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ARMS AND ARMOR OF SOUTH ASIA

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Table of Contents

Abstract

This project studied and documented the Higgins Armory Museum's holdings of South Asian arms and armor of India, Afghanistan, Pakistan, Nepal, Bhutan, Bangladesh, and Sri Lanka, with an emphasis on India while researching their historical, cultural, technological, and military context. The project designed a web-based resource to make information on these artifacts accessible to a global audience. A searchable database within the website contains information and color photos of the South Asian collection.

Introduction

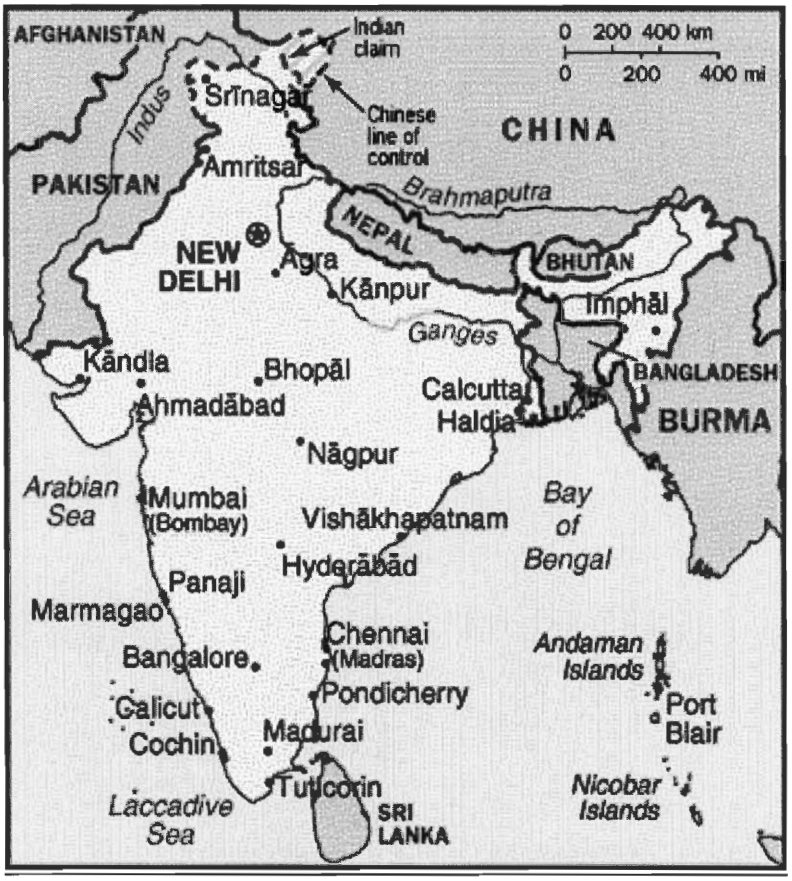
The Higgins Armory located in Worcester, Massachusetts is the only museum in the western hemisphere that is dedicated solely to the display and study of arms and armor. The collection numbers some 5000 artifacts from various sources around the world; at any time only about one-fifth of these pieces are on display for the public to view. Due to resource limitations, many of these pieces not on display have remained unexamined for decades. Also, the focus of the collections and exhibitions is predominantly European and so many of the artifacts from other regions of the world have not received much if any attention. Therefore, it was the purpose of this IQP group to research, examine, document, photo-document, and create a web exhibition for the pieces from South Asia, which includes the current countries of India, Afghanistan, Pakistan, Nepal, Bhutan, Bangladesh, and Sri Lanka, with an emphasis on India.

South Asia boasts one of the oldest civilizations in the world. A variety of philosophies and religions, along with many races and languages, had their beginnings in India long before the Western powers visited the area. With the advent of Western power imposed in South Asia came new technologies and ideas that can be seen in the some of the later pieces from that area. The arms and armor from South Asia are very significant because they teach people about the history and changes that their world has undergone. The military tactics, hardships of existence, social structuring, and many other facets of South Asian life are reflected in the many attributes of the pieces we examine.

This project provided the Armory help with descriptions of the South Asian pieces it holds, and the research report and hardcopy of the photographed items will make it much easier for other groups and organizations that are interested in the South Asian arms and

armor of the Armory to learn what is available. Second, this project provided the Armory with an excellent place to begin designing a South Asian exhibition that is currently scheduled to take place in the fall of 2003. Also, the web exhibition gives students an easy way to learn about specific arms and armor of South Asia. Lastly, the manpower and time that we contributed were valuable to the museum as they did not have to pay us for our time. The technological expertise regarding computer science that members of the group had allowed us to design and build an advanced website that the museum would have not been able to outsource.

History of South Asia



http://www.wellesley.edu/Activities/homepage/wasac/imagemap.html

Geography and Climate

All South Asian countries are rich in history and culture, but the current political borders and geography of the subcontinent are the best starting point in describing the region. India, a peninsula nestled between the Arabian Sea and the Bay of Bengal, is located in the center of the subcontinent and has the greatest landmass. To India's northwest is Pakistan, the second largest country in South Asia, and just beyond Pakistan to the northwest is Afghanistan, the third largest country. To the northeast of India, between India and China, is Nepal; and directly east of Nepal, separated only by a thin strip of India, is Bhutan. The island of Sri Lanka is located off the very tip of India

between the Bay of Bengal and the Indian Ocean. At the eastern end of the subcontinent, completely surrounded by India and the Bay of Bengal, is Bangladesh, the final country that makes up the political geography of South Asia. These political borders are modern boundaries; the actual political map of the subcontinent has changed considerably throughout history.

The climate and geography are varied throughout South Asia. Though mainly tropical, in India alone there exists all climates but polar. This diversity is explained by the vast land area and varied topography.

South Asia can be divided into geographic and climatic regions most easily by starting at the northern section, and moving south. The mighty Himalayan Mountains border the northeastern part of the subcontinent, and give birth to all the major rivers: the Indus, the Brahmaputra, and Ganges. The Indus River stretches from the northernmost tip of India, west through Pakistan, and into the Arabian Sea. The Brahmaputra River begins in the northeastern part of the subcontinent travels directly east into southeast Asia, turns south back into India, and then back west where it meets up with the Ganges River system. The Ganges river starts up in the northern part of India, wraps around to the east, and then finally ends in the Bay of Bengal in eastern India, some parts continuing on to the Mouths of the Ganges in Bangladesh.

To the south of the Himalayas is the Indo-Gangetic plain, the largest geographic region, which is located in the middle of the subcontinent, going from the western part all the way to the east. The plain runs 80 to 200 miles in width and includes the Indus, Ganges and Brahmaputra river systems as described above. Along the Indus River in the western part of the plain is the Indus River Valley. The Vindhyas are a 3,000 to 5,000

foot high range, which runs horizontally across the middle of India, south of the Indo-Gangetic plain.

Directly south of the Vindhyas, in the southern center of India, is the Deccan plateau. The escarpments of the plateau, known as the Western and Eastern Ghats, border the more distinguished coastal plains at the southern tip of the region, on the western and eastern sides respectively. The Malabar coast, to the west, was the first region contacted by western civilizations, and the Coromandel or Carnatic Coast to the east once hosted maritime kingdoms. Every year these coasts are bombarded with rain during monsoon season, which occurs from June to September. The monsoon can drop 800 inches of rain per year, and is the most notable weather pattern in India. (Meyer 1965: 7-10)

Prehistory

The divisions in geography just mentioned correspond with cultural differentiation. The earliest traces of man's existence on the Indian subcontinent date back to the Paleolithic or Old Stone Age, which extended in India from about 400,000 B.C. to about 100,000 B.C. This period covers what have been designated as the pre-Soan, Soan, and evolved Soan cultures, derived from the Soan River Valley in northwest India. Many coarse pebble and flake tools have been discovered in the river valley, as well as a small number of pear-shaped hand axes. Slightly more efficient tools have been uncovered in Gujarat and South India, dating to about the same period. No human remains have been excavated from this early stage in the Indian subcontinent's pre-history. These primitive inhabitants of India were semi-nomadic, living in small groups in rock shelters or huts, and hunting and gathering their food. (Meyer 1968: 25)

The Mesolithic or Middle Stone Age dates from about 100,000 B.C. to about 10,000 B.C., and produced bone and flint implements, as well as those of stone and semi-precious stones. Polished stone axes and handmade pottery have been uncovered from this period. A variety of animal bones from the end of this time period have been discovered, including cattle, pig, horse, dog, deer, chicken and goat, but it is questionable whether or to what extent domestication occurred. It is unclear how far these people were able to take agriculture. (Meyer 1968: 25)

In the Indian subcontinent, the Neolithic or New Stone Age took place from about 10,000 B.C. to about 6,000 B.C. Man's domestication of animals, growing of food crops, and settling down into communities marks the beginning of this period. Neolithic communities have been found in the lower Indus, the upper Sind in south Pakistan, and Baluchistan in northwest India. During this period, man lived in settled communities and practiced animistic religious rites. Man utilized tools such as the potter's wheel to produce painted pottery and clay figurines, and even copper tools were used later in the period. The dead were buried in cemeteries where huge stone blocks, called megaliths, were used as tombs, and stone circles marked the burial grounds, until later in the period, when bodies were cremated and the ashes put in urns. (Meyer 1968: 25)

The Negritos were the first known race to inhabit South Asia. These people had very slight builds, under five feet, and lived a semi-nomadic existence, hunting, gathering, and developing the earliest form of shifting cultivation. This slash-and-burn technique leaves the soil sapped, making migration unavoidable. Not much else is known about the Negritos, or about what happened to them. Remnants of the Negritos

can be found in the Philippines, the Andaman Islands, and some spots of the Malay peninsula. (Tinker 1966: 11-13)

Most people who migrated to South Asia during these early periods are lumped together in one group called Dravidians. Although many of them are different races, or from different areas, what language the South Asians spoke determined how they were categorized, and therefore all those who spoke the non-Aryan languages of South Asia became known as Dravidians. The dark-skinned Dravidians were the first to establish cities in the subcontinent, including the civilizations in the Indus valley. (Tinker 1966: 11-13)

The Dravidian Indus Valley civilization was along the Indus River. These civilizations are some of the oldest on Earth. By 3000 B.C., well-built cities flourished in the Indus Valley. Mohenjo-daro, or the "city of the dead," located on the lower Indus, is one of these. Buildings in the city were built of brick and mortar; it was impossible to procure stone for building purposes in the region. Most of the houses had their own wells, and many even had bathrooms. The drainage systems from these bathrooms were always very good, although they only deposited the waste on the streets, not out of the town. There was even a chute for garbage that led out of the house into a bin, in which the trash was collected. Larger buildings other than the private houses existed, such as a large public bath with auxiliary buildings. The uses of other larger buildings, for example, a great pillared hall thought to have been used as a place of assembly, are purely speculation. (Allan, Haig, Dodwell 1969: 3)

The Indus people were literate; they used a pictographic writing style (comparable to Chinese characters). Although no traces of defensive armor have been found, the

Indus people were acquainted with weapons such as spears, axes, daggers, and bows and arrows. Some weapons and tools were made with copper. Other metals known to the Indus culture include gold, silver, and lead. From these and various semi-precious stones they made beads and other ornamentation. The ornaments uncovered reveal that the Indus community was quite wealthy. (Allan, Haig, Dodwell 1969: 4-6)

Vedic/Epic Age

Very different from the Indus civilization, the Aryans were a pastoral culture that migrated to South Asia somewhere between 2000 B.C. and 1,500 B.C. from the northwest. They were a warrior society that dominated their enemies with the use of horse-drawn chariots. These chariots might have been what allowed the Aryans to gain much control of the region. The language of the Aryans is actually distantly related to English and the predecessor of Sanskrit and modern Hindi. The earliest literary source in the history of India, the hymns of the *Rig-Veda*, comes from these people. (Meyer 1968: 28-29)

Aryan life centered on family and the tribe. The father of the family had the power, and marriages were monogamous and life-long. Patriarchal families were grouped into tribes. Each tribe had a chief, or raja, which was an inherited position. Other traditional positions included, but were not limited to, tribal councils, generals, and priests. Slavery did exist, although it was not very common. Traditional Aryan towns were organized with the main road running east to west. Houses of mud or brick were concentrated in four quadrants. A tree or platform in the center of town served as a meeting place for tribal councils. Four gateways into the town through the outer stockades were each guarded by bamboo or wooden towers. These towers, known as

gopuras, became important in later Indian art and architecture. Although no artwork exists from Aryan times, many Aryan ideas and aspects of life influenced traditional Hinduism, which started taking shape towards the end of the Epic Age (about 500 B.C.). (Meyer 1968: 28-29)

The Aryans invaded and occupied much of northern India, from west to east, driving the Dravidians east and then finally south, into the southern half of India. They comprised numerous tribes that fought often with the local natives and sometimes with each other. Three of the more notable tribes were the Purus, the Turvasas, and the Yadus. These tribes are important because they took part in the battle of the ten kings, which is the most significant event in the Vedic period for the region, in which Sudas, king of the Tritsus, succeeded in driving off his enemies, who greatly outnumbered his forces. (Allan, Haig, Dodwell, 1969: 4-6)

Hindu/Buddhist Age

Hinduism, the world's oldest religion, took its classical form around 500 B.C., thus beginning the Hindu Age. It was by far the most common religion in the region during this period. (Meyer 1968: 28-29) Some major deities of the polytheistic religion are: Vishnu, embodying the power to sustain and nourish life; Shiva, representing destructive power and the one Supreme God; Brahma, the Lord of Creation; and Kali, the divine energy underlying the transforming power of change. (Koller 1998: 86-89) Hinduism posits the idea of the *atman* as the true nature, or essence, of the individual, and *Brahman* as the universal soul, or absolute reality. Hindu teachings explain that the *atman* and the *Brahman* are identical, that everyone is one with the universal essence, the *Brahman*. Human nature is to live in a state of ignorance, called *avidya*. We continue to

live in *avidya* because we are under a cloud of illusion, or *maya*. Everyone is in a virtually perpetual state of reincarnation, the nearly infinite cycle of birth, death, and rebirth, known as *samsara*, until their own personal *maya* has been lifted *Samsara* continues until one reaches genuine enlightenment, referred to as *moksha*. *Moksha* is the ultimate goal: to experience *atman* and realize one's true nature. Then one is transported beyond the cycle of *samsara*. Thus, the lifelong quest is over; one experiences their true self, reaches *moksha*, realizes that their true self is one with the universal self (the *Brahman*), and frees oneself from *samsara*. (Brannigan 2000: 5-7)

The temple is a prominent Hindu religious symbol. A city's temple should be located at the center of the city next to a reservoir. Temples also are usually very large structures as numerous activities would take place in them daily. The best architects and sculptors always built them according to a carefully prescribed sacred design. There were five such blueprints of temple architecture, dependent on the region where the temple is located. (Maloney 1974: 139-140)

Three other basic concepts of Hinduism are that of *varna*, *dharma*, and *karma*. *Varna* or color, meaning class, order, or caste, is the idea that people have different moral worth based on predetermined traits such as family, color, or occupation. *Varna* and the caste system are very important to the everyday life of a Hindu as it provides the basic class structure of Indian society. People are divided into the four *Varnas* based essentially by birth, and are then divided into numerous castes usually depending on qualifications. The *brahmana varna* consists of the priests and teachers, responsible for maintaining cultural traditions, preserving knowledge, performing rituals, and safeguarding morality. The protectors and administrators are the guardians of society, the

warrior class, providing security and enforcing rules, and are called the *kshatriya varna.* People belonging to the *vaishya varna* are the society's traders and producers, responsible for raising cattle, trading and engaging in agriculture. Servants and society's workers make the *shudra varna.* (Koller 1998: 46) *Dharma* is the basic moral code, which is determined by one's caste. Another important belief of Hindus is that of *Karma*, or moral consequence. *Karma* is strongly associated with reincarnation since it carries over from each previous life of a person to all future lives. Each Hindu hoped to continuously improve his *karma* until his ultimate release in *moksha.* Users of yoga apply spiritual and physical exercise to release themselves from physical perception. (Meyer 1968: 32-34)

Hinduism spawned two new religions shortly after 500 B.C.: Jainism and Buddhism.

Vardhamana Mahavira ("Great Hero", 540-468 B.C.), founded Jainism around 500 B.C. The fundamental belief of Jainism is that everything has a soul and is alive. Jains believed that reincarnation is infinite, but through considerate actions, asceticism, fasting, and penance, one can build up merit and advance in the next life. Jain monks made endeavors in the fields of astronomy, mathematics, linguistics, and literature. (Meyer 1968: 34-35)

Buddhism began in India around 528 B.C. Siddhartha Gautama (563 B.C. – 483 B.C.) became known as Buddha, the "Enlightened One," after his enlightenment. *Duhkha* is suffering, and Gautama became enlightened when he realized what causes suffering, and how to overcome it by eliminating the source. Suffering is the result of

unfulfilled wants and desires; to eliminate *duhkha* one must eliminate all desire. The ways of Buddhism were first taught at Sarnath in Deer Park, and spread throughout the kingdoms of Magadha and Kosala. Within a few hundred years, the religion extended all through the Indian sub-continent and beyond. King Asoka (ruled 273-232 B.C.), grandson of Chadragupta Maurya, assisted as notable patron to the religion and provided a model for later missionary efforts. (Koller 1998: 121-124)

The Buddhist system of beliefs, as taught by Gautama, is called the Noble Fourfold Truth. The first truth is that *duhkha* is how life is normally lived. The second is that *duhkha* is brought on by ignorance about existence. Giving up desire for an individual, permanent existence will eliminate *duhkha* and is the third truth. This is made possible by way of the Noble Eightfold Path, the fourth truth. The Noble Eightfold Path incorporates right views, good intentions, moral practice, right speech, right actions, right livelihood, and meditation. Meditative practice consists of right effort, mindfulness, and concentration. The central teachings of the Noble Fourfold Truth, along with recognition of the Buddha and an emphasis on mindfulness, build the foundation of Buddhism. From this there are two branches of Buddhism; Mahayana and Theravada. The division occurred between 200 B.C. and 100 B.C., and though similar in content, Theravada Buddhism is the more traditional, historical view of the religion, where Mahayana takes the basic practices and teachings and includes a focus on becoming like Buddha. Mahayana was embraced outside India as well, spreading to Central and East Asia, while Theravada was predominant in Southeast Asia. (Koller 1998: 122-125)

Buddhism was introduced to Sri Lanka beginning in about the mid-3rd century B.C. and a great civilization developed at such cities as Anuradhapura and Polonnaruwa.

While new religions were being formed and expanding, the state was also rapidly growing. The first important political name in Indian history is King Bimbisara of Magadha. King Bimbisara is known for doing a number of things such as building roads, establishing an administrative system, appointing the jurisdiction of village headmen, and initiating a system of taxation. He was assassinated about 490 B.C., but his successors continuously incorporated more parts of the region into the empire, causing the Indian civilization to constantly grow as time passed. By the time the Nandas ruled the whole Ganga region (which lasted until 321 B.C.), the civilization had become so established that the invasion of Alexander the Great made almost no impact on the culture or history of South Asia. (Maloney 1974: 121) Alexander invaded from the Northwest in 330 B.C. and made it all the way to the Beas River, a tributary of the Indus, before his men mutinied and he had to end his campaign. He and his men found much opposition from the militaristic Mauryans. Upon his death in 323 B.C., his empires in South Asia became divided and started to succumb to Indian rebellion against foreign rule. (Meyer 1968; 40-41)

Chandragupta Maurya founded the Mauryan Empire, the first great Indian kingdom. Lasting from 322 to 185 B.C., it extended westward from the capital of Patilaputra to the Panjab, Sindh, and all the way into Afghanistan. The Mauryas ruled the Deccan also, and exploited the gold mines of Karnataka. Asoka, Chandragupta's grandson, is perhaps the most famous of all South Asian kings in history. He ruled the Mauryan empire stretching all the way from Kandahar in Afghanistan to the deltas of Bangla, and from the foot of the Himalayas to Karnataka. (Maloney 1974: 121)

Many different peoples and kingdoms surfaced on the subcontinent after the decline of the Mauryans. The Gupta empire arose in 320 A.D. The culture was classical and peaceful. Arts and the sciences flourished, and the period of Gupta rule became known as a golden age of India. The founder Chandragupta I, ruled from 320 A.D. to 330 A.D., and built on the state of the ancient Mauryans. Almost all of India was under Gupta influence, except the southernmost tip. There were many foreign contacts, which stimulated Indian creativity. The Gupta Empire began to decline towards the end of the 5th century A.D. when the White Huns, a branch of the Huns from central Asia who had extended their power over Afghanistan, continuously raided northwest India with increasing severity. (Meyer 1968: 59-63)

From about the seventh century A.D. to about the twelfth century competing kingdoms divided the northern part of the subcontinent. After the ninth century in Bangla the Hindu Senas succeeded the Buddhist Palas. In the west the Pratiharas dominated, and repulsed the Arabs who had a foothold in lower Sindh in the eighth century. However, the Rashtrakutas from the northern Deccan drove the Pratiharas from the Ganga plains. Kashmir controlled northern Punjab in the seventh century. Kathmandu broke away from Tibet in the ninth century, and it flourished as an urban civilization by the eleventh century. Rajputs, all claiming to be the *Kshatriya* (warrior) caste, surfaced in the region during the tenth century. Their clans expanded from Rajastan and Gujarat in all directions. (Maloney 1974: 144-145)

As this period progresses chronologically, Muslim conquests into the region occur more and more frequently. Starting in 1000 A.D., Mahmud of Ghazni in Afghanistan began making yearly raids into the Panjab plains. Two of his seventeen incursions into

India are most noteworthy. In 1018, he ventured from Ghazni with a 100,000-horse army seizing Mathura and the Kanauj, plundering temples and acquiring booty along the way. This campaign brought about an indication of the practice of *jauhar*, usually associated with the Rajput clans. *Jauhar* is the practice of warriors who when faced with impossible odds kill their wives and children and sally forth to fight the enemy and certain death against overwhelming odds. From 1024 to 1026 Mahmud led a major campaign south to the Kathiawar coast, looting and plundering their way to the temple to Siva at Somnath. In the late twelfth century, armies from Afghanistan descended to Sindh, and penetrated deep into the Panjab. It was these campaigns of widespread destruction and idol-breaking that caused the Hindu's stereotype of Muslim intolerance and needless waste. (Meyer 1968: 81-82) Towards the end of the 12th century in South Asian history Muslims had a strong hold in the northern part of the subcontinent. (Maloney 1974: 146)

Islamic Age

The era in which Islam was the dominant religion was from about 1200-1700 A.D. Though the first Muslim conquests in India were as early as the eighth century, Islam did not become dominant in the region until much later, when Chinghis Khan's armies threatened the Muslims' very existence. After the armies of Chinghis Khan invaded Muslim lands and destroyed several Muslim cultural and educational centers (Samarqand, Balkh, Gahznin, Baghdad), many Muslims escaped to India. Soon Islamic culture spread to become an influential part of Indian thought and culture. Muslim kingdoms were usually in north India, but were a prominent feature of Indian history, depending on the power of the reigning house. (Koller 1998: 92-94)

Islam means "peace through submission," coming from the root word *slm* meaning peace. It teaches that Allah is the one and only god and Islam is the one and only religion. Muhammad (570-632 A.D.), the founder of the religion, was a camel dealer from Mecca. In his middle age he received visions, which he recorded in the holy book of Islam, the Koran. Every Muslim must live his life by the Five Pillars and spiritual realization. The first pillar, faith, is the foundation of Islam. The remaining four pillars are those of action- prayer five times a day, fasting for one month each year, sharing a part of one's income with the needy, and the pilgrimage to Mecca. Muslims do not believe in the separation of religion and state because everything is God's and life must be lived as an act of service to God. (Koller 1998: 92-94)

