

The World of Beads Monograph Series: 6

INDIAN AGATE BEADS

PETER FRANCIS, JR.

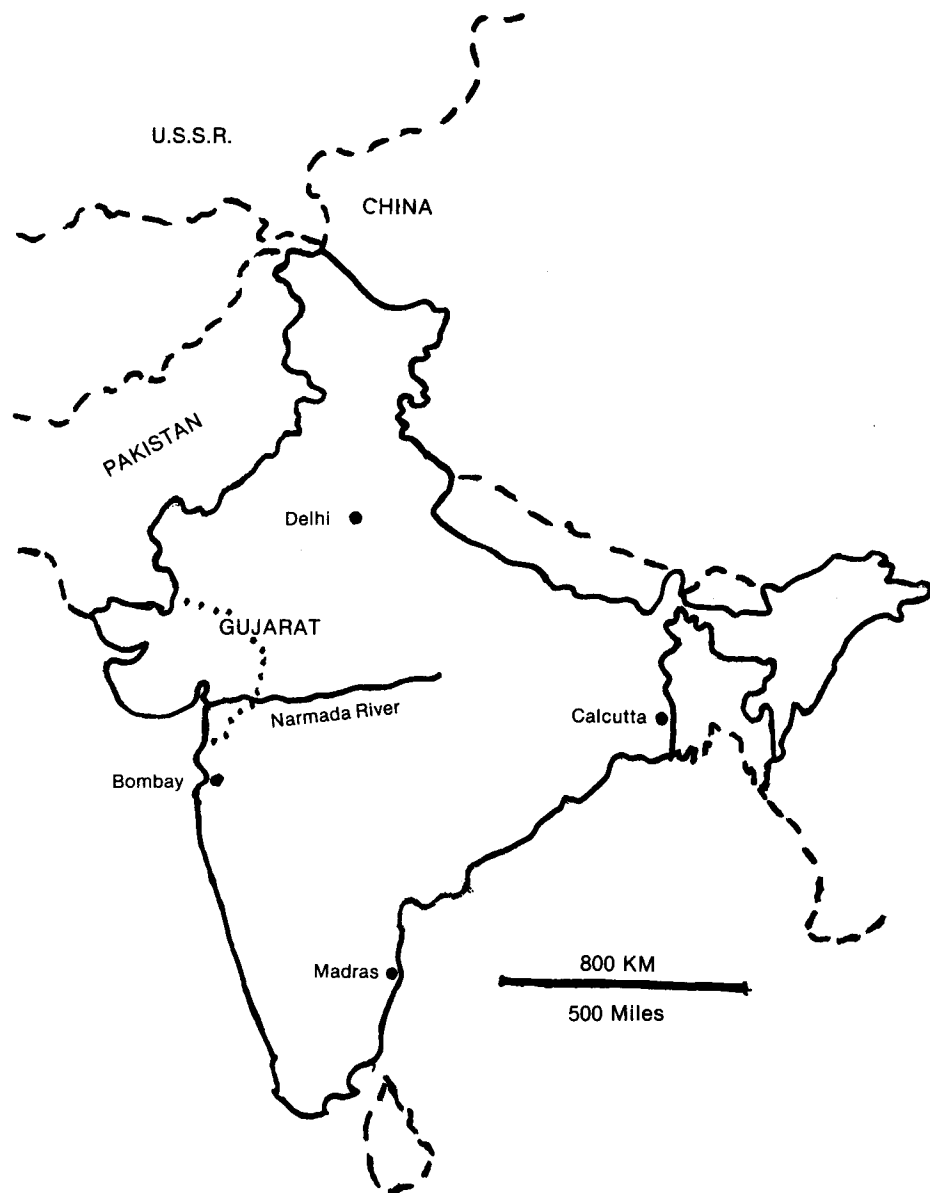


LAPIS ROUTE BOOKS

COLOR PLATE I



- Row 1: 1) Oblate roughout, Inamgaon, ca. 1000
2) Oblate roughout, Limodra, ca. 1400 AD
3) Oblate roughout, Cambay, modern.
4) Fine quality carnelian nodule, Ratanpur.
- Row 2: Roughouts, Cambay, modern. Vertically along
Rows 2 - 4 is a water buffalo horn hammer
head used for chipping stones, Cambay.
- Row 3: Ground, unperforated stones, Cambay, modern.
- Row 4: Finished beads, Cambay, modern.
- Row 5: Limodra: 1) Finely polished cabochon showing no
striations from the operation.
2-4) Ring centers also used for tabular beads.
5) Oblate roughout of bloodstone.
6-7) Cabochons in unfinished states.
- Row 6: 1) Limodra, broken piece showing relationship of
ring and round tabular bead.
2) Cambay, modern ring roughout.
3) Iran, older round tabular.
4-5) Cambay, modern rings.
- Row 7: 1) Knife handle, unfinished, Limodra.
2) Broken unperforated bicone, Arikamedu, 1st c.
AD. The polish shows up as striations.
3) Coin of Muzzafer III, 1570, Limodra.
- Row 8: Rough stones, Limodra and Ratanpur.
1-2) Traditional *babaghori* agate.
3) Sardonyx.



