu. It was also used by Krishna (see the Vishnu Purana).

Shringa, A bow made of horn (see the Dhanurveda).

Shula, A kind of spear (see Kalidasa, the Matsya Purana).

Shulagra, A pointed sword (see Brhatsamhita).

Shyama, Iron (see the Nitiprakashika).

Shikhari or Sikhari, The club of Rama which was given to him by Vishwamitra (see the Ramayana).

Sinhadandstrastra, A tiger-claw (see the Ramayana).

Sinhakarni, Holding the bowstring like the ear of a lion (see the Dhanurveda).

Sira, A ploughshare (see the Nitiprakashika).

Sisa, Iron (see the Nitiprakashika).

Skandha, A mode of pulling the bowstring upto the shoulder (see the Dhanurveda Samhita).

Snayu, Sinew of the bowstring (see the Dhanurveda Samhita).

Soma, The missile of Moon (see the Nitiprakashika).

Somastra, The missile of Moon (see the Nitiprakashika).

Sphtima, A missile.

Sprktala, A weapon (see the Arthashastra).

Srka, A lance (see the Rigveda).

Sthana, A shooting pose (see the Dhanurveda).

Sthira, A target which is stationary.

Sthulagra, A pear-shaped club (see the Aushanasa Dhanurveda).
GLOSSARY OF WEAPONS

Sthuna, A pillar like weapon (see the Nitiprakashika).

Stri, An arrow heavier towards the point (see the Dhanurveda Samhita).

Suchimukha, Needle-shaped arrow-head (see the Dhanurveda).

Suchirbahu, weapon like a hand (see the Nitiprakashika).

Sudarshana chakra, The divine chakra used by Vishnu and Krishna.

Sukarika, A leather bag for defence against attack of stones.

Sukatunda, Arrow having head shaped like a parrot’s beak (see the Matsya Purana).

Suksha, A missile (see the Ramayana).

Shulavata, A spear of Shiva (see the Nitiprakashika).

Suryamukha, The dazzling arrow (see the Ramayana).

Swapna, A missile which could create slumber (see the Ramayana).

Tala, A bow made of tala (palmyra) tree (see the Ashtadhyayi).

Talamula, A wooden shield (see the Arthashastra).

Talamulakrti, A club shaped like the root of palmyra (see the Aushanasa Dhanurveda).

Tamasha, A missile producing darkness (see the Nitiprakashika).

Tegha, A kind of sword which became popular in the later days.

Tejana, Lower end of the shaft (see the Atharvaveda).

Tikshnadhara, A sharp-edged sword.

Tolatra, Like an elephant-goad to control the elephants (see the Manasollasa).

Tomara, A club (see the Nitiprakashika, Bhasa, etc.).

Trapu, Iron.

Tras, A metallic rod similar to prasha (see Bhasa).

Trasika, A rod with three prongs (see the Arthashastra).

Trimaka, A missile (see the Ramayana).

Trisandhi, A thunderbolt (see the Rigveda). Its another variant was vajra.

Trishula, A trident. It is an ayudha of Shiva and has been depicted in several sculptures, paintings and on coins.

Tunira, Quiver (see the Rigveda).

Tvastra or Twstra, A mythical weapon (see the Ramayana, the Matsya Purana).

Ulukhala, A kind of pestle (see the Vishnu Purana).

Una, A short sword (see the Harshacharita). Its local Hindi name is unaa.

Upasanga, A quiver (see the Rigveda).

Urdha-sandhana, A mode of shooting the bow in which the stave is kept lower to the body (see the Dhanurveda Samhita, the Nitiprakashika).

Usiratha, A scimitar (see the Ramayana, the Dhanurveda).

Vaina, Arrow made of woods like reed, bamboo and sara.

Vajra, A thunderbolt,

Vajradhara, A name of Indra (see the Rigveda).

Vajrina, A name of Indra (see the Rigveda).

Vajrapani, A name of Indra (see the Rigveda).

Vajramusthi, Holding the bowstring like a fist (see the Dhanurveda Samhita).

Vajrastra, The thunderbolt (see the Nitiprakashika).

Valahkanta, A leather shield (see the Arthashastra).
Varahakarna, A form of noose (see the Arthashastra).

Varma, A shield (see Bhasa and Kalidasa).

Varna, Sword-spots (see the Brhatsamhita).

Varshana, Rain-producing missile (see the Nitiprakashika).

Varuna, The missile of Varuna (see the Nitiprakashika).

Varunachakra, The disc of Varuna (see the Nitiprakashika).