During the Islamic era in India, the main tension was between the (orthodox) Sunni Muslims and the (mystical) Sufi Muslims. While orthodox Sunni Muslims believe in strictly adhering to the Koran and stress the tradition of the Muslim community, Sufis stressed individual spiritual experience and fulfillment. Sufis believe in the Sufi Path as a path to God that one achieves primarily by his own individual efforts. Many experienced the tension between the orthodox Sunni and the Sufi and tried to accommodate both ways of thinking. This tension was generally healthy for the religion, and gave rise to a third attitude that emphasized coordination of personal beliefs and experiences with the practices of the larger community. Those that followed the third category of thought helped to transform the tensions between the orthodox Sunni and the Sufi into a mutually healthy, enriching relationship. (Koller 1998: 95-100)

There were many differences between the Muslims and the Hindus. Hindus worshipped many gods, while Muslims were monotheistic. Hindus had a caste system;

Muslims believed in the equality of all men (but not women). Muslims did not revere the cow as the Hindus did. The differences in beliefs and lifestyle created controversy that has lasted to the present day. This controversy grew since as time passed in the Islamic Age Muslims took control of more and more of India. They therefore began to control areas that were predominantly Hindu. Riots occurred between Muslims and Hindus, and continue into contemporary times. Though there are those in both religions that accepted cultural coexistence, most did not. Inevitably, cultural apartheid and political partition became the norms on the subcontinent. (Meyer 1968: 80-81)

Many Hindus were won over by the Sufis, whose devotion and piety impressed the Hindus. Hindus revere saints, and were thus stirred by the holiness of the Sufi saints. Numerous Hindus converted to Islam. (Koller 1998: 100-101)

Guru Nanak (1469-1539 A.D.) founded Sikhism. Sikhs are monotheistic and attempt to maintain a close, personal relationship with God. They find salvation through union with God, which is the ultimate goal. Separation from God causes all human suffering, including endless rounds of reincarnation. Human pride and self-centeredness leads to attachment to the pleasures and concerns of this world, which separates us from God. Union with God can only be achieved through love for the Person of God. Sikhs do not believe in ritual actions, yoga, worship of images, or asceticism since salvation is only possible "when God's voice is heard within the human heart and the heart responds." (Koller 1998: 103)

The great Mughal Empire came to power in India beginning with Babur conquering Afghanistan in the early 1500s. Babur was from Samarkand, which was

conquered by the Uzbeks from central Asia, and located between the Uzbeks and the Persians. Both the Uzbeks and the Persians influenced Babur, and with Persian help he was able to briefly reclaim his patrimony. Babur had connections with Persia, and once he held Afghanistan, he invaded India. His use of firearms gave his armies an advantage over the Indians, and allowed him to take on armies with over ten times the number of men as his own. Due to Babur's mobile artillery and genius tactics, the Mughal Empire soon had influence over much of India and South Asia. When Babur died there was much rivalry amongst his sons to succeed him, and the Afghans defeated his successor, Humayun. Humayun reconquered India in 1555 with help from the Persians, but died shortly after. His son, Akbar, defeated a Hindu named Hemu, and secured the Mughals in India and South Asia. (Kluke 1986: 197-198)

British Involvement and Imperial Age

Europeans arrived in South Asia to find that much of the continent was divided and fighting each other, although the Mughals were in control of most of India. When Europeans finally came on to the scene in South Asia, they did so by sea, not by land as previous invaders did. South Asia was very much sought after for many reasons, but trade showed the most promise of profit, especially the spice trade. Spices were used for a variety of purposes in Europe and valued highly. The Portuguese were the first on the trading scene in the region. In 1498, Vasco da Gama made it to the Malabar Coast and back with three small ships. The ships returned with spices and other cargo valued at over sixty times the cost of the voyage. Another larger Portuguese expedition, led by Pedro Cabral, set sail to India in 1500 with thirteen ships. Finally, in 1502, da Gama

returned in force with a fleet twenty ships strong, establishing a trading post south of Calicut at Cochin. (Meyer 1968: 105-106)

The Portuguese government appointed Francisco de Almeida as viceroy in 1505 to conserve growing commercial interest in the region. Affonso de Albuquerque, his successor, aimed to establish a Portuguese empire in the east. He did so by implementing a policy of acquiring key islands and ports in order to control the sea-lanes and trade between Southeast Asia, India, Africa, and the Middle East. (Meyer 1968: 106) Portugal's swift ships with mounted cannons gave them an advantage over all vessels that previously sailed in the region. Early conquest of secondary allies including the shaikh of Ormuz at the mouth of the Persian Gulf, Aden on the Red Sea, Colombo in Sri Lanka, Malacca in the Eastern Straits, and the viceroy's central base of power, Goa, midway along India's western peninsula, allowed the Portuguese to dominate the region and its valuable spice trade for a century. (Wolpert 1982: 38-39)

In the early seventeenth century the Dutch and British developed navies much stronger than that of the Portuguese. The Dutch had more ships and national support, so they were more powerful than the British at first. Therefore, the Dutch gained control of the Molucca and Banda spice islands and the spice trade. (Wolpert 1982: 38-40) In 1602, the Dutch parliament granted a charter and a twenty-one year monopoly to the Dutch East India Company, a national organization aiming to further develop Dutch commercial interests. Although the Dutch secured command of some Portuguese ports in India, their main aspiration was to strengthen their assets in the East Indies, which were foundations of spice production. With their footholds in east India, the Dutch managed to retain a great share of European trade the subcontinent. (Meyer 1968: 108-109)

England had to toil a great deal, but it slowly and unsteadily emerged as a trading power in South Asia. The British East India Company, founded in 1600 by Elizabeth I, did not have such immediate success as the Dutch company. Throughout the seventeenth century, the company had its ups and downs. Following the initial separate voyages, a permanent factory was established as Surat in 1612. After obtaining the right to trade from Gujarati officials, Surat remained the company's headquarters for about seventy years, when its importance was superseded by Bombay. Other ports were founded along the west coast in the early seventeenth century, and some factories on the east coast as well. (Meyer 1968: 110-111)

Local rulers (called nawab) hindered trade for two settlements that were established on the Bay of Bengal, so company representatives explored the possibility of other sites. In 1639, the Vijayanagar Empire broke up and the local ruler at Madras decided to relinquish some land to the British. This was their first territorial grant in India, and they built up a settlement on it and called it Fort St. George. Madras came to flourish as an important British center as the growing town attracted Indian merchants and artisans. (Meyer 1968: 111)

England was involved in civil wars from 1640-1660, but afterwards interest in India was renewed. Charles II gave a deteriorating Bombay to the company in 1668 for ten pounds per year. The company put much effort into fixing up Bombay; the town was fortified, and a policy of religious toleration attracted a diverse multitude of merchants. It eventually became the flourishing center of company activities on the west coast. (Meyer 1968: 111)

Bengal, which came to be known as Calcutta, was strategically located at the mouth of the Ganges, and came to be the most important British establishment. Numerous factories had been constructed but because of disputes with the native Mughals the British were forced to retreat. Upon gaining permission to return to Bengal in 1691, they leased an area of the delta marshlands. The site was not very promising, but the swampland offered the British much protection. Although the settlement was founded as Ft. William, after King William III, it became more commonly called Calcutta. (Meyer 1968: 112)

During the 18th century, expanding English forces clashed with ambitious French forces, which had arrived on the South Asian scene around 1665. (Meyer 1968: 112) These conflicts in India were largely due to conflicts in Europe, namely the War of Austrian Succession and the Seven Years War. Battles occurred at the settlements of Madras (Fort St. George) and Bengal (Ft. William). England eventually emerged victorious in this long conflict and the British had secured their first major territorial base in Mughal India. (Wolpert 1982: 40-43)

The empires existing in India were too busy fighting amongst themselves at the time to pay any attention to the British. Nadir Shah, a Persian general, led the Persian army to take over Qandahar in 1738, then north to capture Kabul, and then west to attack Delhi in 1739. The Persian Muslims looted and plundered Delhi, killing over twenty thousand. Persians gained control of the Punjab, and Sind, and held Afghanistan until the assassination of Nadir Shah in 1747. The chief of the Sadozai clan of the Durrani tribe, Ahmad Shah Abdali, freed Kabul and Qandahar of Persian rule in 1747, proclaiming Afghanistan an independent nation. Ahmad Shah quickly stabilized his country's

defenses and then launched a series of attacks against the Persians' Punjab and Sind. During his reign he captured Lahore, Kashmir, and Sind and began unsuccessfully attacking Delhi. (Wolpert 1982: 43-44)

Shah Wali Allah, of the Mughal court in Delhi, realized that weakened Mughal power needed Afghan military support to defend itself against a growing Hindu Maratha pentarchy. Thus he invited Ahmad Shah to help defend Delhi and Muslim rule in India against the Hindus. The Maratha forces were able to seize Lahore in 1758, and disposed of a Mughal puppet in favor of one of their own. They controlled almost all of central India and the southern peninsula. Then the Afghan hordes of Ahmad Shah recaptured Lahore in 1759, and a huge Hindu-Muslim war ensued in 1761. About sixty thousand of Ahmad Shah's Durrani warriors massacred fifty thousand Maratha troops. Several thousands of the Durrani fighters died in the battle. However, with the common Hindu enemy at bay, the Durrani and the Mughals once again began to fight amongst themselves. (Wolpert 1982: 44-45)

English forces were able to easily overcome the disorganized South Asian forces that had been fighting amongst themselves for centuries. At times the European powers were able to play tribes and clans against each other for their own benefit. A small band of British soldiers and sepoys (Indian soldiers) defeated the combination of three huge armies of the Mughal emperor and the nawabs (local rulers) of Oudh and Bengal in 1764 on the south bank of the river Ganga at Buxar. Finally, the Treaty of Allahabad in 1765 brought the British East India Company into the bureaucratic system of the Mughal Empire as a tax collector for the entire Bengal province. In return, the company paid a small annual tribute to the emperor. It was a scam, however, since the emperor was in

with the company and would appropriate his richest territory's revenues. The sham went on for most of the next century, for fear of retaliation from the company for discontent or treason. (Wolpert 1982: 45-46)

The English expanded from Bengal, and by 1836 they controlled the Ganga plains up to the Panjab, Assam, Orissa, Andhra, most of the south, Sri Lanka, and large parts of Maharashtra and Gujarat. In 1843, Sind fell to the British, and after warring with the Sikhs, who had turned militaristic by then, they took the Panjab also. The remaining civilizations fell easily to the English. Some of these were Hyderabad, Mysore, Travancore, Kashmir, Baluchistan, numerous Rajput lineages in Rajasthan, and the Pathans of Kabul. Upper Burma, annexed in 1886 was the last of England's conquests in South Asia. (Maloney 1974: 150-151)

Nationalism was increasing steadily during the 19th century. Early in the century there were small mutinies, brought about by heavy taxes and a lack of respect of Indian beliefs and customs by the English. However the Sepoy mutiny that occurred during 1857-58 began a more serious widespread rebellion. Sepoys were native troops under native command but controlled by the British. The mutiny was due mainly to the issue of new rifle cartridges that were greased with cow or pig fat and were bitten before shooting the rifle, which was very offensive to both Hinus and Muslims. Sepoys near Delhi refused to touch the cartridges and were imprisoned. The next day three Indian regiments on the station shot and killed their officers, freed the prisoners, and then marched on Delhi. It took the English about 18 months to put down the mutiny. Most of the Indian rebels and the Mughal Empire were completely destroyed. After the mutiny England transferred sovereign authority, and all possessions and interests in India, from the East

India Company to the British crown. In 1877 Queen Victoria became the Empress of India, following the last Hindu and Muslim dynasties. She ruled a larger area of India than the greatest Mughal or Indian ruler had, defining Indian political boundaries to their greatest extent ever. (Meyer 1968: 123-127)

By the 1920's England's Parliament was letting India partially rule itself. The British knew it was only a matter of time before Indian nationalism would be too strong for them to squelch and the Indians would want to govern themselves. England's Parliament passed a 2nd constitution for British India in 1935 that both India and Pakistan kept as their law after attaining independence in 1947. (Wolpert 1982: 96-98)

In spite of improved economic investment and output in India, the country still has many problems. Main concerns include the country's massive overpopulation, environmental degradation, extensive poverty, and ethnic and religious conflict.

In 1971, a war between India and Pakistan resulted in East Pakistan becoming Bangladesh. About a third of this extremely poor country floods every year during the monsoon season, making economic development impossible. There is a continuing dispute between India and Pakistan over Kashmir.

In Nepal, Indo-Chinese matters were the focus of concern. Nepal has maintained neutrality between neighboring countries, but has had significant problems within its own government. The system of hereditary premiers was ended in 1951, after a century of ruling this way. A cabinet system of government was established in 1951 and reforms in 1990 established a multiparty democracy within the framework of a constitutional monarchy. In 2001, ten members of the royal family, including the king and queen, were killed in a family dispute. In 2002, the new king dismissed the prime minister and his

cabinet for "incompetence" after they dissolved the parliament and were subsequently unable to hold elections because of an ongoing Maoist insurgency. The king and his appointed cabinet now govern the country until elections can be held at some future date.

Comparable to the region, Sri Lanka's history is laden with foreign occupation. In the 14th century, a south Indian dynasty seized power in the north and established a Tamil kingdom. Occupied by the Portuguese in the 16th century and by the Dutch in the 17th century, the island was ceded to the British in 1796 and became a crown colony in 1802. As Ceylon it became independent in 1948; its name was changed to Sri Lanka in 1972. Tensions between the Sinhalese majority (the original settlers who migrated from India around the 4^{th} century B.C.) and Tamil separatists turned to violence in the mid-1980s. Tens of thousands have died in an ethnic war that persists today.

South Asian Military Techniques and History

Ancient Times through Epic Age

The earliest records of military activity in South Asia date to around 2000 BC, and are no doubt somewhat inaccurate or exaggerated due to the nature of the sources from which they come.

The very first mention of warfare in South Asia comes from Greek mythology, in which Bacchus is hailed as the first conqueror of India. However, this legend is too fabled to hold any historical merit. (Murray 1981: 37)

The second earliest record of Indian warfare was written by the Greco-Sicilian historian Diodorus (c. 90-21 BC), who tells the story of Semiramis, the Queen of Assyria. Diodorus describes an expedition into India led by Semiramis in which the greatest fear of her fighters was due to Indian war elephants, "the very aspect of which struck terror into troops unaccustomed to their presence." (Murray 1981: 38) The legendary Indian king Stabrobates (or Sthabapati), who held 'indisputable sway' over India of the Vedic times, met her army on the banks of a river with four thousand boats constructed from reeds. Behind the boats, he is said to have had a large army from all over India, and also a "numerous band of elephants." (Murray 1981: 38) Both sides are also listed as having equally numbered cavalry; however, Stabrobates' army was able to rout the Queen in large part due to the intimidation of his war elephants.

As for the accuracy of this legend, which was in no doubt skewed by opinion and time before and after reaching the ears of Diodorus, the only evidence supporting the existence of such a woman is the fact that after the reign of Shamshi-Adad V, 823-811

BC, his widow served as regent from 811-808 BC. However, other sources list the reign of Stabrobates as having taken place circa 2000 BC, and so this early military history must certainly be taken with a grain of salt.

The first civilization from which some concrete military history can be drawn is the Indus Civilization. This culture takes its name from the main river in the northwestern region of India in which they resided, the 'Sindhu' or Indus, and first appeared around 2500 BC. All that is known about warfare among the people of the Indus Valley is that "they possessed no general system of fortification" (Wheeler 1959: 97), as is evident from unearthed ruins. Excavation at the ancient city of Mohenjo-Daro, located presently in Pakistan, shows evidence of a large-scale massacre that took place around 1500BC, and it is generally believed that this was the very end of the Indus people. (Wheeler 1959: 113)

For the next 500 years, the only history known comes from a collection of Vedic hymns that are attributed to the Aryan people. It is told in the hymns that at times they had to fight against both among themselves and against the Dravidians, the dark complexioned people who inhabited India before the Aryans, and that the society was ruled by warriors and not merchants like the Indus people. The scarce military information that is known about the Vedic age of India is that "the bow and arrow were the principal weapons, but spears and battle axes were not unknown." (Smith 1958: 51) Chariots were used in battle, and each generally carried a fighting man and a driver. Also, armor was worn. (Smith 1958: 51)

During the Epic Age of Indian history from about 1000-600 BC, aside from excavated remains, the greatest source of information comes from three epic poems,

Ramayana, *Mahabharata*, and the *Upanishada*. While much can be inferred about Indian society and its beliefs from the poems, they are potentially mythologized and were transmitted orally for a long time so that some specific descriptions are going to be either erroneous or exaggerated.

The only concrete military knowledge that is known about this period comes from archaeology. Around 34 hoards of metallic objects totaling approximately 600 artifacts have been discovered in different areas of northern India, and have generally been dated to around 800 BC. These hoards consisted primarily of flat axes, shouldered axes, chisels, large metal rings, harpoon and spear heads, swords, and other miscellaneous objects. (Wheeler 1959: 113) These findings depict a growing development in metal craftsmanship throughout the late Vedic and Epic eras of India. The Gangetic copper hoard distribution throughout India as well as the stone axe and microlithic industries distrubition are given in Figure 1 and Figure 2.

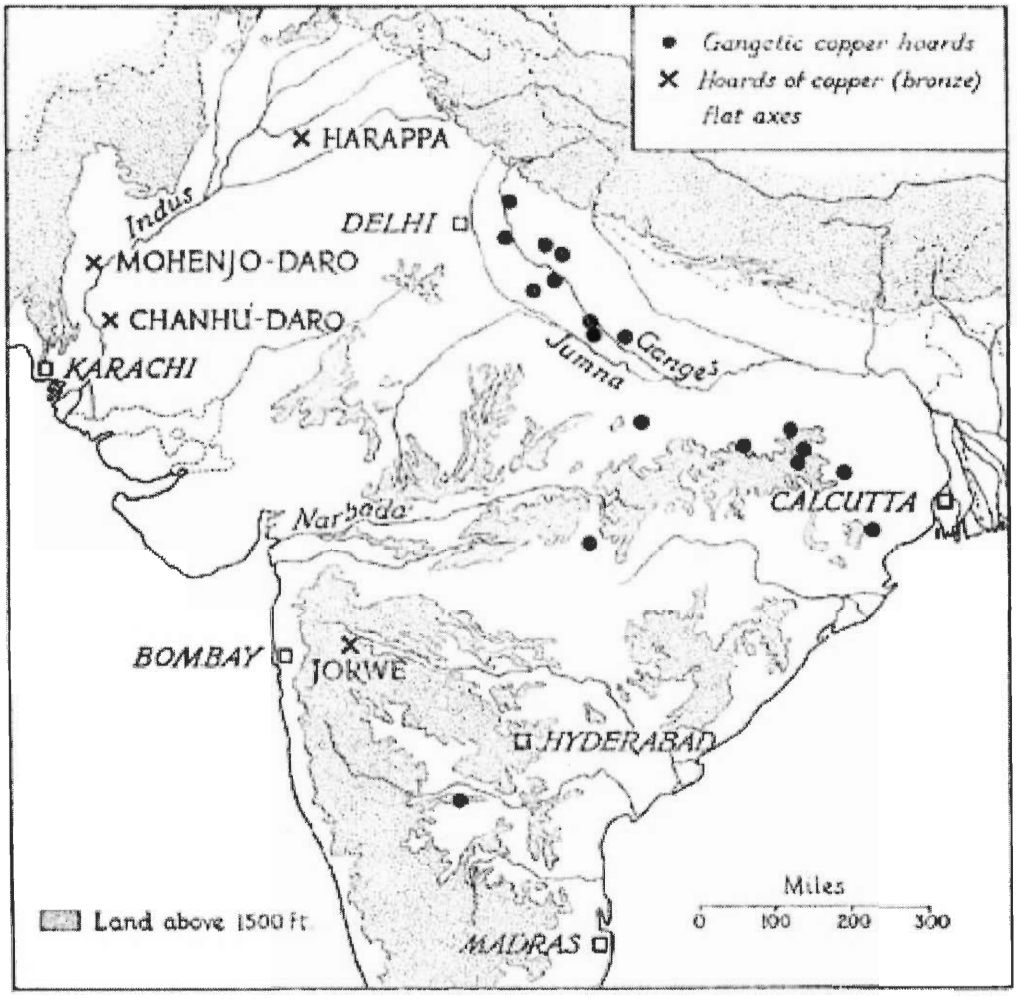


Figure 1 Gangetic copper hoards

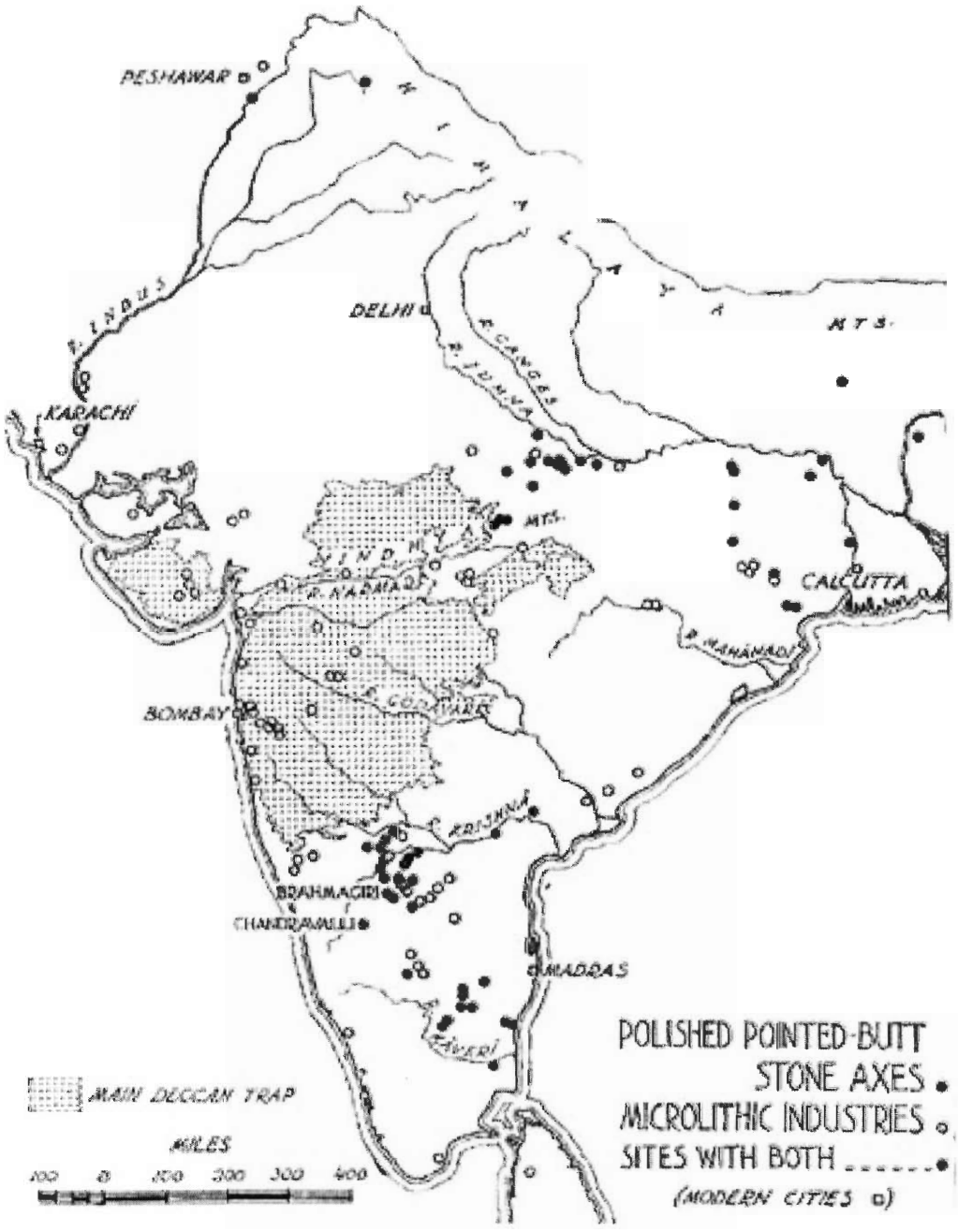


Figure 2 Stone Axe and Microlithic Industries Distribution

Hindu/Buddhist Age

The period in Indian history spanning from the rise of Hinduism and Buddhism until the Islamic incursions into India (500 BC - 1200 AD) can be characterized as a time

of constant change in leadership among the many regions of India. Even so, some characteristic traits of Indian culture, such as military style and tactics, can be seen throughout the era.