Map 1
INDIA

INDIAN AGATE BEADS

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NOTES TO THE READER

The great variation in Indian geographic names has been standardized in the text; a taste remains in direct quotations and bibliographic entries. In some cases, as with Limodra and Nimodra, these differing names have a bearing on our story, but too often they are only bothersome. Sternback catalogued no less than 26 variations in the spelling of Cambay, and at least two others may be added to his list, including Tagore's strange but melodic Cambaliyat. Modern Indian pronunciation is closest to Khambat.

Reference citations have been simplified by using the serial number of a work as listed in the bibliography. Hence (129: 16) is the equivalent of (Ram 1962: 16).

Maps 5 and 6 have no claim to accuracy. They are not based on surveys, and are included only for convenience.

ACKNOWLEDGEMENTS

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Of the multitude of beads in the world, Indian agates stand in a class apart. No other beads have traveled so long and so far to grace men and women of such diverse cultures. Yet, little of their history has been known.

Though convenient, the term "Indian agate" is broad, and it must be qualified. India is a vast country, the "agate family" has many members, and we are dealing with a long time period. It is unfair to minimize the complexity of the problem. The following account is not always simple, and is still only the beginning of a history of these beads.

A complete report on Indian agate beads would require an archaeological campaign with extensive field work, an aerial survey, several excavations, and both chemical and statistical analyses. Without this, many gaps in our story will have to be tolerated.

We need not despair, however. Resources exist to help sketch the history of the industry. The sources are historical, archaeological, geological, geographic, ethnological, and linguistic. The compiling of this data allows us to identify the important features in the history of these beads.

Our presentation is planned as follows. We begin with mineralogical and geological background details, then examine the industry by following a bead from being mined as a stone to becoming a finished product. The history of Indian agate beads is then traced from ancient times to the present. Details of alternate mineral sources, manufacturing techniques and centers, trade, and bead types are elaborated in the appendices.

Mineralogical Aspects

The silica "quartz family" of semi-precious minerals is large and varied. Quartz is one of the most common minerals on Earth (68). Quartz, proper, forms large visible crystals (is crystalline), and its

varieties are distinguished by color: rose quartz, smoky quartz, clear rock crystal, violet amethyst, etc. Most quartz minerals have crystals invisible to the naked eye (microcrystalline). They are divisible into two series, one with a fibrous structure (chalcedony, agate, onyx, carnelian), and the other with a granular structure (jasper, flint). Fortunately, these two series are optically different. Fibrous microcrystalline quartz is translucent and banded; the granular is opaque (except when very thin) and without bands. Opal, a non-crystalline (amorphous) form does not concern us.

The myriad colors and forms of these minerals have received many names. The modern trend is to consolidate varieties, while retaining useful names. Chalcedony is properly applied to the whole fibrous group, but often used only for the bluish-white type, while the red variety is called carnelian. Chalcedony with more than one color is called agate (moss agate, banded agate). When banding is parallel it is an onyx (black and white) or sardonyx (reddish brown and white).

The granular microcrystalline series is not as complex. Brightly colored members are called jasper (red, green, or yellow), and when dull brown or black are known as flint or chert. One special name is given to a green jasper with specks of red: bloodstone.

Within the three series of silicas (crystalline, fibrous and granular microcrystalline) each variety grades imperceptibly into the other. Terms coined for the varieties were especially confusing before the development of scientific mineralogy.

A further complication is that many of these minerals can be altered artificially, some methods being ancient, and some varieties nearly always altered. Carnelian is heated to redden the iron enclosed in the stone. Onyx is often made by soaking banded agate in honey or sugar and using heat or acid to turn the porous layers black from carbonization, leaving the less porous layers white.

Though quartz is abundant, gem quality stones are less common, and large concentrations are rare. Before New World sources opened (U.S.A. and Brazil), India was the best known and most prolific producer of these stones, especially carnelian and onyx. Unless otherwise stated, it is these two we call "Indian agates."

Geophysical Aspects

India was once part of the Gondwana supercontinent, linked to Africa, Australia, Antarctica, and South America. About 150,000,000 years ago, Gondwana broke up and India began a voyage which ended with a collision with the Eurasian plate, the force of which threw up the world's highest mountains. Volcanic activity ensued, covering most of the Indian peninsula with a deep lava cover known as the Deccan Trap (131: 223).