Varunapasha, The noose of Varuna (see the Nitiprakashika).

Varunastra, The missile of Varuna (see the Nitiprakashika).

Vatsadanta, A kind of arrow (see the Dhamurveda).

Vatsakarna, A type of arrow (see the Dhamurveda).

Vaitastika, A kind of arrow (see the Mahabharata).

Vavri, Sheath (see the Kathaka Samhita).

Vayavya or Vayuyna, The missile of Vayu (see the Nitiprakashika).

Venu, an arrow (see the Arthashastra).

Vetra, Cane (see the Matsya Purana).

Vijaya, The personal bow of Indra.

Vidystra, The missile of incantation (see the Nitiprakashika).

Vikampana, A missile (see the Matsya Purana).

Vikata, A shooting pose (see the Rani Gumpha Cave sculpture).

Vikshepa, A mode of fighting with a club (see the Mahabharata).

Vilapana, The wailing missile (see the Nitiprakashika).

Vimalakula, A pure missile (see the Nitiprakashika).

Vipatha, A kind of arrow-shaft (see the Mahabharata). According to the Nitiprakashika it means an arrow that misses the aim.

Viruchi, Fire-omitting missile (see the Nitiprakashika).

Vishekhha, A shooting pose (see the Dhamurveda).

Visamapada, A shooting pose (see the Dhamurveda).

Vishana, The poisonous weapon (see the Vishnu Purana).

Vishanayuddha, War with poisonous weapons (see the Ashtadhyayi).

Vishkha, A kind of arrow (see Kalidasa).

Vishnuchakra, The disc of Vishnu (see the Vishnu Purana).

Vishmudartha, The danda of Vishnu (see the Vishnu Purana).

Vishnipasha, The noose of Vishnu (see the Vishnu Purana).

Vishvasaghati or Nishvasaghati, A machine used in the siegecraft (see the Arthashastra).

Vrstitama, The weapon capable of producing rain (see the Vishnu Purana).

Vrittimana, A moving missile (see the Nitiprakashika).

Vvaya, Pulling of the string (see the Dhamurveda).

Yamiya, The weapon of Death (see the Ramayana).

Yanaka, A weapon used in the siegecraft (see the Arthashastra).

Yantra, Instruments used in war and in siegecraft.

Yantrapasha, A noose hurling stones (see the Ramayana).

Yantramukta, The weapons hurled with the help of machines. Many such machines have been described in the Nitiprakashika, the Arthashastra, the Brhatsamhita, etc.).

Yasti or Yasthi, A staff.

Yogandhara, A missile with superhuman powers. It has been included in the muktamukta category in the Nitiprakashika (see the Ramayana).
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Enamelled hilt of a ‘khanjar’ (dagger) in the shape of a goat’s head. The horns are studded with emerald chips, the forehead with other precious stones; and the tongue and eyes are made of rubies.

Alwar, Rajasthan, c. 1675 A.D.

(Photo : Darshan Lall)
(National Museum, New Delhi Collection)
Plate 1 (see pages 50-52)
Harpoon, Bisauli type. It has leaf-shaped, long, tapering blade and a strong medial-rib. The middle part has two pairs of barbs which are incurved and pointed. At the junction of the barbed portion there is a pair of knobs, of which one is perforated. A cord was inserted in this perforation (also called ‘eye’) which tied it to the shaft. The weapon was made by trimming a plain spearhead because there are indications of trimming on the outlines of the barb. Copper Hoard, 2nd millennium B.C.
(Photographer: Amrik Singh)
(National Museum, New Delhi Collection)

Plate II (see pages 50-52, 60)
Harpoon, Sarthauli type. The blade is shorter and bears a strong medial-rib. The four pairs of barbs are almost flat. The two knobs are comparatively short and heavy. The ‘eye’ is visible. The weapon was cast.
Copper Hoard, 2nd millennium B.C.
(National Museum, New Delhi Collection)
Plate III (see pages 52-53)
Long, tapering, double-edged, pointed sword with a strong medial rib. The hilt bifurcates like the antennae of an insect hence it is called 'Antennae Sword'. The two projections (one missing) of the hilt are bent and touching the pommel. At the base of the hilt are two holes, one on each side of the medial ridge. Total length from hilt to the tip-end is 47 cms. This, together with seven other weapons belonging to the copper hoard culture, were acquired by the National Museum, New Delhi in 1965 A.D.
Shahabad (U.P.), 2nd millennium B.C.
(Photograph K. Awasthi)
(National Museum, New Delhi Collection)

Leaf of an illustrated manuscript depicting cavaliers fighting with bows and arrows. Quivers and 'qirbans' are seen.
Indo-Persian, 16th century A.D.
Plate V (see pages 50-57)

Phiale: S.P. Nanda (National Museum, New Delhi Collection)
12 Anthropomorphic form or all-purpose weapon.
5-9 Celt: 10-11 Antennae swords.
1 Copper head: Weapons 1-4 Harpoons.