The first detailed historical account of Indian warfare comes from the conquering expedition of the Macedonian general Alexander. Alexander subdued all of Persia in 328 BC and then decided to expand his empire eastward into India in order to conquer the entire known world. He and his army crossed the Hindu Kush mountain range in May of 327 BC, crossed the Indus River in February of the next year, and entered the Indian city of Taxila, or Taxiles, in April of that same year. (Smith 1958: 94) Upon arrival, Alexander was welcomed by the Indian king, who even supplied Alexander with 5000 of his own men to help in the conquest. (Smith 1958: 85)

In May of 326 BC, Alexander and his army arrived at the Hydaspes River, and found the other side of the river occupied by a powerful Indian king named Poros. (Smith 1958: 94) Poros, unlike the king of Taxila, was not willing to give his lands up to Alexander, and prepared for battle.

The army of Poros was described as, "A very numerous army, composed of stronger men and braver troops than those whom he [Alexander] had so easily vanquished in Persia." (Mahmud 1993: 42) According to Macedonian estimates, his army consisted of 30,000 infantry, 4,000 cavalry, 300 chariots, and 200 war-elephants. (Smith 1958: 87) Alexander had difficulty getting his army across the river because it was flood season and the water level was considerably higher than normal, and also because the horses of his army refused to face the elephants standing on the opposite bank of the river. So, after a couple of weeks and extensive scouting, Alexander moved his army 16

miles to the north, crossed the river at a shallow point, and was promptly attacked by Poros and his 'numerous army'. After receiving 9 wounds, Poros was captured and his army was defeated. Every elephant was killed or captured, the chariots were destroyed, 12,000 men were slain, and 9,000 soldiers were taken prisoner. Almost unbelievably, less than 1000 Macedonian soldiers lost their lives. (Smith 1958: 87)

This extreme failure of Poros' army can be attributed to a couple of factors. First and foremost, Alexander is hailed by some as, "the greatest general in the history of the world." (Smith 1958: 87) Secondly, the war-elephants had caused more harm to their friends than they did to the enemy. Also, the archers in the 300 chariots were no match for the well-trained Macedonian mounted bowmen. Lastly, the slippery ground hindered the bow-wielding infantry because of the unusual manner in which they were accustomed to shooting the bow, which will be discussed shortly. (Smith 1958: 87)

When his troops refused to advance further into India, Alexander turned his army south in exploration. It was then that he received the greatest opposition to his conquests in India from the Malavas and other tribes. "The confederate forces, said to have numbered 80,000 to 90,000 well equipped infantry, 10,000 cavalry, and 700 or 800 chariots, should have sufficed to destroy the Macedonian army." (Smith 1958: 89) However, again the military abilities and skill of Alexander were simply too much for the Indian forces to handle.

Alexander died in Babylon in June of 323 BC at the age of 33. While he had left his mark upon certain cities and regions of India, within six years after his death all traces of Macedonian authority in India has disappeared. (Smith 1958: 90) Alexander's route is depicted in Figure 3.

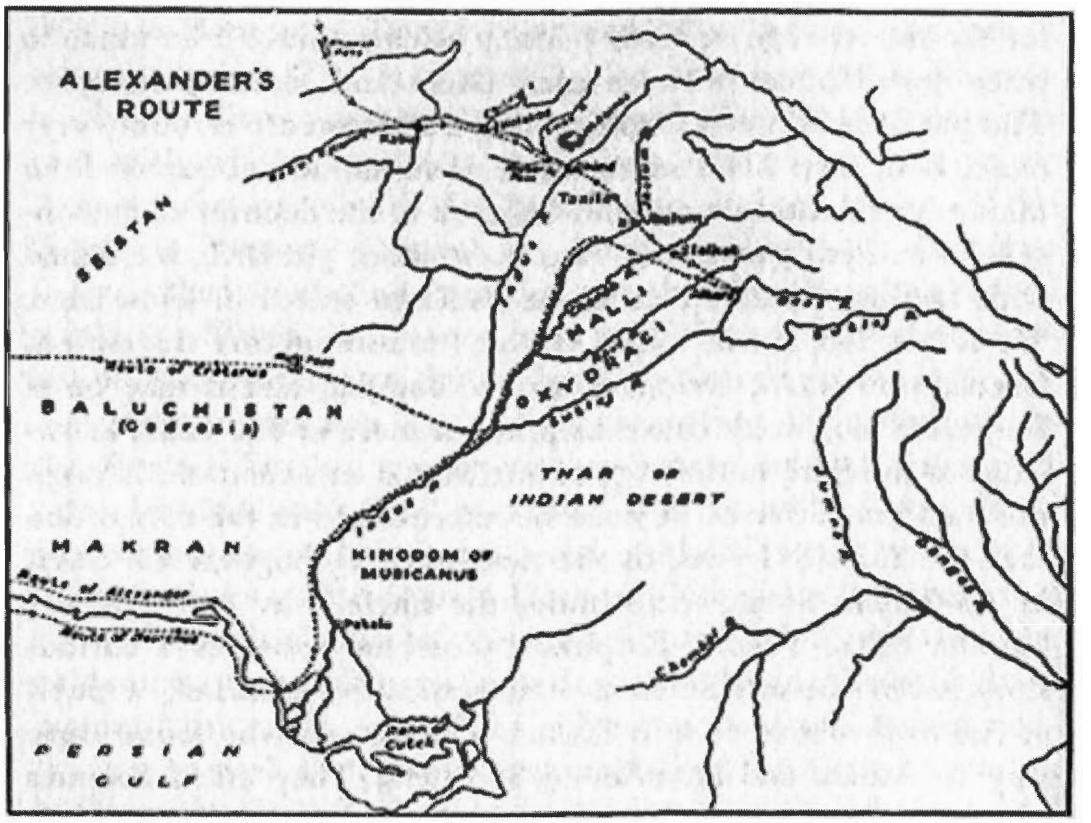


Figure 3 Route of Alexander

Since 500 BC, many small cities and republics had begun and ended all over India, some of which Alexander visited during his Indian campaign. At first these kingdoms were very small, and their lifespan seldom outlived their founders. However, as time went on and communications and trade routes developed, larger kingdoms and empires began emerging. (Bashim 1975: 39) While it is difficult to say when the first true empire emerged, most historians agree that the Mauryan Dynasty was the first because of the proportion of India that it encompassed.

The Mauryan Dynasty was founded only two years after the death of Alexander by Chandragupta Maurya in 321 BC, and its capital city was Pataliputra. Chandragupta Maurya had taken the Magadha kingdom from the Nandas dynasty, and the king whom

he had overthrown was reputed by the Greeks as having an army of 20,000 cavalry, 200,000 infantry, 2,000 chariots, and 3000 to 4000 war-elephants. (Smith 1958: 83)

Pataliputra was defended by a 'massive' timber palisade which had 64 gates and 570 towers along it, and the city was also surrounded by a deep moat. (Smith 1958: 101) Due to revenue generated from a system of taxation in which nearly all daily activities were taxed, Chandragupta Maurya was also able to maintain a large standing army, and unlike rulers before him, was able to pay the entire army's wages directly from the state. Estimates have placed the original army of Pataliputra at 9,000 elephants, 30,000 cavalry, and 600,000 infantry. (Bashim 1975: 39)

Chandragupta Maurya's grandson Asokavardhana, better known as Asoka, took control of the empire from his father in 273 BC, and while the Buddhist Asoka did many great things to further the development of the kingdom, about fifty years after his death the empire had declined and practically ceased to exist. (Bashim 1975: 43)

The next great empire to rise up in India was the Gupta Empire, which began when Chandra Gupta became king of Magadha in 319 AD. (Bashim 1975: 46) It fell apart as soon as the barbaric people called the Hunas, or Huns, began invading the northern regions of the empire in Punjab and Kashmir. Another valiant attempt at an all-Indian empire was made by Harsha in the early parts of the seventh century; however his empire died with him in 647 AD. (Bashim 1975: 52)

Many other empires and kingdoms fought for control of India during the Hindu and Buddhist age of India; however no empire lasted for any substantial amount of time. This can largely be attributed to the political and military theory of the time, which is best represented in the *Arthasastra.*

The *Arthasastra* was supposedly written by a man named Kautilya, who was the minister of Chandragupta, the original founder of the Mauryan Dynasty. Roughly translated, it means 'Science of Polity'. (Auboyer 1965: 38) One section of the *Arthasastra* is as follows:

> Whoever is superior in power shall wage war. Whoever is rising in power may break the agreement of peace.
>
> The king who is situated anywhere on the circumference of the conquers territory is termed the enemy. (Smith 1958: 91)

As stated, "Such maxims could not but result in chronic warfare." (Smith 1958: 91) This was evidently taken to heart by the Indian people, as the lands of India were constantly being conquered by both Indians and foreigners throughout this period. "Warfare had been looked on as good in itself," (Bashim 1975: 51) and while Asoka was a Buddhist who strongly believed in non-violence and was able to reduce warfare during his rein in Magadha, after his death his belief in pacifism lost popular support and was forgotten. (Smith 1958: 51)

The goal of a king in ancient India "was not only to keep his territory intact but also to extend it by conquests." (Auboyer 1965: 283) At the same time, though, the kings often tried other means by which they might conquer another king's land. As stated in the *Arthasastra*, intrigue, spies, winning over the enemy's citizens, assault, and siege are all methods by which a king would try to gain control of another's land, and diplomacy was often tried before waging all-out war. (Auboyer 1965: 283) Also, "traditional warfare of the Hindu king was mitigated by a chivalrous and humane ethical code," (Bashim 1975:

52) and cities were never sacked nor were innocent citizens ever murdered. After victorious battle, one task of the head of the military was even to court-martial all soldiers accused of breaching the formal code of war, which will be discussed shortly.

The reason for such gentlemanly warfare was because most Hindus believed that whatever cruel or unjust actions they did could or would come back to them in possibly some other form in either their present life or next life. (Bashim 1975: 52)

During the Hindu and Buddhist age, the Achaemeniads, Macedonians, Greeks, Scythians, Kushans, Huns, and Turks all occupied various parts of India at one time or another. (Smith 1958: 54-55) The inadequacies of Indian armies at defending their lands can be attributed to one primary factor.

The Indian armies never showed any sign of learning from their enemies and using their skills to their own advantage. Even after the campaign of Alexander the Great against Poros, in which the Indian army was severely defeated due to the military genius of Alexander, the Indians showed no signs of changing their warfare methods and tactics to imitate his. The Indians kings kept to their old ways of "trusting to their elephants and chariots, supported by enormous hosts of inferior infantry," (Smith 1958: 90) and their military tactics continued to follow "cast-iron rules." (Auboyer 1965: 285)

Some blame the caste system for the inadequacies of Indian armies, saying that the fact that most Hindus were non-combatants would almost always generate a poor army. However, all classes of the caste system would be represented in each army, and a lack of training and willingness to change would cause poor armies more so than the values of the Hindus. (Bashim 1975: 55)

No matter what the reason is, the general characteristic of Indian armies during this period is that they were "less mobile and more cumbrous, archaic in their equipment and outmoded in the strategy, when compared with those of their attackers." (Bashim 1975: 55) The war elephants that were so important to many Indian armies were much slower and more unpredictable than the trained cavalry of the armies that they went up against. Also, the invaders generally carried newer and more advanced weaponry, giving them more of an advantage in battle. To sum it up, "one of the main reasons for the repeated ineptitude of Indian armies in the defense of the natural frontiers of India was their outdated and ineffective military technique." (Bashim 1975: 56)

Indian armies of the Hindu and Buddhist age were divided up into four sections; chariots, cavalry, elephants, and infantry.

The chariots were traditionally considered to be a major aspect of the Indian army; however they cease to be mentioned in military descriptions around the seventh century AD. This disuse of chariots in battle is attributed to the fact that they were too heavy, difficult to maneuver, and were easily bogged down in muddy conditions. (Auboyer 1965: 284)

Traditionally, the chariots were drawn by either two or four horses, and two archers would attack while a driver would stand exposed on the shaft of the chariot and steer the horses. The chariots were considered to be both offensive and defensive, and it was believed that if the chariots of an army were defeated, then the army was sure to fall as well. (Auboyer 1965: 284)

Around the time when the chariots began to disappear from armies, the Chinese pilgrim Hiuen Tsang traveled to India, and recorded that "The chariot in which an officer

sits is drawn by four horses, whilst infantry guard it on both sides." (Smith 1958: 105) While the last mention of chariots as forces in armies occurs at about the same time as this, it can be assumed that the function of the chariots shifted from a fighting unit to the method of transportation by officers and other high-ranked officials.

The cavalry of Indian armies usually carried either one or two lances, a sword, or a bow. The cavalry, because it was so easy to maneuver, was utilized for reconnaissance, surprise attacks, pursuit, and other such tasks. It was also customary to "dope [the horses] before battle by giving them a draught of wine." (Auboyer 1965: 284)

The war elephants of the Indian armies were regarded as the most important section of the army because "the victory of Kings depends mainly upon elephants; for elephants, being of large bodily frame, are able not only to destroy the arrayed army of an enemy, his fortifications, and encampments, but also to undertake works that are dangerous to lives." (Smith 1958: 104) Each elephant carried three archers and one driver, or mahout. They were sometimes guarded by three horsemen, and always formed the advance unit of the Indian army. Also, like each horse of the cavalry, every elephant had a unique name. (Auboyer 1965: 284)

While it was customary for an army to have a large number of foot soldiers, their value in battle was relatively small due to little or no military training. (Smith 1958: 105) The main weapon of the infantry was the straight broadsword suspended from a belt that was slung over the shoulder. Javelins, bows and arrows, spears, and daggers were also used by the infantry. The bows were an especially effective weapon for the Indian armies because the soldiers would rest one end upon the earth, and then press it with their left foot while drawing the bow. Because of this method of firing, "neither shield nor

breastplate could withstand it." (Smith 1958: 106) As mentioned earlier, however, slippery or muddy ground can make it very difficult to fire a bow in such a manner, and this was in part a reason for Poros' defeat at the Hydaspes.

Armor went to men, elephants, and horses. The men usually wore leather buckskins or a metal breastplate, and the elephants and horses wore armor of metal plates. (Auboyer 1965: 284)

According to the *Arthasastra*, an Indian army was divided up into squads of 10 men each, companies of 100, and battalions of 1000. (Smith 1958: 106) Campaigns were usually begun in December if the distance to travel was great, and would depart a few months later if they did not have to go as far. The army was always followed by a long procession of supplies, which was usually carried by oxen, and included tents, prisoners of war, water, and other necessities. An ambulance service also followed the army, and would provide surgery and medicine to the fighters. (Auboyer 1965: 285)

When camp was set up, it was divided into four quadrants, one for each division of the army. It was usually formed in a square or rectangular fashion, and the king or head of the army always stayed in the exact center. Battle was undertaken only when omens were favorable, and the armies would pray for the whole week before the battle was to begin for victory. The night before the battle, the king would offer the troops a banquet, and then sleep in his chariot that night with his arms close at hand. Before daybreak, his chaplain would help him into his armor, and at sunrise, the battle would begin. (Auboyer 1965: 285-286)

The army was led by a small group in chariots that would carry the royal standard, and the elephants followed close together and close behind. They would provide cover

for the infantry, who would follow behind them. The front line was usually foot soldiers armed with bows, and the second line would consist of swordsmen, with foot soldiers on each side of the procession as well. The chariots rode next to this central fighting group, and the cavalry would line up behind them. The king would ride with a personal guard at the rear of the procession. (Auboyer 1965: 286)

Conches, gongs, and drums would sound the beginning of the battle, and it was not unusual for the fighters to constantly yell the name of their leader so that their own comrades would not mistake them for the enemy. Fighting always ceased at nightfall, and would resume in the morning. During the night hours, the animals were cared for by veterinarians, men scoured the battlefield for good arrows and weapons, and first aid was administered to injured soldiers. (Auboyer 1965: 286-287)

After the battle was over, the victorious side would gather their fallen comrades and throw them onto funeral pyres, one for each caste among the dead soldiers. The king would distribute the enemies' possessions among his men, and would generally keep one-sixth of the bounty for himself. As mentioned earlier, he would also then court-martial any individuals who were believed to have broken the code of conduct of Indian warfare. (Auboyer 1965: 287)

Islamic Age

The majority of initial Islamic impact upon India came from the Turks. These were a warlike people, and had "swarmed from the great racial hive of Central Asia" (Spear 1961: 103). During the first part of the 11th century, they had established themselves at Ghazni, which is located between Kabul and Kandahar in present-day Afghanistan. From there, their leader Mahmud led raids into northwest India, and a large

section of the Panjab ended up being annexed to the Ghazni Sultanate, including the sacked city of Mathura. However, Mahmud did very little to retain control of these conquered lands, and there were no lasting results from his raids other than "destruction of life, property, and priceless monuments." (Smith 1958: 209)

The beginning of the real Islamic influence in India began with the Turkish ruler Muhammad of Ghor, also named Muhammad of Ghuri. (Smith 1958: 232) He began attacking Indian territories in 1175, and by the end of 1186 he controlled almost the entire Panjab region. (Smith 1958: 234)

The Hindus must have sensed that these Islamic Turks could create trouble in their country if they were not stopped, for in 1191 a large host led by the chief Prithvi Raj advanced upon the Turkish army to stop them. While the Indians were able to fight off the Turks that year, in the next they were defeated in battle. (Smith 1958: 235)

After that, the Turkish leader left India and gave control of the Indian campaign up to a servant of his whom had been bought as a slave, Qutb-ud-din Aibak. He was able to keep the Muslim ball rolling, and stormed the city of Delhi in 1193. (Smith 1958: 235)

Within the next couple of years, this new Turkish Empire spread quickly, and regions such as Kanauj, Banaras, Behar, and other important regions of India fell easily. Much the same as had been in the past, the Indian army was very conservative and hardly ever changed its techniques. This is best stated in the *Oxford History of India*:

> No Hindu general in any age was willing to profit by experience and learn the lesson taught by Alexander's operations long ago. Time after time, enormous hosts, formed of the contingents supplied by innumerable rajas, and supported by the delusive strength of elephants, were easily routed by quite small bodies of vigorous western soldiers, fighting under one undivided command,

and trusting chiefly to well-armed mobile cavalry. Alexander, Muhammad of Ghur, Babur, Ahmad Shah Durrani, and other capable commanders, all used essentially the same tactics by which they secured decisive victories against brave Hindu armies of very large numbers. (Smith 1958: 235).

The greatest factor contributing to weakness of the Indian armies, however, was the disputes of the Rajput clans between themselves. This constant state of dispute never allowed for the formation of a unified force to repel the Muslim incursions; "clan jealousies and class resentments thus combined to prevent either united Indian action or the growth of a strong anti-foreign sentiment" (Spear 1961: 105).

This Turkish Empire, sometimes called the Delhi Sultanate, lasted from about 1192 until 1398 (Spear 1961: 107); however during the years from 1206 to 1290, the dynasty is called the Slave Dynasty. This is because of the Turkish practice of taking children from their homes at an early age and educating them as an enslaved military soldier. These men had no allegiance but to the state and themselves and some of these men turned out to be great leaders. (Spear 1961: 107).

In 1398, a Barlas Turk named Amir Timur (Tamerlane) decided to invade India because of the weakness of its military and the wealth of the sultans. According to his autobiography,

My principal object in coming to Hindustan was to accomplish two things. The first thing was to war with infidels, the enemies of the Muhammadan religion, and by this religious warfare to acquire some claim to reward in the life to come. The other was a worldly object: that the army of Islam might gain something by plundering the wealth of infidels; plunder in war is as lawful as their mother's milk to Mussalmans who fight for their faith, and the consuming of that which is lawful is a means of grace (Rawlinson 1952: 238).

India had been attacked by the Mongols unsuccessfully twice before Timur in 1292 and 1299, however both times the invaders were defeated. This time, he would be successful.

Timur's army had consisted of 90,000 cavalry, and at Delhi came upon "120 gigantic war-elephants, plated with armor and carrying on their backs sharpshooters in howdahs. Between them were rocket-men and grenade-throwers" (Rawlinson 1952: 238). During the battle, the elephants of the Hindi army stampeded, killing many of their own men, and the army was quickly defeated. Timur's army stormed Delhi, plundered the city for five days, and Timur returned home leaving "anarchy, famine, and pestilence behind him" (Smith 1958: 261).

A direct descendant of Timur named Babur secured the throne in Kabul at a young age in 1504, at which time the political state of India was in mass confusion (Spear 1961: 120). Eight years later he turned his attention southeast to India, and by 1525 had secured most of the Panjab for his empire. In 1526, Babur and his army arrived on the plains of Panipat, and there on April 21st met the resisting army of the current sultanate, Ibrahim Lodi. Babur's army of 12,000, which had a large train of artillery that the Indians did not, won the battle in approximately half of a day. (Spear 1961: 120) The artillery is called by some to be "one of the major factors in the Mughal victory of 1526" (Bashim 1975: 55), as at that time "firearms were still a novelty in Indian warfare, and Babur had in his employ a trained body of matchlockmen and a battery of artillery under an experienced Turkish officer". (Rawlinson 1952: 285) Also, his horsemen were trained in

the Turkish skills of wheeling and flank charges, which were much more advanced than the Indian cavalry tactics. (Spear 1961: 120-121)

Babur's rule was challenged by the Indian chief Rana Saga of Mewar, who attacked Babur at Agra with 80,000 cavalry and 500 elephants. This army was better trained than the army of Ibrahim Lodi, however yet again the artillery advantage of the Moguls coupled with more modern tactics prevailed. (Smith 1958: 322)

This government that Babur had established was loosely held together with nothing substantial to back it until Babur's grandson Akbar came into power around 1560. Akbar, who left Islam to rule under his personal religion, did many good things for India, and the era is hailed as a period of growth and unity for the country. Aside from working on civil administration and internal affairs, Akbar also further tightened the grip that the Moguls had on the Indian chieftains, and a servant of his recorded that he felt that a monarch should "ever be intent on conquest, otherwise his enemies rise in arms against him". (Smith 1958: 304) His "exceptional gifts made him a most successful general, and enabled him to construct a military machine much superior to anything of the kind possessed by other Indian states" (Smith 1958: 442).

Control of the Mogul empire in India passed through a couple of generations before Aurangzeb took command in 1659. With his rein came the beginning of the decline of the Mogul empire, as he was not as great of a leader as the other emperors had been. After his rule ended in 1707, five other emperors succeeded him in sitting of the throne of Delhi-Agra for fifty years, and then with the Battle of Plassey came the end of the Islamic era of Indian history. The hierarchy of Islamic rule is depicted in Figure 4.

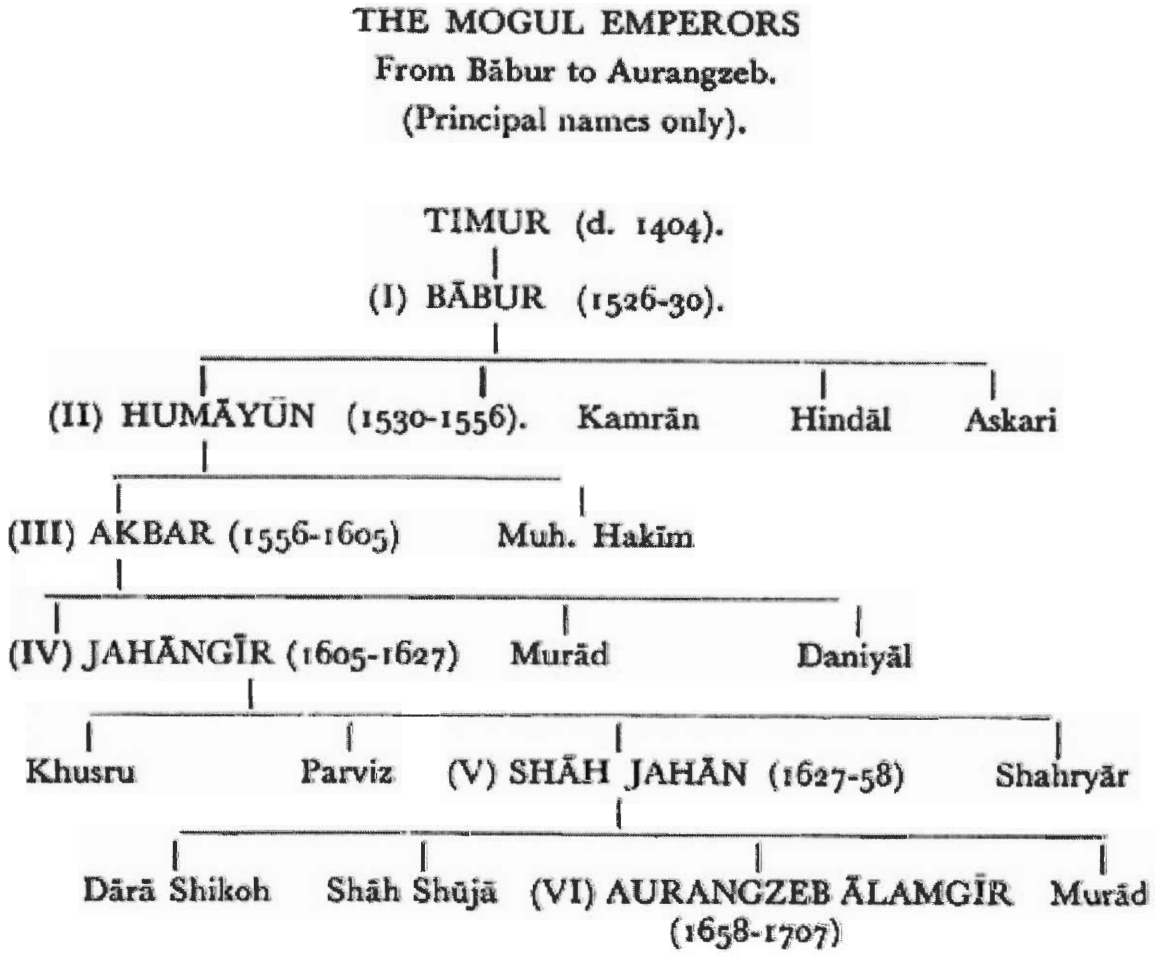


Figure 4 The Mogul Emperors

One reason for the collapse of the Muslim empire in India was the fact that the only real power the government held over the people was that of the army; they were foreigners and did not have any religious ties to the majority of the Indians. "In essence their rule was a military occupation [based] on a religious and racial foundation" (Spear 1961: 105).

Also, while artillery and improved military tactics made the Muslim-Indian armies better and more efficient than they were in the Hindu and Buddhist era, they still did not compare to the military powers of other countries. The French traveler Bernier,

upon examining the state of the military in India, stated that "25,000 French veterans under Conde or Turenne, could rout them with ease". (Rawlinson 1952: 356) A superb example of this happened at the Battle of Plassey in 1757, in which a Mogul army of 50,000 infantry, 18,000 cavalry, and 53 guns was quickly scattered by the advances of only 3,000 men, of whom only 22 were lost in the battle. (Rawlinson 1952: 356)

While the Indian armies under Muslim rule were still not as advanced as the militaries of other countries, there were a couple of great improvements made upon the organization and consistency of the Muslim armies.

First, the Muslim rulers began realizing that in battle, cavalry were quicker, more powerful, and more efficient than any infantry could ever be. So, as the Indian armies of the Hindu era consisted primarily of infantry, the armies of the Islamic era consisted mainly of cavalry, and this is evident from the surviving approximations of the size of the Muslim armies. However, the Indian armies did not suddenly change, and more of a synthesis of Hindu and Muslim traditions of armies emerged. The cavalry which had proved to be invaluable in the Turk-Afghan conquests were still the elite corps of the army, but an elephant branch was often added to each army as well, keeping with the Hindu tradition. A good example of this type of army was the army of a general Sher Shah in the early sixteenth century, which consisted of 150,000 cavalry, 25,000 infantry, and 5,000 elephants (Smith 1958: 325).

The second large change in Indian armies came about during the reign of Akbar, who developed a system of command that was necessary for more efficient organization within the Indian army. The whole cavalry corps, which by Akbar's time was often the majority of the army, was placed under the command of the mansabdars, which means

'office holder' in Persian (Smith 1958: 359). This system split the mansabdars into 33 different grades of officers; each grade differed according to how many horsemen the officer commanded. The smallest group that an officer could command was 10, and the largest group was 5,000. Also, within each of these ranks was a class that was determined by the extra number of horsemen who were allowed in the group. (Smith 1958: 150)

The hierarchy of mansabdars was split into three general sections. An officer in command of 10 to 400 horses was simply a plain officer. A man in charge of 500 to 2,500 horsemen was called *Amir*, which roughly translates to 'lord'. The final grouping of ranks was for the mansabdars in charge of 3,000 to 5,000 cavalry, called *Amir-i-Azar*. (Smith 1958: 150) The highest three grades of the mansabdars classification were usually reserved for princes. (Smith 1958: 359)

This system not only created a necessary chain of command for the cavalry of the Indian armies, but was also "the prototype for British India's civil service." (Smith 1958: 358)

Another change in Indian warfare techniques that occurred during the Muslim era was the increased discipline of Indian armies. One example of this was the decree of the Maratha chieftain Sivaji, who stated, "'No man in the army was to take with him wife, mistress, or prostitute.'" (Smith 1958: 412) The army of the Bahmani Kingdom in Southern India also showed come compassion in battle by signing an agreement with the city they were attacking because "the slaughter of the peaceful cultivators which took place [in a previous battle] induced both sides to sign an agreement that in the future non-combatants should be spared." (Rawlinson 1952: 252)

Probably the most consequential change in the Indian armies that came about during the Muslim era was the introduction of artillery. Before the arrival of the Portuguese, guns were widely used, and a campaign led by Mahammad I, the son of the founder of the Bahmani Kingdom, around the year 1360 "was remarkable for the employment, for the first time in Indian history, of artillery, which had been introduced by Turkish or European mercenaries." (Rawlinson 1952: 252) This addition of artillery and explosives such as grenades dramatically changed the military formation of the Indian armies, and had other ramifications as well.

The addition of cannons, guns, and other such stationary weapons to Indian armies led to the employment of a Turkish technique for deploying the army. A good example of the utilization of this tactic was Babur's attack on Delhi; he first drew 700 wagons together into a line in front of his army, and tied each wagon to the ones adjacent to it with ropes and leather. The cannons, musketeers, and other stationary fighters would then stand behind this line, which thwarted the opponent's cavalry from immediately running them over. Some gaps were left in the line for Babur's cavalry to get through to attack, and this method of attack was one of the prominent reasons for his victory. (Smith 1958: 285) This technique became quite popular as artillery became more important to the Indian army.

This increased use of artillery also prompted the development of stronger fortresses that would be able to better withstand the massive force of these weapons. Many fortresses were re-built with higher and thicker walls, and often cannons were built into the walls as well. (Smith 1958: 289) As Rawlinson says of the Bahmanis, "high

walls with solid stone battlements and round bastions came into fashion." (Rawlinson 1952: 256)

The last and somewhat minor change in the Indian armies of the Muslim period was the increased fortification of army camps. Classical Hindu fighting styles dictated strict rules that had to be followed, such as the usual agreement that battles were to be fought only during the daytime. The Muslims were not as chivalrous as fighters, and it became necessary to somewhat fortify army camps.

Generally, the entire camp of a camping army would be surrounded by a ditch and/or palisades of fallen trees. The Maratha army, for instance, were known to dig ditches about 60 feet wide and 20 feet deep all around their camps. Once that artillery had become more a part of the Indian army, guns were also mounted to the ramparts of the camp as well.

East India Company Era

In the beginning of the 18th century, the British interest in India was primarily economical. The East India Company was founded to trade goods between India and Britain, and in the beginning was nothing more. The British succeeded in forcing the French traders out of India, and as India was at the time in political upheaval, over the next century and a half the British steadily gained political and then military power over the country until it reached its zenith in 1857. While there are many different factors that led to this gradual shifting of power in India to the British, "the cause to which this success is most commonly attributed is superiority of arms and military science". (Smith 1958: 446-447)

During this period, the Indian chiefs, unlike their ancestors, started "to pay European military science the compliment of imitation". (Smith 1958: 447) The Indian chiefs and princes began paying attention to the reasons why an army one-tenth the size of theirs could easily beat them, and by the time the British were firmly established in India "princes knew much of western cannons and western discipline". (Smith 1958: 581). The first Indian prince to fully organize and train his troops in a European manner was Mir Kasim around the year 1760, and many others soon followed his lead. (Spear 1961: 229)

Within India, the two greatest forces opposing complete British rule were the Marathas and the Sikhs.

The Maratha army had taken some ideas from European warfare and incorporated it into their army; however their army was still much more characteristic of the old Indian style of organization than that of the Sikhs. Even so, Warren Hastings, the first Governor-General of India, is quoted as having said:

> I lay it down as a point incontrovertible that if a detachment of much less than 1,000 Europeans, with arms for disciplining a body of native troops in the European manner, shall have once obtained a footing in the Maratha country, or the allies of the Government, all the native powers of Indoostan United will lie at their mercy, and even the provinces of Bengal be exposed to their depredations. (Gardner 1971: 111)

The Maratha, who are "often conceived as a Hindu reaction against the encroaching Muslim power" (Smith 1958: 492), mastered armies that consisted of both a stationary component and a mobile component. The stationary part of the Maratha army consisted of hill forts within their territory. During the peak of the Maratha Empire, about 240 of these small defenses dotted the Indian landscape, and are called "the core of the Maratha defense". (Smith 1958: 494) Each fort could garrison around 500 men, although

not every fort was fully manned at all times. The forts least likely to see any action usually only had a handful of full-time residents and were often used to store various commodities. (Smith 1958: 494)

The mobile section of the Maratha army consisted of cavalry, infantry, and 'freebooters', who would simply follow along with expeditions in hopes of somehow benefiting from a victory. The cavalry, or *bargiri*, and infantry that were paid by the state were the most important and dependable section of the army, and each soldier was graded and ranked according to ability in a Western fashion. There were also *silahdar* cavalry in the Maratha armies, who provided their own horse and arms. (Smith 1958: 494)

The power of the Maratha Empire was at its height in 1758. During that year, two Maratha chiefs were slaughtered by Afghan chiefs, and in retaliation the Marathas attacked. The army had adopted some European practices, such as relying heavily on artillery, and even had a French-trained general Ibrahim Khan to command the division. However, they still retained some aspects of Indian traditions that weakened their forces. For example, the Mogul ruler Sivaji had forbidden women from being brought along with an army, however the Marathas ignored this step towards improved discipline, and the generals of the army even brought their wives and children along to the battles. (Rawlinson 1952: 394)

While the Maratha were able to quickly take Delhi, the Afghan army would not be beaten so easily. After allowing the Afghans to back them into the small town of Panipat, the Marathas mounted their guns and waited for the attack. The attack never came, the Marathas ran out of food, and when forced to leave their defenses and attack the Afghans, they "advanced with that impetuosity by which they were accustomed to

carry all before them". (Murray 1981: 266) While the few adaptations to European practices made the Maratha army a more formidable force, they were still brutally defeated by the Afghans and later on by the British as well.

The Sikh warriors of the Panjab, however, made more use of European fighting tactics and techniques. Around the early 1830s, the size of the army directly controlled by their government was around 75,000 men, and over half of these troops were regular. The army "was organized on the European plan, and indeed included many Europeans in its officer cadre". (Smith 1958: 614) For example, their cavalry was organized by the French general Allard, and the artillery, hailed as the glory of the army, was first organized by the French General Court and Colonel Gardner. (Smith 1958: 614)

The Sikh army, in order to repel the advancing British rule, attacked the British in 1845. The fighting continued for 3 months, after which the British were finally victorious and "the military lessons of the war were the fighting value of the Sikh soldier... and the old Napoleonic lesson of the importance of artillery". (Smith 1958: 617) The Sikh army had fought so well that after the battle, the Britons had admitted that the Sikh army was at least as good as theirs, and possibly even better.

While the Maratha and Sikh armies had borrowed some ideas and methods from the European style of fighting, they were still no match for the British forces. One major cause for this was the difference in European and Indian officers.

No matter the skill or discipline of any individual fighter, it is the abilities of the officers in any given army that really determine the outcome of a battle. In October 1746, the French governor of Pondicherry Joseph Dulieix captured the city of Madras from the British, however then balked on an agreement with the *nawab* of the Carnatic, and so

they attacked. The Indian army consisted of 10,000 poorly trained soldiers, and was defeated in battle with the French by 700 Indians led by 200 Europeans. This battle "was a portent of the swiftly changing balance of power between armies commanded by Europeans and those led by Indians". (Wolpert 1965: 73)

The European officers had had better training and treated their job professionally as opposed to Indian officers. This discipline, in line with superior weapons, made the British armies almost unstoppable by the disorganized Indians. The Portuguese, over a century earlier, had landed on India and were able to retain a portion of the land for themselves with a very small number of troops simply because of this discipline and loyalty.

This new importance of leaders in the armies led to another characteristic of British and Indian armies during the 18th and 19th century, and this was the reduced size of the armies. With better leaders, a European contingent with only a couple hundred men could easily rout an Indian army that was over ten times as large, as was the case with Dulieix at Madras with a French army that consisted of 18,000 natives and only 400 Europeans. (Murray 1981: 287) Also, in Bengal, during the time of British expansion the local government was falling apart and the British general Clive was able to conquer the capital city and retain control of the country with only 3,000 soldiers, a vast majority of whom were Indian. (Wolpert 1965: 76) Indeed, by 1857, one year before the Mutiny only one out of every six soldiers in British India's army was European, and in the largest of the three presidential armies, that of Bengal, the ratio was closer to one out of every seven. (Wolpert 1965: 94)

The British were able to maintain such unbalanced armies because "what the British lacked in men they made up in financial resources, which enabled them to replace losses with equanimity and to attract and maintain Indian auxiliaries with regularity". (Smith 1958: 449) Also, the Hindus saw the British as better people to fight for than the Muslims, and the Muslims felt likewise regarding the Hindus, which made it easier for the British to recruit Indian fighters.

Aside from religious intolerance, which played the greatest role in allowing the British to conquer India, the organization of the British-Indian armies allowed for the British to suppress any people that did rise against them. Many small changes were introduced into the armies, but together they produced a force that was almost unstoppable.

One change that the British made to organized troops was to introduce *batta*, or military allowances, which paid troops for any services that they did above and beyond their specified task. The practice was first started at Madras during the British-French wars, and then continued as a good way to get troops to want to serve more. (Smith 1958: 478)

Second, the British separated the civil and military services of the government, which had previously been one large unit. The new British civil service even had sub-divisions below that, and this is considered a "contribution of value to India" (Bashim 1975: 356) because it made administration simpler and increased loyalty in the armed forces because the soldiers now belonged to a more unified group. (Bashim 1975: 356)

The British quickly realized that one of the major problems plaguing Indian troops was a lack of discipline and loyalty. Before Indian armies really began to imitate

Western tactics, the Indian troops (although having advanced much since the Hindu and Buddhist Era) were usually no more than mercenaries who either followed a certain chief for steady employment or would fight for whoever promised the most rewarding pay. Often, "such people were apt to think more of their horses than their masters". (Spear 1961: 191) This led to poorly organized armies in which loyalty and discipline were strictly personal. Sometimes, Indian chiefs would even have to march troops to simply collect enough money to pay for having that army. Also, often "before a general could plan a battle he had first to forestall a mutiny". (Smith 1958: 449)

In order to remedy this, men were instructed in groups, uniforms were issued, each man received regular pay, and troops were moved in concert to bolster confidence. These acts created a more unified army that then had a greater effectiveness in battle and was more loyal, disciplined, and confident. (Spear 1961: 191)

The artillery of the British armies had become just as important as the cavalry, and was regarded by some to be more important. Artillery operations during battle were organized into volleys, which not only demoralized the opponents but also made it more difficult for the enemy to discern how much artillery the British armies had. Also, techniques of loading and firing muskets and field artillery were also improved so that once a battle began, the musketeers and field artillery could get at least two volleys off into the enemy's charging cavalry before the cavalry reached their infantry. This "removed the terror of the cavalry charge". (Spear 1961: 192) Also, "few bodies of cavalry could withstand two volleys before closing", which added to the effectiveness of this technique. (Spear 1961: 192) The combined factors of improved artillery and quicker

and organized firings made the trained cavalry of the Afghans, Sikhs, and Marathas much less effective.

The importance placed on artillery, however, also brought restrictions. Rain and other moisture would dampen the gunpowder used to fire the artillery, rendering them useless until they dried out. So, weather became much more of a factor during battle than it had ever been before. (Spear 1961: 192)

Lastly, the greatest change to the infantry was the use of bayonets. These devices allowed for one soldier to act as two had before; from a distance a soldier was a musketeer, but up close they could fight as a pikeman as well.

Bayonets increased the utility of the infantry of the British armies greatly, and combined with the improved artillery, amplified discipline and loyalty, and greater organization of the armies, the British armies proved to be superior to traditional Indian armies.

British Imperial Age

On May 10, 1857, in the military cantonment of Meerat north of Delhi, thousands of Indian troops were forced to watch approximately 60 of their fellow soldiers be marched to jail for refusing to use a new type of rifle issued to the British army in India. These soldiers had refused to use new breech-loading Enfield rifles because a rumor had quickly spread that the grease used on the cartridges was a derivative of both cow and pig fat, which violated religious taboos of the Hindus and Muslims. (Wolpert 1965: 95) The revolt that promptly ensued marked the beginning of the Mutiny, which was a pivotal turning point in not only the British administration of India, but also the organization of the British armed forces in India as well.

After the revolt was subdued a year later and British control was regained, the British Parliament, led by the direction of Queen Victoria, put forth a set of decrees and modifications to British Indian organization that would end up dramatically changing the face of the unified army in India. As a result of these changes, "the entire policy of recruitment and the apportionment of military personnel was revamped". (Wolpert 1965: 103)

As the Crown had felt that the mutiny was a result of indifference and greed within the East India Company, the first radical change made was to disband the East India Company. This officially took place on November 1, 1858, and power transferred from "Company to Crown 'for divers weighty reasons'" (Wolpert 1965: 98) However, this also meant that the entire army of the Company was to be disbanded as well, which included about 13,000 Europeans that were then to lose their job. (Spear 1961: 278)

Provisions for a new British-Indian army had been made, and these displaced men were then offered the option of either being discharged from the army and signing up with the new unified army or they could simply go home. However, upon signing with the new army, these men would then be employed under a different contract, and they very wary because their old agreement held that they would only have to fight within India and its territories. In the end, about two-thirds of the men returned to Britain, and a quarter of those men ended up re-enlisting in India. (Gardner 1971: 295)

The Enfield rifle incident had most deeply offended soldiers who were Hindu Brahmans and other intensely religious individuals of the Indian armies. In the Bengal army, for example, there was a much larger percentage of Brahmans than in any other

Indian army, and after the mutiny this army suffered the most severe losses; only 8,000 men had not been killed or scattered of the original 128,000. (Smith 1958: 679)

As a result, after 1858 practically neither Brahmans nor Indians of any caste or religion in Bengal or the united provinces were considered to be "suitable for military service". (Wolpert 1965: 103) Instead, men were recruited from the 'martial races' in Nepal, Panjab, and Rajputana, who had served the British much more faithfully during the Mutiny. In time, "Sikhs, Gurkhas, Jats, Rajputs, and Pathans became the backbone of the 'native army'". (Wolpert 1965: 103-104) It also became the general policy of the British-Indian armies to spread these different races out within the army so that there would not be large masses of individuals from the same sect of India in the same division.

Another significant change made to the British armies directly following the Mutiny was that the ratio of the number of Indian soldiers to the number of British soldiers was limited to a 3:1 maximum, and in most instances the ratio was even less than that. For example, the army of the East India Company in 1857 consisted of 238,000 Indians and 45,000 Europeans and in 1863 the British army consisted of 140,000 Indians and 65,000 Europeans, a ratio slightly greater than 2:1. (Spear 1961: 278) This was due in part because of John Lawrence, who was granted the position of viceroy after the Mutiny. After assessing the situation, he estimated that from that point on, Britain could not securely hold India without at least 40,000 regular British troops. (Wolpert 1965: 104)

Also, any two Indian battalions were usually complimented with a European battalion so that no sizable force of armed native Indians was without any European guidance. (Smith 1958: 680)

Immediately after order was restored in India, the British also disbanded all Indian artillery contingents as they had "proved so formidable in the hands of the mutineers". (Smith 1958: 679) Thereafter, command of the artillery and other 'scientific branches' of the military was held only by Europeans.

After The Mutiny, there was a much closer relationship between British officers and the soldiers under their command. This was primarily because the British had learned how costly such indifference could be, and has "developed into a very high *esprit de corps* which has been carried over into both the new Indian and Pakistani armies. (Spear 1961: 278) Lastly, although the aim of the British was to create a more unified army, they chose to keep the 'unified' army divided up into three presidency armies. This was because this division had created unique attributes of each army, and in the end had diverted the uprising from reaching the southern regions of India. However, in 1895, even this was overruled and the three forces combined to create the unified Indian army under a single commander-in-chief.

Arms of South Asia

Bladed Weapons

In India bladed weapons played an important role in military operations. They were, and still can be vital in hand-to-hand combat. There are many different types of bladed weapons in India including swords, daggers and knives, and others such as the tiger claw.

Writers of early epics stressed the importance of the sword, which was regarded as an instrument of power (Wilkinson 1978: 186). According to one legend, the first sword was created by the god Brahma. A sacrificial fire was lit by Brahma from which a creature emerged that was so bad that it scared the whole world. The creature then changed form into a sword (Wilkinson 1978: 186). The importance of bladed weapons can be seen in the many different types that can be found in India, a few of which are described below.

Early swords

Art and literature are often useful tools that can be used to place certain weapons in certain time periods. They can be particularly important for early periods from which the artifacts themselves rarely survive. By observing paintings and sculptures in Indian culture, we can trace the early evolution of the sword in India.

Two of the earliest sculptural representations of swords in Northern India, dating to about the first century B.C., show a form of sword seen in India through later times, resembling straight-bladed swords of Roman influence. The blades are not intact, but the hilts are; they consist of a broad circular platform pommel with a thick octagonal ring that serves as the guard (Rawson 1968: 1). A sculpture from 100 AD also shows a

straight-bladed sword (Wilkinson 1978: 187).

Later on, after the third century AD, curved types also appear. A fourth-century AD sculpture from Gupta has a sword with a leaf-shaped blade (Pant 1980: 22). Swords can be seen in a seventh-century sculpture from Mahabalipuram. They include swords with a spoon-shaped blade, a straight blade, a deeply re-curved blade, and a broad, leaf-shaped blade with no waist. A ninth-century AD sculpture from Borobudur depicts some curved-bladed swords (Pant 1980: 23). From Rajasthan in the tenth century is a sculpture with two types of swords; one is a long sword with a *khanda*-type blade, the other is an ancestor of the *sosun-pata* type with a concave blade that re-curves a bit near the tip. Orissan sculptures from the eleventh and twelfth centuries show the South Indian flamboyant-type swords (Pant 1980: 24). (Flamboyant swords have an exaggerated curved blade that widens almost to a point near the tip and then tapers to a point.) Hoyasala sculptures between the eleventh and thirteenth centuries AD depict three types of swords: short, straight, parallel-bladed swords with abrupt tips, a forward-angled bladed sword and a double re-curved bladed sword (Pant 1980: 24-5). As you can see, the evolution of the sword in India went from a typical straight bladed sword, to the curved swords typical of India in more recent times.

Stages of the evolution of the *khanda*, a specific form seen later in the classical age of the Indian sword, can be seen. Sculptures from Rani Gumpha reveal khanda-like straight bladed swords. Second and third century AD sculptures from Amaravati and Nagarjunakonda show straight-bladed, narrow swords with both single and double-edged blades (Pant 1980: 21). A sculpture from Chalukyan in the sixth century AD shows a *khanda*-type double-edged, parallel-bladed sword (Pant 1980: 23). Hoyasala sculptures

between the eleventh and thirteenth centuries AD depict a final form of the *khanda* (Pant 1980: 24-5).