Plate V (see pages 50-57)
Gold coin of Kumaragupta I depicting him as an archer. The king is standing left in 'visamapada' pose wearing waist-cloth, jewellery and head-dress, shooting with fully strung bow drawn up to the chin. The stave is in the right hand and the string is drawn by the left. He is shooting a tiger which falls backward on the left. The king is trampling on the beast.

The legend reads 'Shrimam vyagrbalaparakra', i.e., 'the glorious (king) whose strength and valour is like that of a tiger'.

Reverse:

Goddess standing to left on crocodile holding a lotus behind her in her left hand and feeding a peacock with fruits by her right hand. The stave is in her right hand and the string is drawn by her left. The legend reads, 'Kumaragupta dhiraja', i.e., 'His Majesty Kumaragupta'.

Gupta, c. 416-450 A.D.

(Plate VI, see page 90)
Plate VII (see page 90)
Another variety of gold coin of Kumaragupta I showing him as an archer.

Plate VIII (see page 90)
Third variety of gold coin of Kumaragupta I as an archer.
A terracotta panel depicting a fight between Yudhisthira (left) and Jayadratha (right); a scene from the Mahabharata war. Both the archers are shooting from their respective chariots and are holding their bows in 'sama-sandhana' pose. Yudhisthira is gripping the stave with his left hand while Jayadratha with his right. Two quivers filled with arrows are tied on the left and right shoulders of each archer. Jayadratha is shooting 'kshurapra' type of arrow.

Gupta, 5th century A.D.
Ahichchhatra (U.P.)
(National Museum, New Delhi Collection)

A stone panel depicting a scene from the Ramayana. Lakshmana is disfiguring Surpanakha, the ogress, with a sword. Rama is holding a long, self-bow of 'kamatha' variety in his left hand. Sita is standing in the middle.

Gupta, 5th century A.D.
Deogarh (U.P.)
(National Museum, New Delhi Collection)
Plate XI (see page 91)
A bronze sculpture portraying Kamadeva, the God of Love, holding a long bow ('pushpa-dhanva') with both his hands. Early Pala, 8th century A.D., Nalanda, Bihar.
(National Museum, New Delhi Collection)

Plate XII (see pages 90-92)
A stone panel depicting Shiva as 'Tripurantaka', standing in 'alidha' pose on a chariot, holding his 'Pinaka' bow in 'adha-sandhana' pose in his left hand. The panel is mutilated hence the string and a part of the bow are not visible. Western Chalukya, 7th century A.D., Aihole, Karnataka.
(Photo: A.K. Awasthi)
(National Museum, New Delhi Collection)
Plate XIII (see pages 137-144)
A stone panel portraying Lava, one of the twins of Rama, standing in ‘alidha’ pose, holding a long ‘kamatha’ type self-bow in his left hand and an arrow in his right.
Pallava, 9th century A.D.
Kanchipuram, Tamilnadu.
(Photo: A.K. Awasthi)
(National Museum, New Delhi Collection)

Plate XIV (see pages 137-144)
A stone panel portraying Kusha, the brother of Lava, standing in ‘alidha’ pose and holding his ‘kamatha’ type bow fully strung.
Pallava, 9th century A.D.
Kanchipuram, Tamilnadu.
(Photo: A.K. Awasthi)
(National Museum, New Delhi Collection)
Plate XV (see pages 137-144)

A stone frieze depicting 'Joy after victory' ('vijayollasa'). The male and the female warriors are carrying various weapons. One of the lady archers is drawing an arrow from a quiver tied on her back.

Chauhan, 10th century A.D.
Sikar, Rajasthan.
(Photo: Darshan Lall) (National Museum, New Delhi Collection)

Plate XVI (see pages 128-129)

A stone panel depicting Rama standing in 'samapada' pose, holding a long 'kamatha' type bow in his left hand and an arrow in his right.

Pallava, 9th century A.D.
Kanchipuram, Tamilnadu.
(Photo: A. K. Awasthi) (National Museum, New Delhi Collection)

Plate XVI (see pages 128-129)

A stone frieze depicting 'Joy after victory' ('vijayollasa'). The male and the female warriors are carrying various weapons. One of the lady archers is drawing an arrow from a quiver tied on her back.