"Classical" swords

From the seventeenth to the nineteenth century, a great number of swords have survived in various collections, giving us a much more detailed picture of swords of this period, which we will here call the classical age of the sword in India.

Naming of the bladed weapons in this period can be difficult. Often the same weapon will be called by a different name in different regions (Wilkinson 1978: 188). "Few authorities, ancient or modern, seem to be able to agree upon the correct designation for many Indian edged weapons." (Wilkinson 1978: 188).

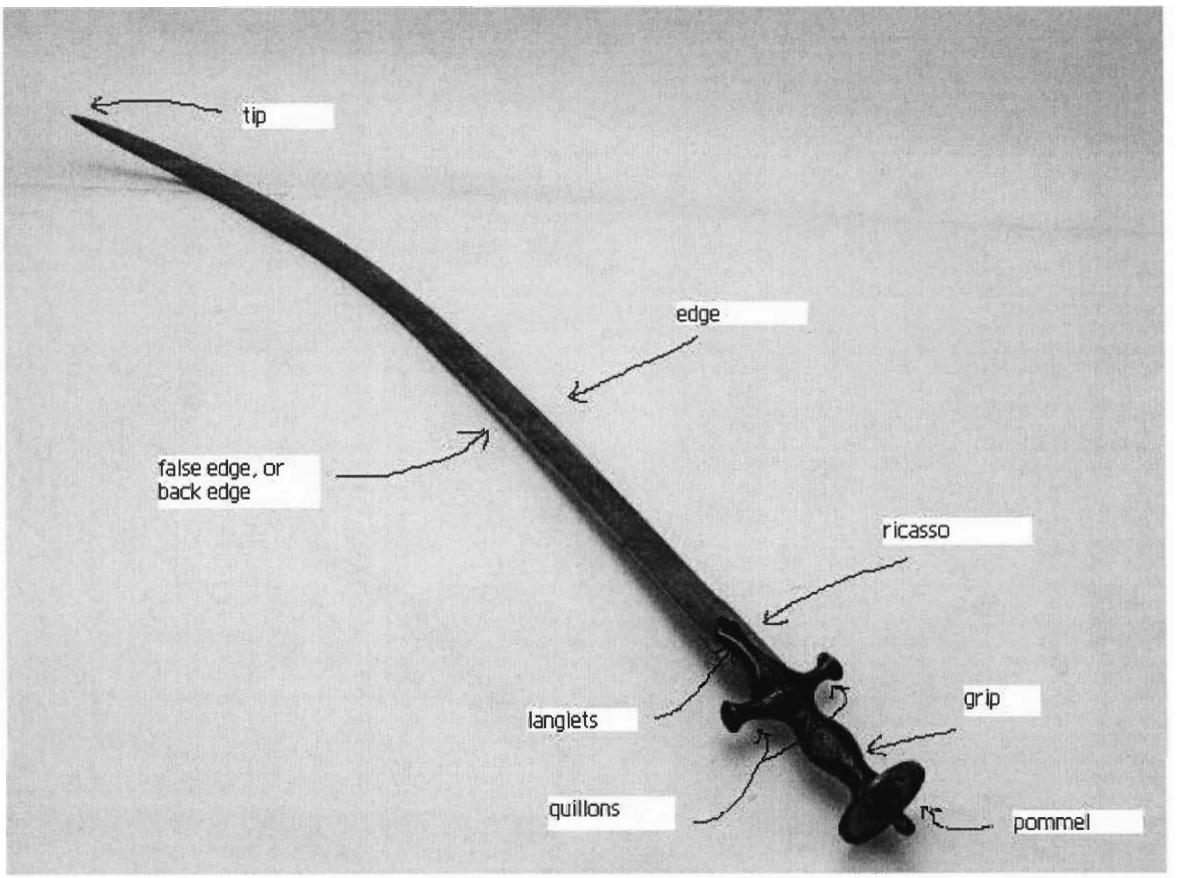
The ideal Indian sword was "fifty fingers long" with a blade that is the "colour of a cuckoo's neck" and makes a good ringing sound when hit. A sword was special if there were recognizable natural shapes in the texture of the metal surface of the blade. Swords were mostly carried in scabbards (Wilkinson 1978: 187).

Parts of a sword

Swords are made up of a hilt and a blade. The hilt may consist of a grip, pommel, knuckle guard, quillons, and langlets. The grip is where you hold the sword. The pommel can be a circular disc or knob shape at the end of the grip (Pant 1980: 30). The quillons are the two arms of the cross guard on the sword. If a hilt has a knuckle guard, it will extend from a quillon to the pommel. The langlets extend toward the tip, running parallel on either side of the blade; they hold the sword firmly in place in the sheath (Pant 1980: 31).

The blade may consist of a tang, ricasso, edge, false edge, back, grooves and a

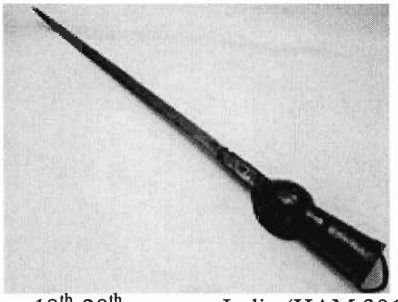
point. The tang is the uppermost part of the blade that is secured into the hilt. The ricasso is just below the tang, and is dull to protect fingers from slipping and being cut (Pant 1980: 31). The edge is the sharp part of the blade that runs the length of the blade. The false edge is the sharpened back edge of a single-edged blade, extending from the tip a short way down the blade. The back is thicker than and opposite the edge. Grooves can run down the blade to lighten the blade without losing rigidity. The point is the sharp tip of the blade (Pant 1980: 32). The picture below depicts a *talwar*, with the parts labeled. Note that the tang and the grooves are not labeled, as the tang is contained in the hilt and there are no grooves (they would be running down the blade).



Types of bladed weapons

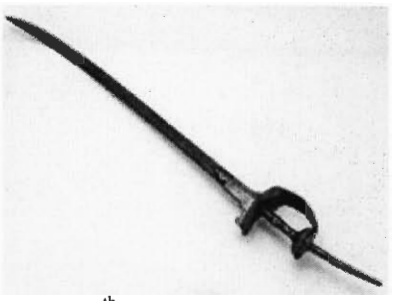
Swords

Some straight-bladed Indian swords are the *pata*, *firangi*, *khanda*, and the *dao*. The *pata* has a long blade. Its hilt is a sturdy half-gauntlet with a long cuff. Decorated arms extend forward, forming the "knuckle" of the gauntlet, which was padded inside. The *pata* was primarily used for cutting, as the grip was perpendicular to the blade, which extends outward from the arm (Wilkinson 1978: 191). Imagine making a fist; the blade would extend forward, perpendicular to your knuckles.



Pata. 19th-20th century, India (HAM 3063)

The *firangi* or "foreigner" has a European blade; if it is fitted with an Indian-made blade it is called a *sukhela.* The *firangi* has a narrow blade with a strong back and a thin rib (Wilkinson 1978: 191-2). The hilt is a "Hindu basket" type hilt. This type of hilt has a tubular grip, domed disc pommel, and two wide cusped plates that serve as guards. The front plate is angled and is attached to the pommel to form a 'basket' for the hand. A decorative spike on the pommel could be used as a second grip, and the inside of the basket is padded. Two metal langlets extend from the basket (Wilkinson 1978: 192). Sometimes a rapier blade can be found on a *firangi* (Pant 1980: 42).



Firangi. 18th century, India (HAM 2057

The *khanda* is one of the oldest, most common Indian swords (Pant 1980: 49). It probably originated in the Deccan region around the eleventh to thirteenth century. The *khanda* also has a Hindu basket hilt and is similar to the *firangi* except for the blade, which is broader. The blade widens at the tip, with fretted ribs along most of the back edge and a shorter fretted rib running along the front. The blade was made better than the *firangi* blade as it is thinner and lighter, while still being rigid (Wilkinson 1978: 192).

Khanda. 19th-20th century, India (HAM 1513)

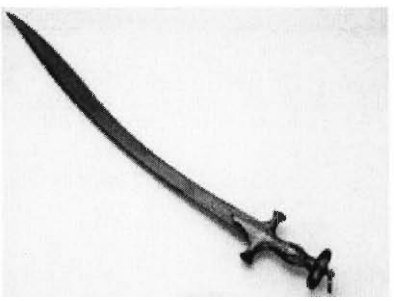
Both the *khandas* and the *firangis* were of decent length and could be carried in the hand as a walking stick. If they had a sheath it was decorated with a covering of fabric. Some sheaths had a smaller integrated sheath for a knife (Wilkinson 1978: 192).

The *dao* is from Assam and has a flared end. The hilt is guard-less with a plain tubular grip. The typical sheath is a board with a slight lip around the edge with a cross binding to hold the blade in place (Wilkinson 1978: 198). The *dao* is found in East India; it is the national sword of many of the tribes found there (Pant 1980: 39).

There is another straight-bladed sword that is nameless. This sword comes from

Madras with a Chinese-style hilt; the pommel is a pointed pinnacle (Wilkinson 1978: 193).

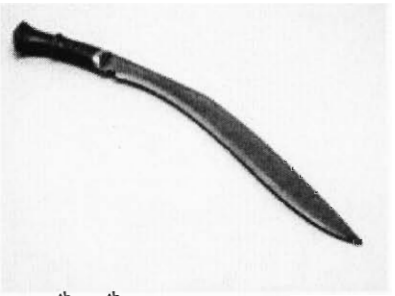
Flamboyant or re-curved bladed swords (blades might have forked tips and have a blade that has a greatly exaggerated curve) are the most common sword in South India. The blade flares out toward the hilt, which is a deep v-shape guard plate with a large, decorated pommel (Wilkinson 1978: 193). The *sosun pata, kukri*, and *ayda katti* are re-curved bladed weapons. The Rajput *sosun pata* has a sharpened inner edge, a Hindu basket type hilt, and a rib on the back edge of blade that adds strength (Wilkinson 1978: 192). The *sosun pata* means "lily leaf" (Pant 1980: 80) and there are three types that can be found: the Deccan type, the Mughal type, and the Maratha type. An example of the Deccan type from the seventeenth century has a double-edged, re-curved blade with no reinforcement and a simple hilt with a basically non-existent guard. The Mughal and the Maratha blades are similar. The Mughal type has a re-curved blade with a hilt that consists of guards, a waisted grip, saucer-type pommel, and a flat knuckle guard. The Maratha type has a Hindu basket hilt and a blade that is made of watered steel with a reinforced back edge that is also re-curved (Pant 1980: 81).



Sosun pata. 1867-68, Hyderabad (HAM 2411.1)

The *kukri* is smaller than the *sosun pata* and is from Nepal. The inside curve of the blade is sharpened. The weapon has a simple hilt made of wood, horn or ivory. Just below the hilt is small circular cut-out of the blade with a smaller pillar standing up in the

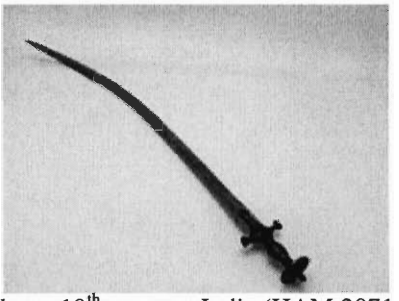
center. The *kukri* was carried in a sheath with two smaller knives (Wilkinson 1978: 193).



Kukri. 19th-20th century, Nepal (HAM 3481)

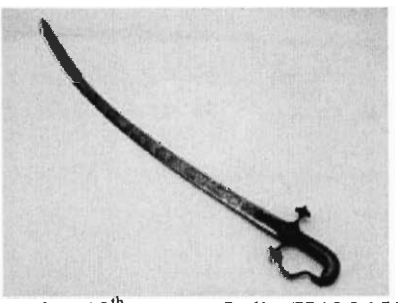
The *ayda katti* is larger than the *kukri.* The blade is semi-oval, about a half a meter long, with rounded tapering between the hilt and the tip, and a straight rounded edge (Wilkinson 1978: 194).

Curved swords are in abundance in India. There are many different types including the *talwar*, *shamshir*, *killij*, *kora*, *ram dao*, *kastane*, *piha khetta*, *dha, and Tegha*. The *talwar* is the characteristic Indian sword. The name can be used to describe a variety of swords. The common *talwar* hilt was metal with a disc pommel that has a slightly upturned rim and a short centered dome. The grip is curved, larger in the middle and shorter on the ends. There are two short quillons, with langlets. Some hilts had knuckle guards (Wilkinson 1978: 188). The blades on *talwars* can vary in size and amount of curvature. The blades are broader than *shamshir* blades with less of a curve (Pant 1980: 83). The most prized blade was of Persian origin and called the "Ladder of the Prophet" or "forty steps", which had chevron-shaped stripes running down the blade. The second-best blade was also from Persia and is called the *bidr* or *qum* (Wilkinson 1978: 188-9). This blade has a grapevine meandering up the entire length of the blade (Rawson 1968: 19). The *talwar* was often carried in a sheath made of wood and covered in fabric with a metal tip (Wilkinson 1978: 189).



Talwar. 19th century, India (HAM 2071.1)

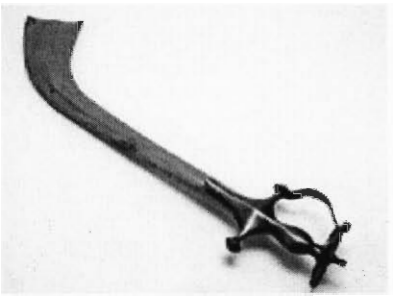
The *shamshir* is of Persian origin, where is first appeared in literature around 1306 AD. It was established in India around the sixteenth century AD (Pant 1980: 72). The *shamshir* is strongly curved, with a blade that is heavier than that of the *talwar.* The hilt is tubular with an inverted L-shape, with the curl of the L forming the pommel. The quillons are formed out of a diamond shaped plate, which also forms the langlets. Usually, the grip is ivory or bone and the blade is single edged with a wedge-shaped part (Wilkinson 1978: 190). *The killij* is similar to the *shamshir,* but with a broader blade that widens near the tip and terminates into a cusp. Some of the blades on the shamshir and killij are so curved that the sheath has a slot cut with a metal strip that springs into place after the blade is drawn.



Shamshir. 18th century, India (HAM 1551)

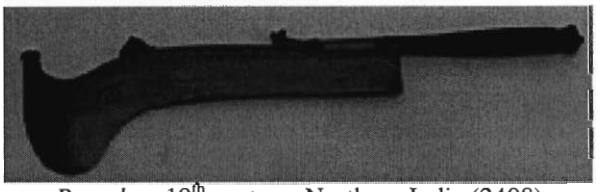
The *kora* is slightly curved and widens abruptly at the tip which is rounded with a point. The hilt has flat discs at the end of the tubular grip. To accommodate the widened tip, the kora was carried in a broad sheath (Wilkinson 1978: 194). It can be found in North India where it is the battle saber of the Gurkhas. The blade is single-edged, heavy

and wide at the end, and it is not very sharp (Pant 1980: 54).



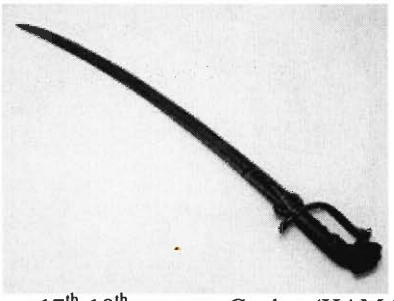
Kora. 19th century, perhaps Nepal (HAM 304.a)

The *ram dao* was used for animal sacrifice. The blade is similar to that of the *kora;* some curves are almost hook-like. The hilt is an extension of the back edge of the blade. Most *ram dao's* have an engraved eye near the tip of the blade (Wilkinson 1978: 194). The *ram dao* can be found in north and north-east India (Pant 1980: 67). The blade is also broad and heavy with an axe-like projection (Pant 1980: 69).



Ram dao. 19th century, Northern India (2408)

Both the *kastane* and the *piha khetta* come from Sri Lanka. The *kastane* is short with a slightly curved blade. The blades originate from the Dutch. The hilt has a molded or carved dragonhead pommel, a pommel guard that sweeps up, two short quillons, and langlets (Wilkinson 1978: 198). The *kastane* was also used in South India (Pant 1980: 111). The *piha khetta* is single edged with a sloping tip. The blades appear droopy with a slight curve to the cutting edge. Most of the blade is decorated with gold or silver sheeting. The hilt is made of bone and the sword is carried in a sheath (Wilkinson 1978: 198).



Kastane. 17th-18th century, Ceylon (HAM 2393)

The *piha khetta* is single edged with a sloping tip. The blades appear droopy with a slight curve to the cutting edge. Most of the blade is decorated with gold or silver sheeting. The hilt is made of bone and the sword is carried in a sheath (Wilkinson 1978: 198).

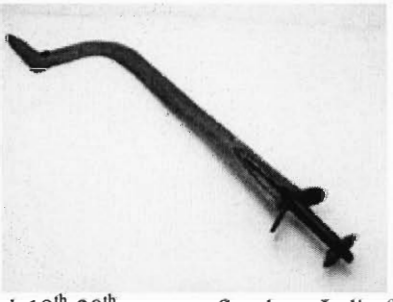
The *dha* is from Burma (Wilkinson 1978: 198), and can found in India (Pant 1980: 40). It has a slightly curved, single-edged blade that usually tapers to a point. It can be anywhere from a few inches to a full sword length and is similar to the Japanese sword. The hilt has no guard, with a tubular grip. The *dha* is carried in a wood sheath wrapped in silver sheeting, which is hung around the shoulder (Wilkinson 1978: 198).

The *tegha* is another Indian saber. It consists of a broad, curved blade. The hilt is similar to that of a *talwar.* A *tegha* may sometimes be confused by a *talwar.* The distinguishing features are the blades of the two weapons. The *tegha* has a broad blade, whereas the blade of a *talwar* is narrow. If there are hunting scenes on the blade, the sword is called a *tegha shikargaha,* and was used for hunting (Pant 1980: 84)

Tegha. 19th century, India (HAM 2072)

There is also another group of swords that are classified as the Nayar (or Nair) Temple Swords. These swords resemble forms of early fighting swords, with the exception that they are of a lesser construction. These swords are found in South India, where they were kept in Temples. These swords were flexible, and some had jingles which would sound as the swords were shaken during a ceremonial precession. They were used in ceremonies of the Nayar, which was a caste name of the Tamilnadu (Pant 1980: 57). The Nayar caste, were "gentlemen of birth" and could be servants to the king (Pant 1980: 58).

There are six ways to classify the Temple Swords. The first type has a flamboyant style, single-edged blade. The blade is usually broadest at the root, near the hilt, narrowest at the waist, and has a widened belly near the tip. The blade is forward curved, with a flattened back edge, that doesn't run the full length of the blade. The next type has a double-edged sickle-shaped blade. The blade is straight with a sickle shaped section at the end of the blade. The third type has a double-edged L-shaped blade that straightens at the tip (Pant 1980: 58).



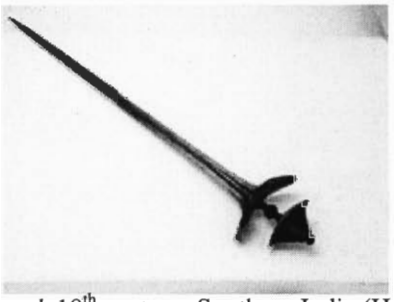
Temple sword. 19th-20th century, Southern India (HAM 1495)

Another type has a crescent shaped blade. It is double edged with a flat blade. The upper and lower portions of the blade are curved in such a way that the blade looks like a sickle (Pant 1980: 58).

The fifth type has a spear head shaped blade. This blade is double edged and

rigid. The blade is straight, with the edges running parallel, up to near the tip. The tip is shaped like a spear head, thus giving it this classification (Pant 1980: 58).

The final type is known as the Madrasi straight sword. This sword has a long, rigid, double-edged blade that is straight and tapers to a point. The edges of the blade are sometimes wavy. The hilt has curved quillons, and a broad, flat pommel (Pant 1980: 58).



Temple sword. 18th century, Southern India (HAM 2421)

Daggers and Knives

Daggers and knives are also found throughout India. Examples of some are the Khyber knife, *pichingatti*, *jambiya, khanjar, khanjarli, jamadhar* (also called *katar*), scissors *katar, bichwa, chilanum, kard,* and *pesh-kabz.*

The Khyber knife has a long, tapering blade and a plain, short hilt (Wilkinson 1978: 193). It is also known as the "Afghan knife" and the name Khyber comes from the Khyber Pass. The blade is also heavy and single-edged and the hilt is made of bone, ivory or wood (Pant 1980: 149).

Khyber knife. 19th century, Afghanistan (HAM 3280)

The *pichingatti* is found in South India (Pant 1980: 188). *Pinchingatti* means "broad knife". This style has a wide blade with a little cusp on the back edge near the tip. The sheath is made of wood with metal decoration. The *pinchingatti* is more a tool than a weapon and can have useful trinkets attached to it by a chain (Wilkinson 1978: 194).

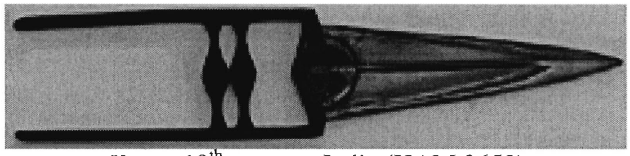
The *jambiya* is found in India, but is of Arab origin (Pant 1980: 158-9). The *jambiya* is widely used in India and has many regional variations. It has a slightly curved blade with a narrow central rib with patches of *koftgari* (silver decoration). Often it is carried in a metal sheath. There are two types of hilts found on *jambiyas,* the all-metal hilt with a waisted grip and the more common pistol-butt type hilt similar to that of the *shamshir.* The hilts can be made of jade or crystal (Wilkinson 1978: 198).

Jambiya. 19th century, India (HAM 3768.a)

The *khanjar* closely resembles the *jambiya,* but the blades are different. The *khanjar* blade has less of a curve, no central rib and curves toward the pistol-shaped pommel. The hilts are usually decorated and are made of ivory or jade. The *khanjar* is carried in a sheath decorated like the hilt (Wilkinson 1978: 194). Most often, the *khanjar* is highly decorated and the pommel will terminate with a carving on the end (Pant 1980: 175-6). The *khanjarli* has a fairly large, double curved blade with a large hilt that has a semicircular pommel (Wilkinson 1978: 196). It is a Hindu dagger with a thickened blade end and a small knuckle guard (Pant 1980: 179).

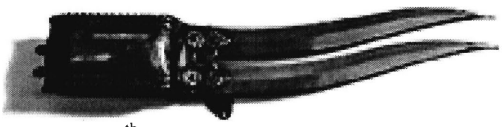
The *jamadhar,* or punch dagger, is held like the *pata,* as an extension of the arm (Wilkinson 1978: 198). Often the *jamadhar* is called the *katar.* The *jamadhar* is known as the "tooth of the God of Death" (Pant 1980: 163). The hilt consists of two parallel bars

running from the base of the blade and joins two other parallel bars which run perpendicular to the blade that are used to grip the weapon. The North Indian blade is wide at the hilt, tapering fast to the tip (which was thick for punching through mail). The South Indian blade is longer and straighter with a knuckle bow. The scissors *katar* has a hollow outer blade that divides down the center, which can be opened up by squeezing to holding bars to expose a third inner blade (Wilkinson 1978: 196).



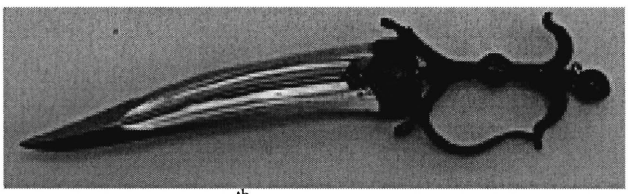
Katar. 19th century, India (HAM 3652)

The *bichwa* or 'scorpion sting' is a dagger with a re-curved blade attached to an oval shaped band that fits around the hand (Wilkinson 1978: 196). It is an Indian dagger with a double-edged blade (Pant 1980: 154). The *bichwa* is sometimes combined with the *bagh nak* (described later) to make a fierce weapon (Pant 1980: 155).



Bichwa. 19th century, Mahrattas (HAM 3149)

The *chilanum* is a dagger with a blade similar to the *bichwa* blade. It has a metal hilt with a narrow waisted grip that flares out at the top and bottom. Both the *chilanum* and the *bichwa* blades can be found to split into two prongs (Wilkinson 1978: 197).



Chilanum. 17th century, India (HAM 736)

The *kard* is of Persian origin and was introduced to India in the sixteenth century AD by the Mughals. It is fancy and decorated, used mainly by princesses; it is not too

durable (Pant 1980: 173). The *kard* is a knife with a T-section blade and tapers to a point. The blade is strong for piercing mail. The hilt is basic, made of jade or ivory and gets wider at the pommel. The knife sits deep in the scabbard and some hilts have a smaller knife hidden in them.

The *pesh-kabz* also comes from Persia and was introduced by the Mughals. The name means "fore grip" (Pant 1980: 173). It is a larger knife resembling the *kard.* The blade is different in that it tapers fast to a skinny tip, and the hilt is a little chunkier (Wilkinson 1978: 197).

Blunt Weapons

Blunt weapons are not in abundance in India. The list of blunt weapons is small, the most common being maces, and there appears to be very little information on the history of blunt weapons in India.

Blunt weapons in India include maces, clubs, and war-hammers. Most Indian maces had long shafts with hilts similar that of the *khanda,* of the Hindu basket form (Wilkinson 1972: 135). Most maces have a shaft which is used for gripping the weapon and a head that is the blunt (although sometimes sharp) end used for striking. Examples of maces are the *shashpar,* the *gurz,* and the *chob.* An example of an Indian club is the *kirri.*

The *shashpar* is a multiple-bladed Indian mace (Stone 1934: 553). One example of a *shashpar* is made of blue steel. It is a Mughal mace from South India from around the seventeenth century AD. It has a hollow, octagonal shaft and a head with six blades. The grip is faceted and ends in a flat knob that serves as a pommel (*Arms and Armor at Sandringham* 1910: 2). Another example of a *shashpar* comes from the Deccan region of

South India. It is a Mughal mace from the eighteenth century AD. This piece has a *talwar* type hilt with a knuckle guard. The shaft is also octagonal and the head has six serrated blades (*Arms and Armor at Sandringham* 1910: 11).

Shashpar. 17th century, India (HAM 1411)

The *gurz* is an Indian mace whose head can be flanged or pear-shaped (Stone 1934: 270). One example of a *gurz* is a piece showing Mughal influence from the eighteenth century in the Deccan region. The head of the mace has flutings that run vertically along the head. The shaft spirals and twists down to a heavy pommel (*Arms and Armor at Sandringham* 1910: 11). Another example has a double head, one after another. The hilt is of the Hindu basket type with a broad knuckle guard and a circular, flat pommel. A final example has a circular shaft and the same hilt design as the last example (*Arms and Armor at Sandringham* 1910: 39).

The *chob* is a ceremonial mace. One example of the *chob* has an eight-sided steel shaft with flutes. The mace curves like a hockey stick and the head is a big knob. The grip is covered in silver (*Arms and Armor at Sandringham* 1910: 19).

The *kirri* or *tyindugo* are called "knob-kerries". They are war-clubs that are made of iron and wood. Some *kirris* are made of rhinoceros horn (*Arms and Armor at Sandringham* 1910: 54).

In South India there is a strange straight club found. It is used by robbers and it has iron rings that project outward from the weapon (British Museum 1910: 51).

War-hammers are not found in abundance, but were used in India. The common name given to Indian war hammers is *zaghnal.* Two seventeenth-century examples of war-hammers both have a steel head of the "crow-bill" form. One has a wooden shaft covered in black velvet and a steel grip. The other has an octagonal-shaped, grooved pick opposite which is the hammer head. The shaft is plain wood (*Arms and Armor at Sandringham* 1910: 39).

Zaghnal. 18th-19th century, India (HAM 2413)

Staff Weapons

Staff weapons may be found in different forms throughout India. These weapons are not limited to but include lances, spears, javelins, pikes, and axes. Lances are used from horseback, to thrust into an opponent. Spears, javelins, and pikes can be thrown at an opponent or they may also be used in a thrusting manner. Axes are used primarily for cutting.

Some weapons in India are hard to place in their own category, so they will be included in a miscellaneous category. These weapons include secret weapons, boomerangs, and combination weapons.

Spears

The spear is a very common and very old weapon. In its simple form the spear consists of a wooden shaft with one end sharpened or with a sharp stone attached to it. It

is primarily used for thrusting (Tarassuk 1982: 445). Later more complex forms of the spear may be highly decorated and well fabricated.

Spear. 19th century, India (HAM 391)

Indian spears include the *bhala, barchi, patisthanyah,* and the *homyahla.* The *barchi* is a Mahratta (of North India) spear or a pike and is used primarily by foot-soldiers. The butt end is spiked and the square head is long and narrow without edges (Stone 1934: 94).

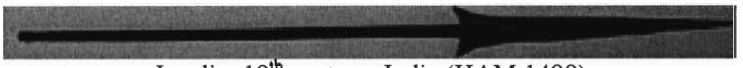
The *bhala* is also used by the Mahratta, but it is used by the horsemen. It is a spear with a grooved, sometimes forked blade (Stone 1934: 111). An example of a nineteenth-century central Indian *bhala* has a steel blade and butt, and a long shaft made of cane. The butt has two spherical projections with a long spike (*Arms and Armor at Sandringham* 1910: 6).

Both the *patisthanaya* and the *homyahla* are more for decoration than for combat. The *homyahla* is used for ornamental purposes by the people on the Nicobar Islands (Stone 1934: 296). One example of the *homyahla* is all steel with a rectangular shaft. The blade is long and heavy with a ridge down the center. The butt-end has a small spear head (*Arms and Armor at Sandringham* 1910: 39).

The *patisthanaya* is a processional spear. A Sinhalese example of a late-eighteenth, early-nineteenth century *patisthanaya* is pike shaped with flamboyant-style blades. There is also a pair of straight quillons directly below the blade. The shaft is teakwood (*Arms and Armor at Sandringham* 1910: 1).

Javelins

The *barchha* is an Indian javelin. Two examples that have been considered are both from North-East India. The first is from Assam where it is used by the Nagas hill tribe. It has an ovular, flat blade made of steel. The shaft is made of wood and short. The butt has a four-sided iron spike (*Arms and Armor at Sandringham* 1910: 9). The second example is from the nineteenth century. The blade and the butt are both made of steel. The blade is triangular and long, the butt consists of a point (*Arms and Armor at Sandringham* 1910: 30).



Javelin. 19th century, India (HAM 1490)

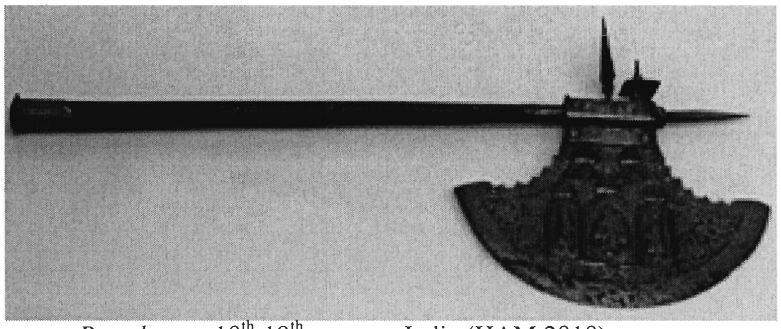
Lances

The *sang* and the *neza* are two examples of Indian lances. The *sang* is a Rajput lance made of entirely of iron. Sometimes there are iron straps on a wooden shaft for a few feet from the end. It was used in the desert for fighting from camels (Stone 1934: 538).

The *neza* is a lance with a long, narrow head. It comes from the Punjab (Stone 1934: 468). Lances were also fitted with metal weights to help keep weapons level during riding.

Axes

Indian axes vary in blade shape from a crescent to a L-shape (Wilkinson 1978: 197). The axe was a common Asian weapon until about the late nineteenth century (Wilkinson 1978: 145). Types of Indian axes include the *bhuj* the *tabar* and parade axes. The parade axes were used in ceremonies, and were not meant for combat. They are usually well decorated.



Parade axe. 18th-19th century, India (HAM 2818)

The *bhuj* is an Indian axe with a large blade. The blade is fitted in line with the shaft, and might have an elephant head where the blade meets the shaft. It is not uncommon for a *bhuj* to have a knife hidden in the handle (Wilkinson 1978: 197).

The *tabar* is a common Indian axe with a crescent-shaped blade. Some of the blade tips may be forked. The version from North-East India has a long, triangular blade on a long, wooden handle. This version is used by the Nagas hill people (Wilkinson 1978: 145).

Miscellaneous weapons

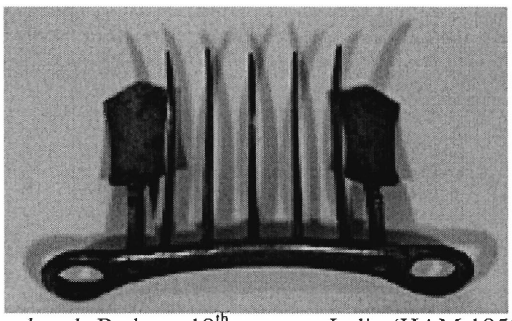
Boomerang

The *singa* is a South Indian boomerang. It is made of steel and is about eighteen to twenty inches long (Stone 1934: 565). One nineteenth-century example is made of steel with a sickle-shaped, flat blade. There is a heavy grip or knob at one end (*Arms and Armor at Sandringham* 1910: 7).

Secret Weapons

These bladed weapons are meant to be concealed. Examples include the *bagh nak, gupti,* and the fakir's crutch. The *bagh nak* or tiger claw is used for slashing. It consists of a metal bar with two rings, one at each end, to put fingers through. There are three or more sharp blades that curve down and extend from the metal bar; these are the 'claws'.

A closed hand hides the claws. Another form of the *bagh nak* has a dagger that extends from the end of the metal bar (Wilkinson 1978: 196).



Bagh nak. Perhaps 19th century, India (HAM 1953)

The *gupti* is found in North and Central India. It is a stiletto hidden in a sheath in such a way that it appeared to be a cane. Its name means "concealed weapon" (Pant 1980: 44).

Indian priests were not allowed to carry weapons. To carry a weapon without breaking the rules, priests used the *bairagi*, or fakir's crutch (a fakir is an Indian priest) (Wilkinson 1978: 197). It is a hollow, T shaped tube in the form of a hand holding a spike. It is built as a support and can be put under armpit when sitting. It could be used as a mace, and usually contained a dagger hidden in the handle (Wilkinson 1978: 197).

Combination weapons

Often weapons will be combined to form two or more functional weapons in one. So far I have come across a few examples. The fakir's crutch described above could be considered a combination weapon. A *bhuj* also described above could be considered a combination weapon.

A combination between a spear and a pistol comes from nineteenth-century North-West India. There is a revolver with a fixed bayonet mounted at the end of a long bamboo shaft. The leaf-shaped bayonet opens up when pressure is applied at the tip to

form a trident, also triggering the revolver to discharge (*Arms and Armor at Sandringham* 1910: 29).

Ranged Weapons

Ranged weapons are shot at opponents. The weapons themselves may be a projectile or they may fire a projectile. This section will consider the more primitive ranged weapons, such as bows and arrows. Ranged weapons that require gunpowder will be addressed in a separate section.

Archery was an important part of Indian warfare. Different types of bows may be found in India, but the most common is the composite bow (Wilkinson 1978: 143). This bow bends backwards when it is unstrung to make a C-shape (Wilkinson 1978: 14). It is possible that the composite bow that is found in India and Persia originated in Northern Central Asia where good elastic wood for making plain bows was not readily available (*Arms and Armor at Sandringham* 1910: 14). Some of these bows are made of steel, while most are made of wood. The wooden bows have a staff made up of wood, sinew and horn. The bows are quite springy due to their shape and materials. Arrowheads also come in a variety of forms.

A few types of Indian bows include the *kaman* and the *gulail*. The *kaman* is a composite bow made of wood, sinew and horn. Sometimes the *kaman* will be made of steel. Often the bow was decorated with various colors and lacquered. The bow was strung with *chilla,* which is twisted silk. When the bow is unstrung, the ends of the bow spring back, taking the forms shown below (*Arms and Armor at Sandringham* 1910: 14).

The two forms that an unstrung bow will take:

When unstrung, the Indian version of the *kaman* doesn't curve back as much as the Persian version (Stone 1934: 333). One example of a nineteenth-century Rajput *kaman* is made of blued steel that has a floral design and an ivory grip (*Arms and Armor at Sandringham* 1910: 5).

There are many different types of arrows used with the *kaman. Tir* is the name for an Indian arrow. The name is widely used to describe basically any arrow. The steel heads of *tirs* come in a variety of shapes (Stone 1934: 615). There are hunting tips that have a broad head, arrows for shooting birds that have small heads, and arrows that are used for war with solid small dagger-like tips (Wilkinson 1978: 143). The tangs of the tips go into the arrow-shaft, which is usually reed. The shafts are commonly painted and can be gilded elaborately. The arrows are usually flighted with feathers so that they fly straight. The notches of the arrows may be made of bone or ivory (Stone 1934: 615). One example of a Sikh *tir* from the nineteenth-century has a conical steel point, while another Sikh *tir* from the same time has leaf-shaped steel points (*Arms and Armor at Sandringham* 1910: 7-8).

Another missile that was fired from a bow was a 'bird bolt'. This was an arrow with a reed shaft that has a blunt wooden head. The bird bolt is flighted with two "wings" (*Arms and Armor at Sandringham* 1910: 37).

The arrows were carried in a *tarkash*. This is a Central or Northern Indian quiver that can be either cylindrical or elliptical in shape. The quiver is covered in cloth or

velvet which may or may not be embroidered (Stone 1934: 606). One Moghul *tarkash* from the eighteenth-century is cylindrical and made of wood with a painted silver cover (*Arms and Armor at Sandringham* 1910: 7).

The *gulail* is a pellet bow, most often made of bamboo. There is a double string that is held apart at one end with a pocket in the middle that holds the projectile. The projectile is usually a piece of baked clay, but it can be a pebble or some other small object. The weapon can be accurate if used by someone who is trained. As soon as the weapon is fired the bow must be moved to the left to avoid being struck in the thumb by the projectile (Stone 1934: 256).

There is another weapon found in India that may be considered a range weapon. It is called the *chakkar* and it is a throwing disc, or war quoit. It is used by the Sikhs, primarily the Alkali Sikhs. It is a flat ring varying in diameter from five to twelve inches. It is also found to be from a half to one and a half inches thick. Most often it is plain, but it may be elaborately decorated. The disc was carried on a pointed turban. It could be thrown with good accuracy and force, it can "cut off a green bamboo three-quarters of an inch in diameter at a distance of thirty yards" (Stone 1934: 171)

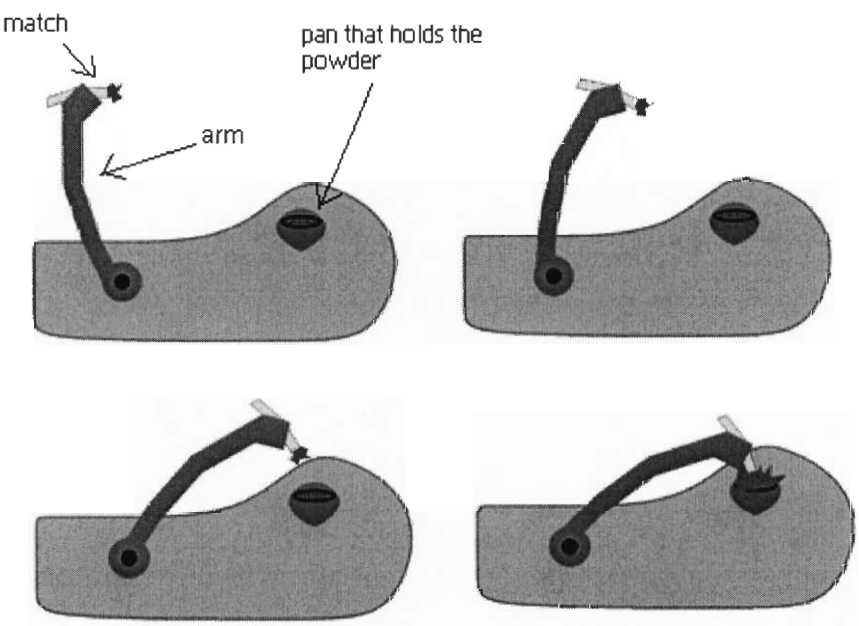
Gunpowder Weapons

The gunpowder weapons considered here consist of long arms and pistols. Long arms and pistols both fall into separate categories, depending on the mechanism by which the gun is fired.

Some important parts of the firing mechanisms are useful later on. All guns have a lock, a mechanism by which the gun fires (Stone 1934: 418). Both the matchlock and the flintlock have a flash-pan which requires a primer. The flash-pan is where the

gunpowder (priming) goes in the gun and the primer, or priming-flask, holds the gunpowder. A finer powder is required in the pan than in the charge (Stone 1934: 515). The pan is primed from the priming flask, and the powder in the pan is then covered. The lit match is put in the jaws of the cock and the trigger is pulled. The cock falls into the pan and the match sparks the priming. The cock then is sprung back into its original position (Muller 1980: 21).

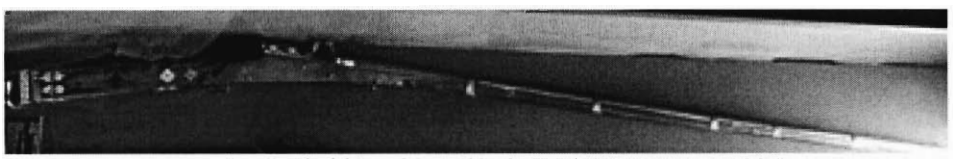
Matchlocks were the earliest guns. The matchlock consists of an s-shaped lever pivoted to the stock, with a fork-shaped upper end that holds the match (Stone 1934: 441). The match is a cord that burns slowly, and is used for lighting the powder in the pan of a matchlock (Muller 1980: 20) The firing happens when the lower end of the lever is squeezed, forcing the match into the flash-pan, igniting the priming (Stone 1934: 441).



When the trigger is pulled, the arm brings the lit matchcord into the powder in the pan; the powder ignites the main charge in the barrel to fire the bullet.
(In reality the matchcord is about six inches long)

Matchlocks were introduced into India around 1500 by Portuguese traders. The traders had matchlocks, and the Indian soon found ways to create these weapons (Blackmore 1965: 15). Matchlocks were still in use in some areas of India up until the twentieth century (Held 1957: 43).

Types of matchlocks found in India include the *toradar* and *toradar shikargah.* The *toradar* has two main types: from central India, and from Northern India. The Central India type is narrow with a straight stock that has five sides. The barrel is light, and the gun ranges from three to six feet long (Stone 1934: 623). The Northern Indian type has a curved stock with four sides. The barrel is heavy and larger at the breech (where the barrel meets the stock) and the gun ranges from five to six feet long (Stone 1934: 23).



Toradar. Probably 1700-1750, Central India (HAM 2085)

Two examples of a *toradar* are from the 18th century. They both have rosewood stocks. The first example has a smooth-bore steel barrel with a decorated surface and has five silver bands to secure the barrel to the stock. The second example has a smooth-bore watered steel barrel with ten straps of rawhide attaching the barrel to the stock (*Arms and Armor at Sandringham* 1910: 5).

The *toradar shikargah* is a hunting matchlock. A Mughal example from the 18th century has a barrel with fluting running along its length. The barrel is smooth-bore and of steel. There are animals chiseled into the trigger plates, and the stock is rosewood (*Arms and Armor at Sandringham* 1910: 15).

An example of a matchlock revolver is Rajput and is from the 18th or 19th century. The barrel is smooth-bore and steel, and the stock is rosewood. This gun has four chambers in order to dire four shots without reloading (*Arms and Armor at Sandringham* 1910: 20).

Matchlock weapons also require some equipment for reloading. A *kamar* is a belt that carries the necessary components needed. There may be multiple *tostan's*, or cartridge boxes, and a *barutdan*, a horn shaped powder flask (*Arms and Armor at Sandringham* 1910: 6).

The flintlock uses a flint rather than a match to ignite the charge. The flint is held in the lever that is cocked back. When the trigger is pulled, the lever is released and the flint strikes the hammer, spraying sparks in the priming powder in the flash-pan igniting the charge (Stone 1934: 233). The flintlock was invented in France around 1630 (Held 1957: 83). It likely found its way to India via traders soon after.

The *banduk*, *ek banduq,* and *banduq fauhardar* are both flintlocks. The *banduk* shoots "nut-like pellets" (Stone 1934: 92).

An example of the *banduq fauhardar* is Sind and from the 19th century. The rifled barrel is steel. It has a rosewood stock and a deeply curved butt of the Afghan type (*Arms and Armor at Sandringham* 1910: 22).

The *ek banduq* is a carbine. A carbine has a flintlock and is shorter and lighter than an infantry gun with a smaller bore; it is a horseman's gun (Stone 1934: 163). The *ek banduq* is loaded at the breech and has a rifled, steel barrel. An example is an eastern imitation of a western weapon built in a Raja's workshop in the nineteenth century (*Arms and Armor at Sandringham* 1910: 35).

A blunderbuss is a short gun with a large bore and a bell shaped mouth (Stone 1934: 121). The blunderbuss was often equipped with a bayonet that could fold back. Those found in India were relatively small and not used much in the military, instead for personal protection. The blunderbuss was developed by the Dutch around the sixteenth century and was used until about the mid-nineteenth century (Stone 1934: 122). An example of a blunderbuss is a *sher-bacha.*

The percussion lock was developed after the flintlock. It was first built in England about the year 1807 (Held 1957: 171). It is used for both muzzle and breech loading guns. There is a metal cap that is loaded with an explosive mix that is put on a hollow nipple. This mixture explodes when the hammer falls. This type has a better rate of fire than previous weapons (Stone 1934: 493). An example of a percussion lock is - called the *banduq* (*Arms and Armor at Sandringham* 1910: 31) A piece from Bengal around the nineteenth century and has a rosewood stock with a barrel of watered steel (*Arms and Armor at Sandringham* 1910: 38).

Decoration and Fabrication

Indian weapons offer good examples of high-quality decoration and fabrication (Karcheski 1994: 3). The main ingredient for making quality weapons was smelted iron. It was introduced to India around eleven-hundred BC from the Near East (Pant 1980: 89).

India has a large quantity of iron ore, estimated to be about ¼ of the worlds supply (Pant 1980: 89). Once iron production techniques were learned, India began producing some of the world's best steel.

Steel is an essential element to building any sort of bladed or barreled weapon. If crafted well it makes a very strong and sharp cutting edge.

There are two main types of steel shaped into all kinds of bladed weapons. These are pattern-welded steel and Damascus, or watered steel (Karcheski 1994: 3). Pattern-welded steel is made from a mix of metals. This technique involves hammering wires of iron and steel together and heating so that the metals may be folded and twisted together. This steel may be used in blades and barrels of guns (Karcheski 1994:3).

Damascus steel derives its name from the location in Syria of a renowned production center of fine weapons. The iron ore used in these weapons came from India, thus Indian steel is called Damascus steel (Pant 1980: 90).

Damascus steel is made in three ways. Going from lowest to highest quality they are imitation Damascus, welded Damascus, and oriental Damascus (Pant 1980: 91). Imitation Damascus steel is made by etching a pattern and pouring acid on the blade give a structured surface (Pant 1980: 96). This type may also be known as *koftgari* (Pant 1980: 239).

Early in the first century AD, welded Damascus made its way to India (Pant 1980: 96). It is made from a mixture of various quality steels (Pant 1980: 96).