Chauhan, 10th century A.D.
Sikar, Rajasthan.
(Photo: Darshan Lall) (National Museum, New Delhi Collection)
Plate XVII (see page 91)

A fine stone sculpture depicting Mahishasuramardini holding various weapons including a battle-axe, a shield and a discus in her multi arms. The bow is held by her uppermost raised right hand.

Pala, 11th century A.D.
Eastern India.
A stone panel depicting King Narasimhavarman as an archer. The King is standing in the 'alidha' pose. Several arrows shot by him have pierced a wooden plank and have penetrated up to their nocks. In the lower panel, one of the soldiers is holding a double-edged straight sword and a shield is kept near his feet while another soldier is carrying arrows in a quiver.

Early Ganga, 12th - 13th centuries A.D.
Konarka, Orissa.
(National Museum, New Delhi Collection)
Plate XIX (see pages 90-91)
A stone sculpture showing a huntress ('bhilani') carrying a simple bow and a leaf-shaped arrow. She is profusely ornamented and is wearing a short skirt.
Hoyasala, 12th-13th centuries A.D.
Halebid, Karnataka.

Plate XX (see pages 90-91)
A wooden panel portraying Rama standing in 'samanapada' pose holding a triangular-shaped feathered arrow. The bow is slung round his left arm.
Pahari, Chamba (Himachal Pradesh) 14th century A.D.
( Photo : Darshan Lall)
Plate XXI (see pages 90-91)
A stone sculpture depicting Indrani, the consort of Indra, the Lord of Heaven, riding an elephant, holding a bow in her raised left hand and a spear-shaped arrow in her right.
15th century A.D.
(Photo: A. K. Awasthi)

Plate XXII (see pages 90-91)
A bronze image showing ten-headed and twenty-armed Maha Sadashiva. The deity is carrying several weapons in his arms.
Andhra Pradesh, 16th century A.D.
(Photo: A. K. Awasthi)
A bronze figure of Rama standing in 'tribhanga' pose in the position of carrying a bow although the actual bow is not shown. He is wearing ornaments and a tailed coat. A quiver filled with arrows is tied on his right shoulder.

South India, Early 17th century A.D.
(Photo: Darshan Lall)
Plate XXV (see pages 90-91)
A bronze Virabhadra depicted as a warrior holding a bow in his left hand.
Karnataka, 17th century A.D.

Plate XXVI (see page 119-121)
A bronze figure of Mahishasuramardini Durga holding a long self-bow in her left hand and an arrow in her right.
Kerala, 17th century A.D.
(Photo: Darshan Lall)
Plate XXVII (see pages 90-91)
A bronze image of Mahishasuramardini Durga holding several weapons in her various arms. A bow is seen in one of her left hands.
Orissa, 17th century A.D.

Plate XXVIII (see pages 119-121)
A bronze sculpture showing Rama as expounder of philosophy. Lakshmana is holding a long bow.
Kerala, 18th century A.D.
(National Museum, New Delhi Collection)
Plate XXIX (see page 92)

A scene from the wall paintings at Ajanta. The soldiers are seen attacking one another with various weapons. The elephants are also taking part in the battle.

Vakataka, 5th century A.D.
(Photo: A. K. Awasthi)
(Courtesy Y. Yazdani)
A folio from the 'Babur-Nama' depicting Babur's victory over Husain Mirza in 1496 A.D. Both the soldiers and the horses are fully armoured. The 'targash' and the 'girban' are tied round the waist of almost each soldier.

Mughal, 1597 A.D.

A. S. Beveridge, folio No. 33, p. 58.

National Museum, New Delhi, folio No. 32.

(National Museum, New Delhi Collection)
Plate XXXI (see pages 93, 129, 131)

A folio from the ‘Babur-Nama’ depicting preparations for the battle of Panipat. On the 15th Feb., 1526 A.D., Humayun made sudden attack on the Afghan camp. His mounted archers, swordsmen and matchlockmen killed several Afghan soldiers and captured many including 8 elephants. This was Humayun’s first affair, his first experience of battle. Mughal, 1597 A.D.
A.S. Beveridge, folio No. 262, p. 466: National Museum, New Delhi, folio No. 255. (National Museum, New Delhi Collection)
Plate XXXII (see pages 93, 129, 131)

A folio from the ‘Babur-Nama’ depicting the battle of Panipat. On the 20th April, 1526 A.D., Babur with his mounted archers and others stationed himself at the plain of Panipat. Seven hundred carts (‘araba’) were joined together with the ropes of raw-hide; between every two carts 5 or 6 mantlets were fixed behind which the matchlockmen stood and fired. The turning parties (‘tulghuma’) discharged arrows from right and left to the enemy’s rear. Says Babur, “Our right, left, centre and turning parties having surrounded the enemy, rained arrows down on him and fought ungrudgingly”.