Oriental Damascus was the finest steel available. The intrinsic patterns in the steel that come from this method look like a "pattern waved like a watered silk" (Pant 1980: 91). This look stands out as the best steel money could buy. It began being made in India around the thirteenth-century (Pant 1980: 91). The production process involves heating a mixture of metals to their melting point, cooling, melting, and then finally cooling the steel (Pant 1980: 92). Highly elastic and resilience are both qualities of this type (Karcheski 1994: 3).

Crafting actual weapons components from the steel was the job of steel-smiths. These men shaped and formed the steel into various types of blades, for axes, daggers, swords, etc. They were also made into the barrels of gunpowder weapons.

Swords have two main parts: the hilt and the blade. The may be made out of many types of materials including bone, horn, wood, ivory, or metals. The majority being made of cast metal (Pant 1980: 105). The other types of material would be carved to serve desired functions.

Crafting a sword or dagger involves attaching the hilt to the blade. The hollow portion of the hilt is thoroughly cleaned and a hot lac is poured into the hole. Lac comes from the *peepal* tree and sticks very hard to iron and steel. The tang of the blade is pressed extremely hard into the lac and centered. After it is cooled, it is tested for strength (Pant 1980: 105).

Decorations are often found on weapons in India. Decorations may include precious and semi-precious stones, fine metals like gold and silver, designs and patterns in the metals, carvings, writings, and depictions of religious concepts. Religion inspires artists to express ideas and themes that reveal what was happening in a certain era (LaRocca 1996: 3). Some weapons may have carvings of gods and animals that appear in the Hindu equivalent of the bible, the *Rig-Veda*. A few examples include depictions of Shiva the destroyer, Brahma the creator, a demon called Durga and a peacock named Paravani (LaRocca 1996: 4).

Inscription and writings are not all inspired by religion. Some writings are and may be verses or words from the *Rig-Veda* (Pant 1980: 3). Other writings may be names

of the maker and or the owner of the weapon, where the weapon was crafted and maybe a trademark (Pant 1980: 193).

Indian weapon crafters raised the bar by combining decoration and function. Combinations of highly-crafted fine steel and precious and semi-precious stones make for some of the most prized weapons (Karcheski 1994: 3). These weapons may be so exquisite that they are more for show than use.

The craftsmanship evident in weapons from India shows the skill and technology available to the smiths. The weapons that these smiths made are of high-quality and served there owners well in battle or otherwise.

Armor of South Asia

Soft Armors

Soft armors were used in all civilizations including those of South Asia. The first types of armors were made of animal skins. Animals were hunted for food and that skin used for clothing and armor. The animal skin clothing would protect its wearer on the next hunt or occasional skirmish with the neighbors. As the human population grew and skirmishes became more frequent and larger, better types of soft armors evolved to cope with changing weapons.

For instance, instead of using leather in its natural form (dried animal skin), the leather was boiled and beaten, molded and dried. As a result the leather armors would better fit the wearer thus providing better protection (Pant 1978: 28). Furthermore the boiling and drying of the leather would harden it, which provided additional protection.

Other types of soft armors were made of wool. Wool, produced from sheep hair, has an advantage over leather. Since leathers are obtained from animal skins, the animal must first be killed, whereas sheep could be raised in large number for the harvesting of their wool. The process of harvesting wool does not involve killing the, sheep are allowed to live and grow back their hair and the cycle continues.

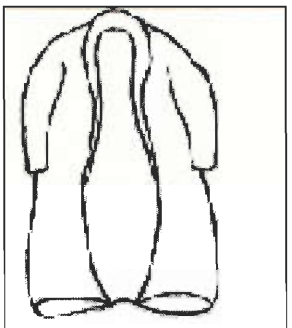
All civilizations made use of soft armors but their styles and extent of use greatly differ. Soft armors in combination with other types were extensively used in South Asia because of the hot climate (Ibid). For a soldier marching in the hot climate, having too much metal protection would be impractical.

The styles of soft armors were a product of local culture and invading forces. The Indian subcontinent is situated between the Far East and West. This made India a center

for trade and ambitious rulers' goals of conquest. India was invaded from the Eastern empires of Mongolia, the Turks from the Central Asia and later on the British Empire. Therefore India was heavily influenced by foreigners. For instance the clothing and armors from central India and Rajputana had many similarities to Mongolian and Central Asian designs (Robinson 1967: 101). The Mogul empire's domination of India brought in more clothing and armor design styles. There are two distinct types of fabric armors that were widely used in South Asia during antiquity. The first were those made up of several layers of quilted cloth. The second type is comprised of wool or cotton padding, covered by velvet or silk (Pant 1978:28). Velvet and silk are soft and smooth and because of these characteristics they make for poor shock absorbers.

Jama is a name for soft armors found in the Indian subcontinent that were likely the only protection a peasant foot soldier would have in combat. It is tightly fitted on an individual and it is quilted in several layers of cloth (Ibid). Some commoner's armors sported tailcoats. The coat ran down to the waist and was secured by a long cloth strip of cloth of which the left-over extended down to the ankle. The *Jama* counterpart, the *Qaba,* was geared more toward the aristocrat. The *Qaba* is a loose long cloth jacket with no button. Its characteristic of being loose restricted the *Qaba* to being used as a ceremonial piece, worn over a more protective armor such as mail (Ibid).

Tailcoat wore by a commoner. *Drawn after Pant*



Aristocratic soft armor: *Qaba*
Drawn after Pant

Soft armors belonging to royalty were always exquisitely designed and decorated. They generally consisted of several layers of soft material and a thin layer of cotton, finishing off with a layer of either velvet, silk or satin, making it comfortable to wear since these materials are smooth and soft. The surfaces of the armors were known to be decorated with nails that appeared either as scale or a diamond pattern (Robinson 1967: 101). The Sandringham collection holds one such royal soft armor called a *Pyjanas*. It is a purple, long-sleeved silk fabric jacket with gold threads.

Soft armors comprised of leather offered little protection from a sharp blade and armors made of cloth would yield poorer protection. For a poor farmer drafted into military service, soft armors were the only option since they more widely available and easier to reproduce. A well-to-do, high-status combatant would utilize soft armors in conjunction with other more protective types (Pant 1978: 20). For these reasons, soft armors did not simply fade out as soon as better weapons were invented. They were still cheap enough for the masses to afford and were retained by the upper class because of their ability to absorb shock and reduce chafing for their wearers.

Metal Armors

There is a never-ending race between arms and armors. As soon as improved arms appeared on the battlefield, armor makers looked to produce new types of protection that would increase the survival probability of those soldiers who could afford the armors. Experts have offered different viewpoints concerning the advance of South Asian armor design. According to Robinson's *Oriental Armour*, at the time of Alexander's invasion of

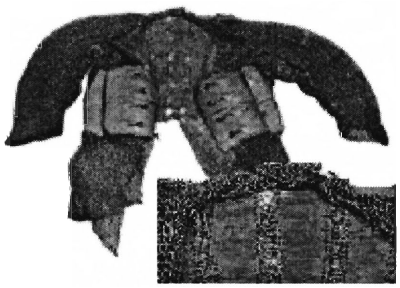
India metal armors were not widely used by the Indian army (Robinson 1967: 120). Pant's book *Indian Arms and Armour* disregards Robinson's claim as inaccurate and misleading. Pant suggests that besides fabrics and leathers armors, the Indians had extensive use of other types long before Alexander's invasion. However both Robinson and Pant agreed on the type of armors South Asian country possessed. In addition to fabric armors there was scale, lamellar, mail and plate.

The development of scale armors is a natural progression following leather and fabric types. This was not just the case in South Asia but true throughout the world. Robinson suggests that the Assyrians were the first to use scale armors and the technology then spread throughout Europe, then to India and reached as far as the island of Japan. This was a conclusion was based on paintings and the oldest scale discovered, which was Assyrian in origin. Another possibility might be simultaneous development of scale, since it seems natural to do so.

Scale armors are essentially composed of small plates, which are sewn to leather or fabric with each plate overlapping each other. The rectangle plate type of scale armors resembles house roof tiles because they are overlapped in the same fashion. Each rectangular plate, either with pointed or round upper edges, contained several holes which were used to secure individual plates together with a leather thong. The shapes of the plates were not just restricted to rectangular form. They can be square or have shapes resembling tree leaves (Pant 1978:33). Plates were made of out a variety of materials, depending on what was available locally. Plates were known to be made out of iron. This material can be heavy because the iron plates are stacked on top of each other, thus increasing the overall weight. Other types of metals used for the plates included gold,

silver, copper, bronze and tin. Wood and bamboo replaced metals where metals were rare and precious. In other cases rawhide or leather could also substitute as plates. Local scale-covered animals were also used as well (Ibid). The Sandringham Arm and Armors collection catalogue contains many beautiful royal armors put on display for King Edward VII by the nobles and princes of India. The collection holds one such animal scale piece, a jacket made up of horny scales from the Indian armadillo. The jacket's interior is layered in green velvet for comfort. Each individual scale was decorated with some sort of floral design and its edge composed of gold. Other Indian scale armors pieces included a Jazeran, which consisted of iron metal plates fixed firmly to the leather (Ibid).

A closely related type of scale armor was brigandine. In brigandine the scales were quilted between multiple layers of fabric or leather. Metal scales, besides being heavy, were armor such as mail (Ibid.). Time-consuming to produce and at the same time difficult to construct. The greatest shortcomings that plague scale armors are that they are rigid. The ability of a warrior in battle to move freely could mean life and death; therefore scales were only used to protect certain parts of the body. This allowed more mobility for soldiers wearing scale armors.

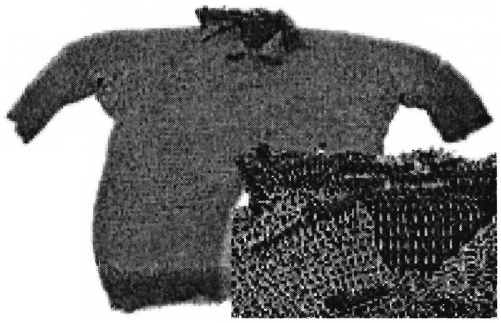


Mail shirt with 3 row of lamellar in the back and plates lined the belly section. perhaps 19th century

HAM 394

The Mongolian invasion of South Asia in the 16th century A.D paved the way for the use and development of lamellar armors (Robinson 1967: 77). Lamellar armor was dominated by strips called lamellae which were connected to each other rather than being mounted on leather or fabric like scale armor. It seems that lamellar armors were not that popular in India. The Sandringham collection did not contain any example. The Higgins Armory owns an example of lamellar-construction armor, a shirt composed of mail, lamellar and plate. Five rows of lamellae are linked with the mail shirt to protect the wearer's back. In the front of the shirt are larger plates protecting the stomach area.

No one really knows for certain the origin of mail armor. Mail has been utilized by most civilizations. The Romans used it and recorded that it has Gallic origin, however most armor experts disagree (Ibid). Mail is the most efficient mean of defense against slashing weapons such as a sword. However mail provided little protection against a crushing blow from a mace. The combination of a mail shirt and a shield was the most popular form of protection in South Asia. Robinson theorized that even though India had outside influences for centuries it is unlikely that they produced mail within their country. Most mail armors were imported from Arab countries. Robinson then went on to explain that it was not until the Turkish invasion that India produced mail. India's mail armor makers were often trained in another country, usually a nearby Arab nation (Ibid).



Mail shirt with leather lining the collar. 18th-19th Century

HAM 1734

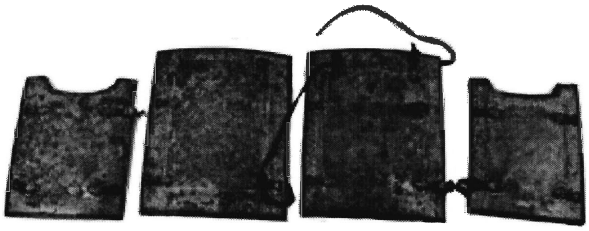
Mail design patterns depended on the regions of South Asia. But the core specification of mail armors can be categorized in three types. The first type of mail was riveted. This type of mail was constructed so that each ring on the coat was interlocked with four other adjacent rings, thus making riveted mail durable and strong (Pant 1978: 35). The second type of mail armor had the rings punched out of metal sheets with a rectangular bar separating the two halves of the circle (Ibid). The third type of mail had the ends of each link merely butted together, and therefore was not as strong (Ibid). The typical Indian mail coat was made up of riveted or un-riveted rings with the interior covered in some kind of fabric. The mail can either be sewn on to the fabric or worn as a separate piece (Robinson 1967: 99). Much of the mail in the Sandringham collection was riveted jackets arranged in patterns with beautiful gold decoration and the interior covered in velvet. Velvets were the materials of choice for royal armors since they are smoother than other fabric, producing less discomfort when worn under mail. An example of non-riveted mail armor from the Sandringham collection is a jacket composed of steel and brass rings arranged to produce a pattern; it is also lined with velvet.

Royal mail armors like those in the Sandringham collection were carefully constructed and lavishly decorated with precious metals. They were likely worn in ceremonial events rather than in battle. The regular Indian army officers probably wore mail armor in combat that was less decorated and less comfortable. More likely they

wore mail over a quilted coat called a *Kubcha* (Robinson 1967: 97). The quilted coat would not be as comfortable as the velvet lining, but it would have absorbed shock much better than velvet. An important point to recognize is that mail armors were expensive: it was a time-consuming task to make each ring and then link the rings together. For that reason the majority of soldiers were not equipped with mail. The same holds true for local militia: it is highly likely that they went into battle with their daily farming clothes and if they could afford armors it would be quilted soft armors rather than mail or scale.

Metal plate armors also appeared in South Asia but were unlike those in Europe. The plates in South Asia were only used to cover certain parts of the body and were often incorporated into mail, whereas in Europe plates were used to cover a combatant from head to toe. Robinson suggested in his book the reason why plate was not used as in Europe was because the armors makers of South Asia had not mastered the art of metalworking. On the other hand Pant hinted at the factor of extreme heat as the main reason why pure plating was not used to construct armors. Solid metal plates were used to construct headgear, arm guard, and breast and back protection.

Russell and Pant agree that the Singh of Northern India produced many excellent plate and mail armors. These plate and mail armors could be integrated with each other or worn as a completely separate piece. The separate plates usually consisted of the main breast plate, two side plates and a back plate. These separate plates were secured together with leather thongs (Robinson 1967: 98). Examples of plate construction can be found in the Higgins Armory collection.



Steel construction with gold decoration and lined with fabric on the back end of the plate. Perhaps 18th century.
HAM 1492

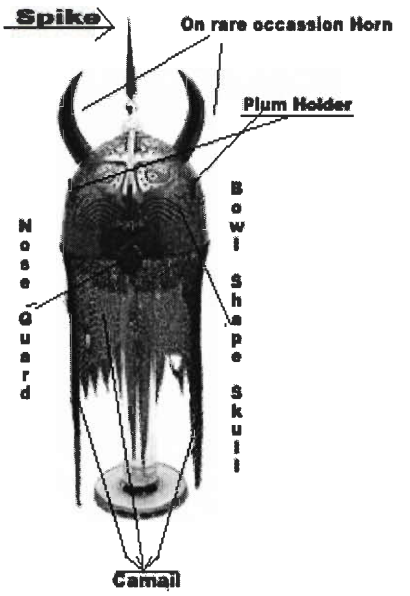
Headgear

One of the important pieces of combat armor is the headgear. Without protective headgear a blow to the head would kill a combatant immediately or cause severe brain injury. The importance of the headpiece caused armor makers to devote enormous time and energy to finding a better method to protect the head; attention was focused on every part of the headgear. This attention to details can be seen in the battle helmet of South Asia. There are five different parts, the skull, the crest, cheek-pieces, nose guard and the camail (Pant 1978: 39).

The part of headgear responsible for protecting the skull is the most crucial. All skull pieces in South Asia were made from a solid piece of metal, with the exception of helmets of the early 17th century Singh helmet design: the skull piece of a Singh helmet contains many small plates connected together with riveted links of mail. The mail-plates helmet covered the entire head, leaving holes for the eyes and mouth. The plates protecting the skull were often decorated with some sort of floral design (Ibid). Helmet design of this type offered less protection than the skull piece that was beaten from a single solid sheet of metal. With a single skull piece the entire helmet would absorb an impact, whereas in plate construction only the individual plates absorb the shock.

Pant classifies the skull piece shape into seven types. The most common skull shapes found in South Asian helmets were the hemispherical, dome, oval and cap shapes. The other more rarely used shapes were flat and turban shape. Skull pieces were primary constructed out of iron, but other materials such as bronze and steel were also used.

The skull pieces of some South Asian helmets were equipped with crests and spikes, which do not have any protective function; they serve as decoration. Hunting scenes were a common form of decoration on the headgear. The crest of the helmet served as a decorative identification, much like the coat of arms in Europe. The crest materials included horsehair, chicken, peacock and heron feathers (Pant 1978: 48). Only certain parts of South Asia featured this decorative technique. The south and northwest parts of the Indian subcontinent rarely displayed crests on their armor, while northern India made extensive use of crests. Plume holders, which contained decorative feathers, were cylindrical in form. In northern India, the Singh usually had two large plume holders situated on either side of the helmet, but 3 plume holders were also found on some Singh helmets. On occasion there were 4 plume holders on a Singh helmet. The favorite Singh crests were those of black heron feathers, however peacock feathers were also popular (Ibid).

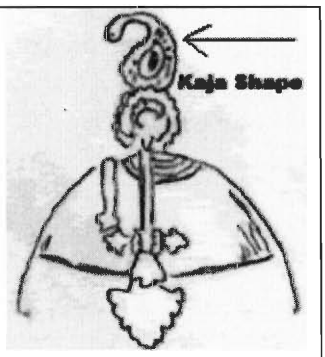


18th-19th Perhaps India

HAM 2971.4

The spike was an integral part of South Asian helmets though in some cases the plume holder replaced the spike on the topmost part of the helmet. The purpose of the spike is unclear, other than to serve as decorative piece. There were many varieties of spike decoration found in South Asian helmets; some were of local design while others have strong foreign influences. The possible shapes of spikes were bayonet, diamond, conical, fluted, cylindrical, fish-like, pyramidal, square and *Kaja*-shaped (Pant 1978: 46).

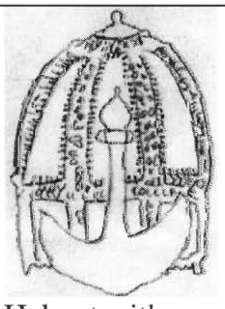
The other parts of the helmet are the cheek, the camail and nose guard. Early Singh helmets did not include cheek or nose guards; instead a mail piece completely covered the face leaving two holes for the eyes and a mouth opening.



Drawn after Pant.

The South Asian cheek guard was either formed as part of the helmet skull or made up of two separate pieces attached to the helmet with hinges so that they could be lifted out of the way (Pant 1978: 50). In a typical South Asian helmet a solid cheek guard was usually replaced with a camail (a European term for mail designed to protect the neck and sides of the face). The camail in all helmets extended down to the wearer's shoulder. The helmet's bottom rim was drilled with holes that allowed the mail rings to pass through, making it possible to secure the mail to the bottom half of the helmet (Pant

1978: 49). Nose guards always appeared together with the camail. The nose guard was either fixed with a small hook or movable up and down. The possible shapes of the nose guard included leaf, cone, spade, quatrefoil, palm, cartouche, spear, shield, trefoil, and pine shape (Pant 1978: 47). Designs of the piece protecting the nose were creative and very often bizarre looking. For example the cavalier's helmet, utilized during the Mughal Empire, had a nose guard resembling a ship's anchor and big enough to cover a person's whole face



Helmet with nose guard completely covering a person's face. Mogul *Drawn after Egerton*

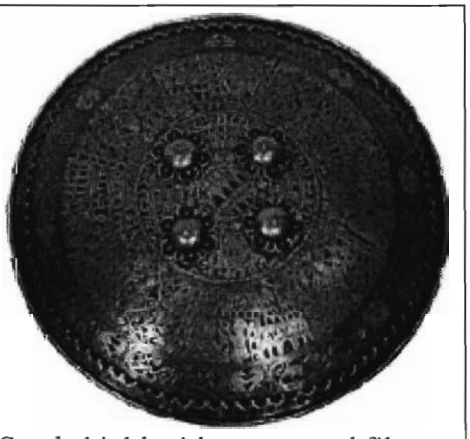
Foreign influences have been part of the driving forces in South Asian armor design. The Islamic world, especially Persia, exerted the biggest influence on the Indian subcontinent. Therefore it can be difficult to determine whether a helmet was made in India or Persia. Pant suggests some key differences between Persian and Indian helmets. First, the Indian helmets often have a sliding nose guard rather than a fixed style, as in Persian helmets. Secondly, the Persian spikes were generally long and quadrangular in shape. Third, the Persian camail was much longer compared to its Indian counterpart. Finally, perhaps the most useful difference was the Indian armor maker's practice of signing their name on the finished work. The differences listed above are the most useful in distinguishing Indian helmets from Persian helmets, however there are more differences noted by Pant (Pant 1978: 51). Distinguishing Indian helmets from Persian ones is not a trivial task. Some illustrations in Robinson's books classify a certain helmet as Persian, while the same pieces were classified as Indian in Lord Egerton's *A description of Indian and Oriental Armour* (Egerton 1896: 12). Perhaps the pieces were so similar that in

photographs they look the same. This illustrates the strong similarity between Persian and Indian helmets.

Shields

The shield was the most basic form of protection for a combatant; shields do not need to be fancy to be effective against blows or slashes. For a militia in antiquity a shield was probably the only affordable effective method of protection. Shields were the cheapest form of armor because they could be made out of virtually any material. The material of choice for a shield was wood, since it is abundant and easy to obtain.

In South Asia, the use of non-metal shields was widespread, which led historians like Robinson to conclude that it was the only form of armor South Asian countries developed and that metal types were either imported from neighboring countries or copied after those of foreign invasion forces. Other historians like Pant disagree and suggest that metal shields and armor did develop in India but their use was limited to royalty and nobility. He further suggests that foreign influences enriched Indian armor development, but were not a catalyst which started it.



Steel shield with cotton and fiber stuffing in the back. 19th India.

HAM 2817

Indian shields were generally round, ranging from 8 to 30 inches in diameter. Metals shields were less convex than the non-metal type. The outer rim of shields were either rolled back inward toward the carrier, or the opposite way with the rolling turning outward, away from the carrier. All shields, both metal and non-metal, included a square cushion that the knuckles could rest

comfortably against. In addition, South Asian shields often had more than one handle to carry the shield (Pant 1978: 71). Non-metal shields were very popular in all parts of South Asia. For royalty and nobility non-metal shields served more as displays of power rather than as a protective piece of equipment in battle.

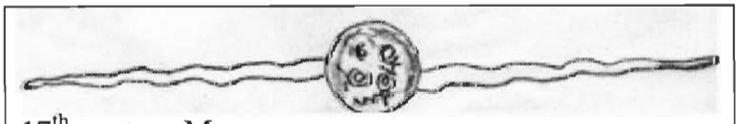
17th century Mahabharata armies from South Asia left behind shields that are excellent examples of shields used for display. *Sharavarna* or the Indian shields were made of leather and decorated with figures of the sun, moon, and stars along with carefully painted geometrical designs (Egerton 1896: 49). Other popular decorations included hunting scenes. Nobles probably would not trust their life to a shield that could be easily penetrated; however such a piece would communicate a high social status to others.

The practice of using shields as a sign of rank was more formalized within the Mahabharata army structure. According to Pant, shields were use as royal insignia (Pant 1978: 79). Shields could also take on a more symbolic role at the conclusion of a battle. Very often the defeated army's shields were taken away in triumph by the victorious forces (Ibid). Nobles from other parts of South Asia also used shields to demonstrate their power. For instance in Northern India, Nepal, and Bhutan there was a shield called *Nagphahi Dhal* from the 18th century, which translates as snake-hood shield. The shield has a circular shape, made out of black rhinoceros skin and coated with a thin layer of copper. The shield's rim was interlaced with cobra's skins, hence its name "snake-hood" (Pant 1978: 90). Besides serving as a decorative piece, this type of shield could have been used in actual combat. According to Pant, black rhinoceros skins were rare and are extremely durable. With a thin coating of copper these types of shields could be highly

effective on the battlefield. The *Nagphahi Dhal* is a hybrid shield, having some of the characteristic of both metal and non-metal types. The non-metal type is light in weight but offers less protection. Metal shields are more protective but are much heavier. Because part of the *Nagphahi Dhal* was constructed from leather it was lightweight while the thin coat of copper would have offered additional protection that the rhinoceros leather alone could not provide.