Mughal, 1597 A.D.
A. S. Beveridge, folio No. 267, p. 474; National Museum, New Delhi, folio No. 260.
(National Museum, New Delhi Collection)
A folio from the ‘Babur-Nama’ depicting the performance of an archer. The archer with his strung bow has confronted the whole army. The warriors and the horses are fully armoured. Mughal, 1597 A.D.
A. S. Beveridge, folio No. 103, p. 174.
(National Museum, New Delhi Collection).
Plates XXXIV

A folio from the Babur-Nama depicting the naval operation of Babur. Most of the boats used in war had names. A large boat, formerly called 'Baburi,' which had been built in Agra at the time of battle with Rana Sanga, was named 'Asaish' (repose); the second one built by Araish Khan was called 'Araish' (ornament) and one presented by Jalaluddin Sharqi was called 'Gunjaish' (capacious). While the army was crossing the river, a crocodile ('gharial') leaped high and fell into the boat. It was caught alive and brought before Babur.

Mughal, 1597 A.D.

A. S. Beveridge, folio No. 367, p. 663; National Museum, New Delhi, folio No. 360.

(Photo: Amrik Singh)

(National Museum, New Delhi Collection)
Plate XXXV (see pages 93, 129, 130, 131)

A folio from the 'Babur-Nama' depicting Babur's victory over Marghinan fort. Babur with his mounted archers rode for days together and finally attacked the forces of Tambal and captured the fort. In this folio are seen the fully armoured horses and the warriors; the archers are carrying both 'targash' and 'qirban' together, each slung on one side of the waist. Some of the 'qirbans' are decorated.

Mughal, 1597 A.D.

A. S. Beveridge, folio No. 61, p. 100; National Museum.

New Delhi, folio No. 66.

(Photo : Amrik Singh)

(National Museum, New Delhi Collection)
Plate XXXVI (see pages 93, 129, 131)

A folio from the 'Babur-Nama'. Babur, riding a caparisoned horse, is giving instructions about the battle. The 'tarqash' and the 'qirbans' are seen. The horses and the elephants are armoured.

Mughal, 1597 A.D.

A. S. Beveridge, folio No. 65, p. 113.

(National Museum, New Delhi Collection)
Babur himself describes, “Nine standards were set up. A Mughul tied a long strip of white cloth to the thigh-bone of a cow and took the other end in his hand. Three other long strips of white cloth were tied to the staves of three of the nine standards. The Khan and the those present sprinkled ‘qumiz’ (fermented mare’s milk) in the direction of the standards; hautbois and drums were sounded towards them: the archers flung the war-cry out three times towards them, mounted their horses, cried it again and rode at the gallop round them.”

Mughal, 1597 A.D.
A. S. Beveridge, folio No. 100 B, pp. 154-5; National Museum, New Delhi manuscript folio No. 90.
(Photo : Amrik Singh)
(National Museum, New Delhi Collection)

Plate XXXVIII (see page 93)
An inscribed miniature painting showing ‘Nata Ragini’. The couplet in the Devanagiri script says that the earth belongs to the brave. The two archers are shooting arrows from the elephant-back at a cavalier. The foot soldiers are fighting with swords and shields.
Marwar, late 17th century A.D.
(Photo : Darshan Lall)
(National Museum, New Delhi Collection)
Plate XXXIX (see pages 95-96)
A miniature painting depicting a prince dressed in 'pugree' (turban) and long shirt, riding a galloping horse. The reins, saddle and stirrups are visible. The prince is out for hunting. Unable to control the charger, the prince has dropped his 'jamadhar' (push dagger), his bow, and his quiver filled with arrows on the ground.
Kishangarh, late 17th century A.D.
(Photograph: Amrik Singh)
(National Museum, New Delhi Collection)

Plate XL

A prince holding a bow and arrow
Delhi school, late 16th century A.D.
Plate XLI (see page 95)
A miniature painting titled 'Raag Vibhasa', showing the hero embracing his beloved and at the same time stringing his bow.
Bundi, late 17th century A.D.
(Photo: Amrik Singh)
(National Museum, New Delhi Collection)

Plate XLII (see pages 94-95)
A painting on paper showing an armoured charioteer shooting arrows at his opponent who is completely surrounded with arrows all around him; a few of them have pierced his shield and his body.
Paiithana, Maharatra,
Early 18th century A.D.
(Photo: Darshan Lall)
Plate XLIII (see pages 94-95)

A Miniature painting showing a lady archer who has just dismounted her horse and is about to take bath in a river. Her costumes and a bow together with a quiver filled with arrows are hung by the branch of a nearby tree. A male horse archer is watching her at her bath. A 'girban' is tied near his waist and a 'targash' opposite to the 'girban'.

Late Mughal, 18th century A.D.

(National Museum, New Delhi Collection)
Plate XLIV (see page 96)
A miniature painting depicting a couple shooting deer from their galloping horses. The prince has already shot a black deer with his arrows which have pierced almost up to the feathers. The princess has entangled a deer in her bow and is trying to catch it alive.
Bundi, early 18th century A.D.
(National Museum, New Delhi Collection)

Plate XLV (see page 96)
Same as plate XLIV. Here the prince has shot two arrows at a white deer which have penetrated almost up to their nocks.
Bundi, early 18th century A.D.
(National Museum, New Delhi Collection)
Plate XLVI (see pages 94-95)

A miniature painting showing Mahishasuramardini riding a tiger and carrying various weapons in her multi-arms. She is holding a huge self-bow in one of her left hands and is shooting a needle-shaped arrow with one of her right. Two arrows have pierced deep into the body of Mahishasura.
Kangra (Himachal Pradesh), 18th century A.D.
(Photograph: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate XLVII (see pages 95-96)
Portrait of Rai Arjan Ji of Narabada. He is holding a naked sword in his raised right hand and a round shield in his left. A quiver filled with arrows is tied, presumably with leather belt, to his waist-band. The quiver, probably of leather, is decorated with floral designs.
Bundhi, Early 18th century A.D.
(Photograph: Amrik Singh)
(National Museum, New Delhi Collection)

Plate XLVIII (see pages 94-95)
A miniature painting depicting a battle scene. The elephant has trodden a mounted archer. The broken sword, quiver, bow and arrows of the rider are lying helter-skelter. The saddle and the shield are scattered.
Mughal, Early 18th century A.D.
(Photograph: Amrik Singh)
(National Museum, New Delhi Collection)
Plate XLIX (see pages 94-96)

A miniature painting showing a tiger-shooting with matchlock guns and bows and arrows. Quivers filled with arrows are tied at the waists of two archers, both sitting in 'garuda krama' pose.

Sawar (Rajasthan), c. 1720 A.D.

(Photo : Amrik Singh)

(National Museum, New Delhi Collection)
Plate L

A miniature painting depicting a war-scene.
Patiala, 18th century A.D.
(Patiala Museum Collection)

Plate LI (see pages 94-96)
A miniature painting depicting a tiger hunt.
Late Mughal, late 18th century A.D.
Plate LI (see pages 137-144)
The miniature painting depicting Prithviraj Chauhan (12th century A.D.) as an archer. His name is recorded in the Devanagari script. The king, dressed in 'pugree' (turban), 'chaubandhi'-type long shirt and 'pataka' (waist-band), is holding a long bow in his left hand and a triangular-headed arrow in his right. He is seated in the 'garudakrama' pose.
(Photo: Shah Nemtullah)
(National Museum, New Delhi Collection)
Plates LIII to LVI (see page 122)
The details of the personal bow of Shah Alam of Mughal dynasty. The inscription in Nastaliq script is written in Urdu language in black ink. Altogether there were four inscriptions, one on each side of the obverse and reverse of the nock. One of the inscriptions is now missing.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LVII (see page 125)
The central portion of a steel bow made of two pieces, with the upper limb screwing into the lower limb. The grip is engraved with creeper design and the two sides of the limb, near the grip, are engraved with the figures of deities.
Chamba (Himachal Pradesh), 18th century A.D.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LVIII (see page 125)
The reverse of plate No. LVII, showing the additional curved portion of the metal.

Plate LIX
Illustrated leaf of a palm-leaf manuscript showing the warriors fighting with bows and arrows.
Plate LX (see page 122)
Full view of the personal bow of Shah Alam. It is made of one piece of wood and is lacquered and painted all over. It bears four (one missing) inscriptions, one on each side of the obverse and reverse of the nock.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LXI (see page 125)
The details of the limb of plate No. LX. It shows floral and creeper design.

Plate LXII
Details of one of the inscriptions found on the bow of Shah Alam.
(National Museum, New Delhi Collection)
Plate LXIII (see page 122)
The details of the grip of plate No. LX. It shows floral motif.