The Indian term for a leather type shield is a *charma*. Rare hides were highly prized as the material of choice for royalty in shield construction. The most valued hide was rhinoceros skin, but other valued leathers were those of elephants and tigers, as well as turtle shell. Common foot-soldiers' shields were constructed out of ox-hide, because the hide could be more readily obtained. Leathers such as those from deer and crocodile were also known to be used in shield construction (Pant 1978: 97). Other non-metal and non-leather types of shields were those made out of wood and bamboo.

Though circular shields were widely used in South Asia other types do exist. For instance, a mantlet was a type of shield which covered the person's entire body. This type was mainly used by the Babur to protect their archers. Pant mentions a shield that was used to protect a person from elephants. There were bell-shaped shields with a round top and rectangular base, used primary by the cavalry (Pant 1978: 85).



17th-century Maru
Drawn after Egerton

Another type of shield was the *Maru*, which is more difficult to classify. A *Maru* consisted of a weapon and protection built into one piece. The Maru has a pair of horns pointing in opposite directions, with a small shield at the center where the horns meet (Pant 1978:

89). When used as a weapon the Maru was generally thrust at an opponent. The Maru could also be constructed out of leather and metal. It is a type of shield that is distinctive to South Asia. The Mahabharata, the Bhils and other aboriginal tribes used this shield/weapon.

Process of Manufacture

According to Pant, it is impossible to determine some of the exact armor-making processes employed by South Asians since written records are non-existent. The art of making armor was generally passed down orally rather than recorded in written form and as the needs and demands for armor changed, the old processes were lost through time. However, armors and their decoration that survived to modern times can provide clues and give us a general idea on how armors were made in South Asia.

The use of animal skins in the construction of armors was widespread in South Asia. For the commoners, it was the only type of armor they could afford. On the other hand, the nobility and royalty used these types of armors to display their wealth and status. Many of the animal-skin armors that survived to modern times belong to the latter class. Because the animal skin survived to modern times, this suggests that the skins must have been treated and processed. Raw dry skins are hard, but when exposed to water (or moisture in the air) the skins begin to rot. Animals' skins are composed of three cell layers. The topmost layer is called the epidermis and holds the hair; the middle layer is called the derma; and the fatty bottom layer is called the adipose (Anderson: 1). It is the middle layer which was most likely used by South Asians in armor construction, since this layer is most durable.

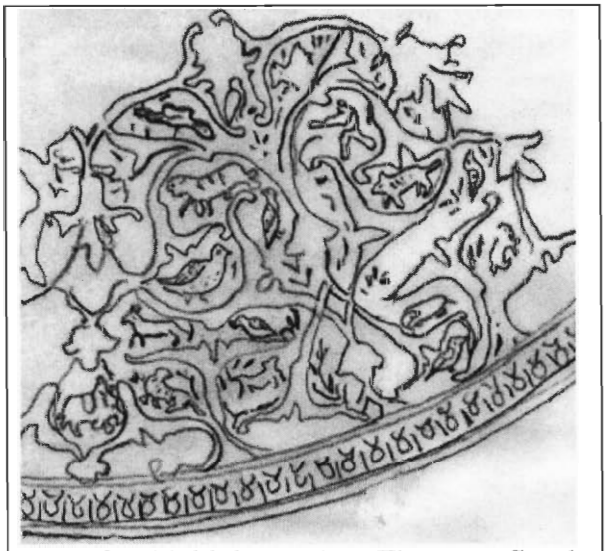
Furthermore, leather shield decorations provide additional clues. For example, the *Sharavarna* (shield) was made out of leather and decorated with figures of the sun, moon, and stars along with carefully painted geometrical designs. The skins could not have been beautifully decorated if the hair were left in place.

There are two main steps in the modern process of making leather for shoes and clothing. The first step is to remove the hair from the animal skin. This involves soaking the skin in lime to weaken the hair so that it can be easily scraped off (Ibid). The South Asians would probably include this step in their leather armor making process. Another effect of soaking the skin was that dyes, which were a crucial decoration, would easily stick to the skin's surface. In the modern process, the next step is to remove the bottom layer of the skin. This involves cutting it away (Ibid). For the shield to last and not rot, the South Asians would probably perform this step also.

The processes of making mail and plate employed by South Asians are harder to deduce from artifacts. Again, most of the mail shirts and armors that survived belonged to royalty and nobility because the higher-class armors were more likely to be well kept and maintained. Pant suggested the process for making mail armor started with making the wire by hammering it out from a solid bar of metal (Pant 1978: 36). To maintain consistent to size for each individual ring, the hammered wires were then twisted spirally onto an iron or wooden rod. The next step would be to cut out each individual ring. Each ring was then linked to its neighbors ring and the open ends were brought together. The mail armor making process can be slow and tedious. Each ring has to be linked together and on some mail armors there can be thousands rings, an estimate from one of Higgins's Armory mail shirt contain 4403 rings. The details of step-by-step plate construction

utilized in South Asia are unknown, but one thing for certain is that the metals would have had to be heat-treated for them to be beaten into the desirable shape.

As mentioned earlier, armor decorations were reserved for the wealthy because the process was time-consuming and expensive. Decorations on metallic armors would have to be carefully chiseled onto the armor (Pant 1978: 36). A well-known decorating technique was damascened, which were utilized in South Asia as well as in Europe. Damascened could be apply to both iron and steel arms and armors pieces. In order to make the metal workable, it was first heated up then the design was etched into it. The process of damascened involved engraving, in which the desired pattern was etched into the metal, but the more elaborate process was inlaid. Inlaid was the technique where the armor makers hammer in precious metals, such as gold, on to the etching groove. In South Asia, precious stones were also known to have been use for inlaid (Egerton 1896: 45).



Part of a shield decoration. There are floral patterns with human figures and varieties of animals such as elephants, tigers, dogs, and birds. *Drawn after Egerton.*

Egerton divided Indian decoration techniques and styles into zones, the North-West provinces, Central India, and the Southern provinces. Each zone or region has a unique style which was evidenced by the armor they left behind. Geometrical and floral decorations were favorites in the North-West provinces, mainly Kashmir and Punjab. Rajpantana

and the Deccan, located in Central India prefer raised floral patterns, which were chiseled out solid steel, where as in Southern India, the common decoration theme were serpents, loins and dragons decoration (Egerton 1896: 47). Flower utilized in decoration included lilies, irises, and lotus (Egerton 1896: 55).

Animal Armors

War animals, mainly horses and elephants, were valuable assets to early armies, so animals were often protected by armors just as well as their human masters. This was also the case for the armies in South Asia. Combat animals were often armored since they were expensive and time-consuming to train; favorable outcome in battle could sometimes rest on these animals.

To replace lost animals could be very costly. This was especially true with war elephants. Since elephants rarely breed in captivity and young elephants are difficult to raise, they were caught and trained fully-grown, which makes elephants an exception to the rule that adult wild animals are hard to domesticate. Elephants were trained by a mahout or elephant-driver. Replacing horses was also expensive, and although they were a domesticated species, they still required a great deal of training time before becoming combat ready.

Elephants were greatly valued in South Asia, in fact elephants were employed in warfare right up to the 18th century. Robinson details the battle in 326 B.C between Alexander army and King Poros army, in which Poros's 200 elephants were defeated because Alexander ordered archers to aim for the mahout and attack the elephants under belly (Robinson 1967: 110). It is possible that King Poros's elephants and mahouts were

not protected by armors, but certainly at its peak in the 18th elephants were heavily armored.

Elephant's armors were composed of steel plates incorporated with mail, and the armored mahout was protected by a small tower on the elephant's back. Riding with the mahout were armored men with guns, arrows and spears (Richardson 1995: 102).

Richardson in his article "Elephant Armor", speculates that the earliest evidence of elephants being outfitted with armor was during the reign of the Seleukid Empire in Syria (190 BC), since a bronze figurine of an armored elephant was found there. In South Asia, the first record of elephant armors occurs in 1011-12 during the period of Sultan Mahmud. The Sultan's 740 elephants were all equipped with head defenses called *ayina-yi* (Richardson 1995: 101).

An account written by Anathasius Nitikin in his voyage to India, further reveals the evolutionary process of the Indian's war elephants. Nitikin wrote, in addition to being outfitted with head defense, the war Elephants of Sultan Muhammad "...are clad in ornamental plates of steel." (Ibid). At the battle of Panipat in 1556, against the Mughals, rebel Hemu protected their war elephants with mail suit known as *kajim.*

As a response to the changing nature of warfare and weaponry the Indian army tried to outfit their elephants with more armor and arms until it was no long feasible to do so. Helmut Nickel shows a photograph of armored elephants equipped with 2 cannons on either side (Nickel 1971:93). From the early days of being armored with huge carpet-type coverings made out of quilted fabric or leather, the elephants had been transformed into a weapon that was heavily armored and armed (Robinson 1967: 119).

Though less value than elephants, horses were also well protected in combat. An *artak-i-kajem* is an Indian term referring to the protective armors on horses that covered the horse's body, shoulders, and tail. A solid single metal plate known as a chamfron protected the head of the horse; the combination of body protection and chamfron for a horse was known in India as a *gardani.*

Conclusion

The group began in B-term 2002 by researching four major topics; the history of the South Asian countries, the military style and techniques of the region, the weaponry of the region, and its armor. Each person researched and documented one topic. This research provided our group with a clear picture of the times from whence the South Asian artifacts that Higgins Armory currently holds come.

The second stage of the project took place in C-term of 2003, and consisted of the examination, documentation, and photo-documentation of the 236 South Asian artifacts in the Higgins Armory's possession.

The last stage of the project involved the union of the knowledge gained from the research gathered in B-term with the photos and information acquired C-term, and resulted in a comprehensive review of the South Asian pieces that reside at the Higgins Armory. This knowledge was presented within a website linked to the website of the Armory, and a final IQP paper will take the current knowledge of the history of South Asia and its warfare and combine it with inferences drawn about the artifacts studied in order to further clarify the accepted history of South Asia and its practice of combat. The website gives us the opportunity to provide the public access to our project.

Bibliography

Arms

Arms and Armor at Sandringham. (1910) London: W. Griggs & Sons.

- *Collection of Indian Arms and Armor presented by chiefs, princes and nobles of India to Britain's leader around the turn of the century. Weapons include: swords, daggers, spears, javelins, flintlocks, matchlocks, quivers, boomerangs, sabers, bows, arrows, etc. There are pictures and information on specific weapons.*

Cohen, Stephen P. (1971) *The Indian Army.* Berkeley, Los Angeles, London: University of California Press.

- *Begins with the British Indian Military Organization and goes to WW2. Topics include recruitment, defense problems, officers, wars, and the Indian Army after independence.*

Elmer, Robert P., M.D. (1926) *Archery.* Philadelphia: Penn Publishing Company.

- *Contains info on bows and arrows. History of archery from around the world, Including some bows and arrows from East India.*

Grancsay, Steven V. (1986) *Arms and Armor.* New York: The Metropolitan Museum of Art.

- *Collections from the Met. With color photos and detailed descriptions of pieces from all over the world. Indian topics include: an East Indian gun, Scimitar, and various Indian and Persian arms and armor.*

Hammond, Peter. (1986) *Royal Armouries of the Tower of London.* London: Trustees of the Royal Armouries.

- *Official guide to the Royal Armouries. Mostly European arms and armor. Topics from South Asia include: Indian Elephant Armor, N. Indian warrior, Indian mortar and Indian cavalry armor.*

Karcheski, Walter Jr.; Richarson, Thom. *Arms of the East: Jewleled Weapons of Status and Rank.* Portsmouth, NH: Buckley Associates.

- *Catalogue of a display of Eastern arms and armor. All entries are highly decorated.*

LaRocca, Donald J. (1996) *The gods of war: sacred imagery and the decoration of arms and armor.* New York: Metropolitan Museum of Art.

- *Book about the important role religion played in the decorations and art on weapons and arms. South Asia topics: Hindu India, Islam, and Sikhism.*

Mann, Sir James. (1962) *Wallace Collection Catalogues.* London: Printed for Trustees by William Clowes and Sons.

- *European arms. Couldn't find South Asian examples. (Prof. Forgeng has copy of the Wallace Collection Catalogues with the Asian arms collection.)*

Muller, Heinrich. (1980) *Guns Pistols Revolvers.* New York: St. Martins Press

- *A lot of information on guns. Specific entries on certain types, with lots of diagrams and illustrations.*

Nicolle, David. (1999) *Arms and armour of the crusading era, 1050-1350: Islam, Eastern Europe and Asia.* London: Greenhill Books; Mechanicsburg, Pa: Stackpole Books.

- *Arms and armor used by those involved in the Crusades. Illustrations and information on all the pieces. Includes: India, Eastern Iran, Afghanistan, Western Iran and the Islamic Caucasus.*

Pant, Gayatri Nath. (1980) *Indian Arms and armour: Volume II Swords and Daggers.* New Delhi: Army Educational Stores.

- *Info on Indian swords and daggers. Topics include: swords (origin and development and classification), blades (shapes, metals used), hilts (types, materials, and decorations), sheath belt and strap, daggers, decorations (enameling, materials).*

Rawson, Philip S. (1968) *The Indian Sword.* London: Jenkins.

- *History of the sword in N. and S. India, Nepal (the Ram Dao), and Assam. Topics include: info on Kopis blade, regional styles and techniques of decoration, forms of hilts and variations from region to region. Includes illustrations.*

Reid, William. (1976) *Arms through the Ages.* New York, Hagerstown, San Francisco, London: Harper & Row Publishers.

- *Evolution of arms and armor from Bronze Age to WW2 of entire world. Info on specific types of weapons and armor, including photos.*

Stone, George Cameron. (1934) *A Glossary of the Construction, Decoration, and Use of Arms and Armor.* Portland: The Southworth Press.

- *Info on arms and armor from around the world, and many eras. Broad ranged entries on swords, daggers, etc. Specific entries on specific types of weapons and armor (ex. Talwar) with photos.*

Tarassuk, Leonid and Blair, Claude. (1979) *The Complete Encyclopedia of Arms and Weapons.* New York: Simon and Schuster.

- *Specific A-Z entries of weapons from all over the world with photos.*

Trousdale, William. (1975) *The Long Sword and Scabbard Slide in Asia.* Washington: Smithsonian Institute Press.

- *Info on long swords and scabbard slides in Asia. Some info on Afghanistan, North India, and Iran. Mostly pictures of old military sculptures.*

Wilkinson, Frederick. 1972. "Antique Arms and Armor." New York: Drake Publishers

- *Antique arms and armor descriptions with photos. Entry on India.*

Wilkinson, Frederick. (1978) *Arms and Armour.* London; New York: Hamlyn.

- *Arms and armor from around the world. Indian topics: swords, archery, knives.*

Wilkinson, Frederick. (1989) *Swords and Hilt Weapons. Chapter 14 "India and Southeast Asia".* New York: Weidenfeld & Nicolson.

- *Info on swords and various hilt weapons and their evolution from the Stone Age to WW2, from all over the world. Topics for India and Southeast Asia include swords and daggers from the region from about 1500 on up. There are individual photos and descriptions for some of the swords.*

Young, Peter and Lawford, J.P. (?) *History of the British Army.* New York: G.P Putnams & Sons.

- *History of British Army. Info on conquest of India and war with the Sikhs, including descriptions of battles. (@ Holy Cross Library)*

Armor

Arms and Amour of Sandringham. (1910) London: W.Grigg & Son.

- *Indian Arms and Armors on display for King Edward VII during his visit to India in 1875. Pictures include many types of armor (Helmet, shield, body armor), which are accompanied by detailed descriptions.*

Egerton, Wilbraham (1896) *A description of Indian and Oriental Armour: Illustrated from the collection formerly in the India office, now exhibited at South Kensington.* London: W.H Allen & Co.

- *Collection of Indian arms and armor. Information presented includes the processes, manufacture and decoration of shields and helmet.s*

Nickel, Helmut (1969) *Warriors and worthies; arms and armor through the ages*. New York: Atheneum

- *Information on armor in general. Also contains a figure of an elephant armed with 2 cannons*

Pant, G. N. (1978) *Indian Arms and Armour*. New Delhi: Army Educational Stores.

- *Discusses the origin and development of India Armors by examining sculptures, painting, and coins that survive to the modern time. In addition, describes the construction of fabric, leather, scale, lamellar and mail armor. Shields and helmets are also covered.*

Richardson, Thom, and Donna Stevens. "The elephant armour." Royal Armouries Yearbook Volume 1 for 1996: 101-106.

- *Contains information on elephant armor.*

Robinson, H., Russell. (1967) *Oriental Armour*. London: Jenkins.

- *In the first couple of chapters the author offers explanations on different type of armors of South Asia. Type of armors presented included fabric, scale, lamellar, and mail. The author then presents armors belonging to different country in Asia, for instance India, the Middle East, Persia and Turkey.*

Wilkinson, Frederick. (1978) *Arms and Armour*. London; New York: Hamlyn

- *Source of information on India's and Persia's shields and helmets*

Military Tactics

Auboyer, Jeannie. (1965) *Daily Life in Ancient India*. New York: Macmillan.

- *Provides good information on the Arthasastra and the role of leadership in ancient India.*

Bashim, A.L. (1975) *A Cultural History of India*. Oxford, Oxford University Press.

- *Discusses the military methods and moral code of Indian warfare.*

Gardner, Brian. (1971) *The East India Company*. New York: The McCall Publishing Company.

- *Provides a good quote from Warren Hastings, the first Governor-General of India, and speaks of India during the British era.*

Mahmud, Ali. (1993) *The Fearful State*. London: Zed Books.

- *Discusses the particulars of Alexander's Indian conquest.*

Murray, Hugh. (1981) *The History of Nations: India*. New York, The Bradley Company Publishers.

- *Provides very early Indian military history as related through the ancient Greeks regarding Semiramis, the Queen of Assyria.*

Rawlinson, H.G. (1952) *India: A Short Cultural History*. New York: Frederick A.

Praeger Publishers.

- *Gives specific quotes from the autobiography of Timur.*

Smith, Vincent. (1958) *Oxford History of India.* Oxford: Clarendon Press.

- *Provides an all-inclusive history of India and its military tactics.*

Spear, Percival. (1961) *India: A Modern History.* Ann Arbor, MI, USA: The University Of Michigan Press.

- *Speaks of the Islamic age of Indian history and the military happenings of the time.*

Wheeler, Mortimer. (1959) *Early India and Pakistan.* New York: Frederick A. Praeger Publishers.

- *Discusses the Indus civilization and the hoards of metals found that they left behind.*

Wolpert, Stanley. (1965) *India.* New Jersey, USA: Prentice-Hall Inc.

- *Discusses the British and French influence on South Asia.*

History

Allen, J., T. Wolseley Haig, H. H. Dodwell. *The Cambridge Shorter History of India.* S. Chand and Co: 1969

- *This text provides a complete history of the territory that India now comprises from ancient India to the 1960's. The focus will be mainly on the sections of the*

book that contain information on the 18th and 19th centuries. The book goes into detail about the regions patterns of government, social order, religions, and economic and social change.

Brannigan, Michael C. *Striking a Balance*. Seven Bridges Press: 2000

- *Covers Asian ethics and traditions, and gives brief general historical backgrounds.*

Bose, Sugata, Ayesha Jala, *Modern South Asia History, Culture, Political Economy.* London: Oxford University Press 1998

- *The book seeks to weave together the threads that make up the history of modern South Asia. Much of it concentrates on the different empires and it seems to do an excellent job classifying the history into different eras based on them. Most of the information it contains is on the history, culture and political economy of South Asia.*

Kluke, Hermann, Rothermund, Dietmar. *A History of India*. Great Britain. Mackays of Chatham PLC: 1990

- *Detailed account of India's history.*

Koller, John M., Koller, Patricia Joyce. *Asian Philosophies third edition*. Upper Saddle River: Prentice Hall: 1998

- *Analyzes the views and arguments of the major Asianphilosophical and religious traditions.*

Maloney, Clarence, *Peoples of South Asia.* Holt, Rinehart and Winston, Inc: 1974

- *Discusses the culture, religions, traditions, philosophies, and historical roots of the people of each South Asian country.*

Meyer, Milton W. *India-Pakistan and the Border Lands.* Littlefield, Adams & Co. 1968

- *This book provides a history of the peoples of South Asia, and describes all the different types of governments that have existed and co-existed throughout the regions history. It should prove very useful as it is extremely thorough and contains information on all aspects of South Asian history, from geography to culture, to politics and economy.*

Tinker. *South Asia a Short History.* New York: Praeger 1966

- *The book contains information regarding the history of South Asia's economies, governments, social orders, religions, and the changes that have occurred to these over time. The text provides information from the earliest civilizations in South Asia up through colonization into modern times.*

Wolpert, Stanley. *Roots of Confrontation in South Asia.* New York: Oxford University Press: 1982

- *Examines the cultural background of India, Pakistan, and Afghanistan for determining why the region has so much conflict.*

Internet sources:

From Skin To Leather. Anderson, April. U of North Carolina. (http://www.unc.edu/courses/rometech/public/content/arts_and_crafts/April_Anderson/aaleather.html)

- *Details the process of making leather.*

http://www.fordham.edu/halsall/india/indiasbook.html

- *Online textbook with tons of information about India's history, cultural influences, etc. Great general source for info in India.*

http://www.nationalmuseumindia.org/armour.html

- *online museum of New Delhi. There is good background information on many aspects of India, including a short article about arms and armours.*

http://www.vikingsword.com/ubb/Forum1/HTML/001142.html

- *Information on types of swords.*

http://coombs.anu.edu.au/WWWVL-AsianStudies.html

- *"Asian Studies WWW Virtual Library" A lot of links to South Asian, Asian sites with research information on all Asian countries.*

World History Archives (http://www.hartford-hwp.com/archives/52/index.html)

- *Website breaks down the world into sections and gives history of each section as a whole before breaking down the sections into histories of individual countries.*

There is a large quantity of the information about every aspects of South Asia's history, as well as the individual histories of each country.

South Asian History (http://members.tripod.com/~INDIA_RESOURCE/sahistory.html

- *Website goes through the history of science, culture, philosophy, religion, art, and trade of India and other South Asian countries.*

South Asia History (http://goasia.about.com/cs/histor1/)

- *Site contains links to any information on all aspects of South Asian history.*

The World Factbook 2002 (http://www.cia.gov/cia/publications/factbook)

- *Maps*

Project Discussion

This project was created by students four students of WPI: Brian Tetreault, Vuong Mai, Jake Conklin and Michael Holmes. The project is an Interactive Qualifying Project (IQP) and is one of three projects undergraduates of WPI must complete in order to graduate.

The IQP intends to examine how science and technology interact with social structures and values. By completing an IQP students will understand, as professionals and citizens, how their careers may affect the larger society to which they are a part of. This IQP was done in conjunction with the Higgins Armory Museum located in Worcester Massachusetts.

The Higgins Armory Museum is the only museum in the Western Hemisphere that focuses entirely on arms and armor. The museum boasts a collection that covers many historical, cultural and technological periods. The museum interior is also constructed in a way to enhance the pieces on display, with the Medieval Great Hall hosting many of the museums pieces on display. Informative and entertaining programs are also offered at the Higgins as a way to help visitors interpret the collection.

This project was completed under the guidance of Jeffrey Forgeng who is the Curator of the Higgins Museum and also a Humanities Professor at WPI. The team consisted of Brian who is a senior and majoring in Computer Science, Vuong who is a junior Computer Science major, Jake who is a junior as well and also majoring in Computer Science and Michael, who is a sophomore and is majoring in Physics.