Plate LXIV and LXV
Details of the inscription found on the nocks of the personal bow of Shah Alam of the Mughal dynasty.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LXVI (see pages 125-126)
The details of the grip of the steel bow of Bahadur Shah Jafar, the last king of the Mughal dynasty. The bow is of one piece; the nocks, limbs and the grips are profusely damascened in gold depicting floral and creeper motif. The grip is slender. The bow bears three inscriptions (see plates LXX, LXXI and LXXII).
(Photo : Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LXVII (see pages 124-126)
The details of the nock portion of a steel bow made of two pieces, with the upper limb screwing into the lower limb. The floral motif has been depicted in silver damascening.
North India. 17th century A.D.
(Photo : Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LXVIII (see pages 124-126)
Same as plate No. LXVII, showing the reverse portion. Silver damascening is visible.

Plate LXIX
Same as plate No. LXVII, showing the second nock of the bow.
Plate LXX (see page 122)
Details of the steel bow of Bahadur Shah Jafar (cf., plate LXVI).
The inscription in Nastaliq script and Urdu language reads:

"रशि पुंजट हैरानी बदन में,
कष्मी-बेली तीर में कहलाता है"

i.e., "Anybody who sees this bow, shaped like the sky and the arrow looking like the Milky Way, is so astonished that he places his finger on his lips."
Translated by Narinder Nath, National Museum, New Delhi.

Plate LXXI (see page 122)
The second inscription on the bow of Bahadur Shah Jafar in the same script. It reads:

"यही कहना है जो देखे है उसको
सिलाली इंद निकला है फ़लक पर"

i.e., "Whoever sees this bow with a crescent-shaped arrow thinks as if the novilunar of ‘Id’ has appeared in the sky."
(‘hilali’ stands both for ‘novilunar’ and a kind of arrow with crescent-shaped head. vide, F. Steingass, op.cit., p. 1505)
Translated by Iqbal Ahmad Omri, National Museum, New Delhi.

Plate LXXII (see page 122)
The third inscription on the bow of Bahadur Shah Jafar. It reads:

"ज़रे पीले सियाहे रखके काफ़ुल
मुज़ाहिम है कसरा बसा है समक कर"

i.e., "The front portion of the elephant is so dark that the long black hair of the damsel feel envious. This bow is shining brilliantly on account of its gold damascening and it seems that it is a gold ornament."
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LXXIII (see page 122)
The nocks showing inscriptions. Both the obverse and the reverse of each nock bears an inscription in black colour.
_Photo : Shah Nemtullah
(National Museum, New Delhi Collection)

Plate LXXIV (see pages 104-108)
Different arrows, naos and an arrow-puller.
_Rajasthan, 17th century A.D._
(Photo : Darshan Lall)
(Museum, New Delhi Collection)
Plate LXXV (see pages 97-102)
Left:
A reed arrow decorated near the point. Flat triangular head has two ribs. The middle part is cut.

Middle:
A reed arrow with a long leaf-shaped barbed blade having a medial-rib; used in big games or war. The tang is inserted into the wooden shaft.

Right:
Same as on left. The point has a shank which is capped over the shaft.

North India, 17th century A.D.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LXXVI (see pages 104-105)
The details of the nocks. All are made of reed, are lacquered and painted with different floral and creeper motifs. The one on the extreme left and that on the extreme right have ivory butts.
Rajasthan, late 17th century A.D.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LXXVII

Arrows of different kinds.
17th-18th centuries A.D.
(Photo: Darshan Lall)
(National Museum, New Delhi Collection)

Plate LXXVIII

Different kinds of 'naos'.
17th-18th centuries A.D.
(National Museum, New Delhi Collection)
Plate LXXIX

'Thuth' or headless arrows for symbolical use or for practice. The round head is capped on the reed or wooden shaft. Most of them are painted in brilliant colours. The central one has a big octagonal head.
Rajasthan, 17th-18th centuries A.D.
(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LXXX (see pages 101, 135)
Left:
‘Thuth’ or headless arrow. The steel point is round and plain; the body is of reed. A few inches above the nock is painted in bright colours.
Right:
Arrow-puller (‘tir-kash’) made completely of steel (cf., plate LXXXI).
Jaipur, 17th century A.D.
(Photograph : Shah Nemitullah)
(National Museum, New Delhi Collection)

Plate LXXXI (see pages 101, 135)
Left:
The arrow-puller, hook is missing.
Middle:
Three-pronged (‘trishula’) arrow with a tang inserted into a wooden shaft which is wrapped round with thread.
Right:
Arrow-puller made completely of steel; bifurcated up to a few inches. A sliding hook is attached.
Rajasthan, 17th century A.D.
(Photograph : Shah Nemitullah)
(National Museum, New Delhi Collection)
The details of 'naracha' made completely of steel. The crescent-shaped head ('ardhachandra' or 'hilal') is one inch wide and the distance between the two tips is 6 inches.

(Photo: Shah Nemitullah)
(National Museum, New Delhi Collection)
Plate LXXXIII
(see pages 129-132)
The details of a cylindrical quiver made of a single piece of mulberry wood. It is lacquered and then painted all over with floral and creeper designs in glittering colours. Jaipur, Late 17th century A.D.
(Phot: Shah Nemittullah)
(National Museum, New Delhi Collection)

Plate LXXXIV (see pages 129-132)
Details of an octagonal huge quiver of wood, lacquered and profusely painted all over with mythical and 'shikargah' scenes in bright colours. The top panel depicts Garuda, the central one portrays an archer and the lower one a warrior. The colours have flaked at places. Rajasthan, 17th century A.D.
(Phot: Shah Nemittullah)
(National Museum, New Delhi Collection)

Plate LXXXV (see page 130)
Another view of plate No. LXXXIV
Plate LXXXVI (see page 130)
The details of one of the panels of the quiver (cf., plate No. LXXXIV) showing ‘Fish Incarnation’ (‘Matsyavatara’) of Vishnu.

Plate LXXXVII (see page 130)
Another panel of the same quiver (cf., plate No. LXXXIV) showing ‘Man-lion Incarnation’ (‘Nrisimhavatara’) of Vishnu.
Plate LXXXVIII (see page 130)
A badly damaged quiver of cotton with embroidered 'zari' work. Here the upper half is visible.
Rajasthan, late 17th century A.D.
(Photo : Shah Nemitullah)
(National Museum,
New Delhi Collection).
Plate LXXXIX

Plate LXXXIX (see page 146)
An aboriginal ('divasi') of Bihar performing a ceremonial dance. Several arrows are seen at his two sides.
Modern, 1972 A.D.
(Photo: Darshan Lall)
Details of a 'khadga' (curved sickle like weapon) depicting 'shikargah' (hunting) scene in high relief. The cavalier is hurling a spear at a deer.
Pahari, 16th century A.D.
Photo : Darshan Lall
(National Museum, New Delhi Collection)
About the Book

The old Indian arms and armour are fast becoming obsolete and are very rapidly leaving the Indian frontiers. The author, being the Head of the Department of Arms and Armour, National Museum, New Delhi, has seized the rare opportunity of collecting, handling, studying and classifying all kinds of Indian arms and armour with inspired interest. In the last 18 years he has physically examined more than half a million weapons, and has presented in these treatises, in a coherent and scientific way, practically all that is worth knowing about the Indian weaponry.

The book is divided into four volumes. The first deals with the pre-and-proto-historic weapons and bows, arrows and quivers. The second narrates the edged weapons like sword, dagger, and battle-axes; projectiles like spears and javelins; and smashing weapons like mace, gurj, etc. The discus, thunderbolt, shataghni and yantras have also been included into it. The third volume is confined to the armour and shield. The helmet, body armour, armour for other parts of the body, horse armour, elephant armour, and various kinds of shields have been described in detail. The fourth and the last volume is devoted to the fire arms i.e., cannons, matchlocks, wheellocks, percussion-cap guns, rifles, revolvers, pistols, etc. The other three volumes are in press.

All the four volumes are profusely illustrated with sketches, photographs and maps. The line drawings and photos are authentic and drawn from the actual specimens preserved in the different museums.

The books are considered to be the authoritative volumes which stand as a highly respected landmark in a subject area on which there is a dearth of published material. It is earnestly believed that this, together with the other three volumes when made available, will prove a reference source for the historians, librarians, curators of museums, antique dealers and collectors of arms and armour.

"ETERNAL GOD, THOU ART OUR SHIELD, THE DAGGER, KNIFE, THE SWORD WE WIELD, TO US PROTECTOR THERE IS GIVEN, THE TIMELESS, DEATHLESS, LORD OF HEAVEN, TO US ALL-STEEL'S UNVANQUISHED MIGHT, TO US ALL-TIME'S RESISTLESS FLIGHT, BUT CHIEFLY THOU, PROTECTOR BRAVE, ALL STEEL, WILL THINE OWN SERVANT SAVE."

AKAL USTAT, GURU GOBINDA SINGH