These lava flows left cavities into which water precipitated minerals, often in spectacular forms such as amethyst geodes and agate nodules. As the trap was eroded, harder minerals were freed and deposited in river beds. The rivers of peninsular India are full of

agate nodules, a fact long recognized (126: 37).

The river of our story is the Narmada, a mighty westward flowing stream some 1200 km (800 miles) long. It is bordered on the north by the Vindhya Range and on the south by the Satapuras, and flows into the Gulf of Cambay. As the river lies on a primeval fault line, the valley is tectonically unstable (34: 435). Culturally, historically, and geographically, the Narmada represents the crucial north/south division of India.

On the southern bank of the Narmada only 25 km (16 miles) from its mouth is an old elevated flood plain. The top soil is grey silt a meter or so thick overlying several meters of red silt which contains the prized agate nodules. These are generally thought to have washed out from the Deccan Trap (165: 134), though Bose believed they were independently formed (17: 178). Recent carbon-14 and thermoluminescent (TL) dating of the fossil soil atop the red silt a few miles upstream from Ratanpur yielded dates of 22,000 to 23,000 years ago, revealing the time when the grey silt was deposited (82).

Below the agate-rich red silt is gravel, often concretized into conglomerate rock. Stone tools of prehistoric (Middle Paleolithic) men have been found on this gravel, perhaps 200,000 years old (135: 4; 137: 113). The mineral wealth of the Narmada Valley has long been used by man, who must have witnessed the floods and other changes responsible for forming the characteristics which make the agate bead industry possible.

Beadmaking at Present

Our story begins in Ratanpur (the Village of Gems) where stones are dug with primitive tools in much the same way as thousands of years ago. The stones are made into beads in the celebrated city of Cambay, the chief beadcutting center of Asia, if not the world. Though some processes have been modernized, most operations have not changed since time immemorial (Appendix A).

Ratanpur is a village of a few hundred souls located in Jhagadia taluka (subdistrict), Broach district, Gujarat state. It is built on two hillocks, one with two dozen cane and stick houses inhabited by Bhils, members of one of India's larger aboriginal tribes. The other hill has about the same number of more substantial dwellings of stone and mud or brick and cement owned by Muslims. This ethnic division is unlike most neighboring villages which are primarily Hindu and Bhil.

Most Ratanpur families farm small plots, though some Muslims have other work (petty trader, professional musician). A small but important group of Muslims are Siddis, descendants of African slaves. The Bhils are the principal miners; some are Christians, but most are best described as eclectic Hindus.

The Bhils mine in the clement winter season on irregular days, digging from early morning until noon. A shaft is dug two to ten meters into the grey soil until the red layer is struck. Then other more-or-less horizontal shafts are dug following the agate-rich red soil. In July, as the rains approach, the shafts are refilled to prevent collapse and accidents from the monsoon torrents.

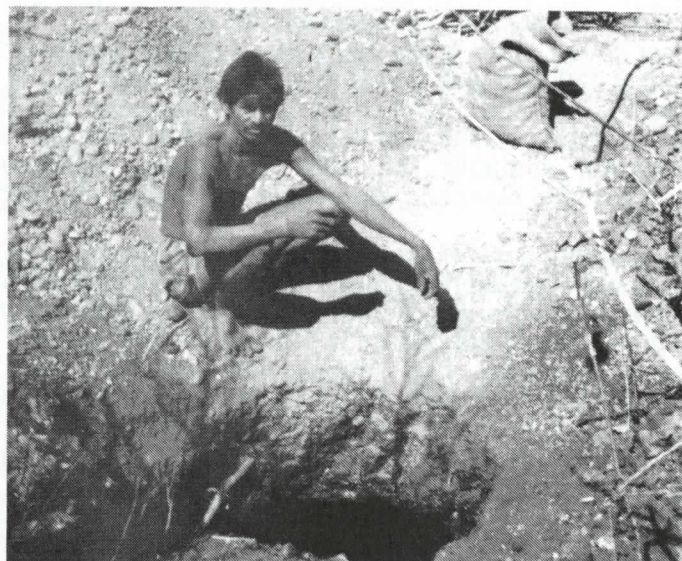


Plate 1: RATANPUR A Bhil miner near the entrance of an especially deep agate mine shaft.



Plate 2: RATANPUR An old man and woman sort stones by the entrance to a mine shaft.

As digging proceeds, stones and dirt are handed up in baskets, sometimes with pullies. The older folk sit by the entrance chipping stone against stone to examine the interior. Dark olive is the best carnelian grade; crystalline stones are rejected. Sorting is repeated when the shafts are refilled to secure good material initially overlooked.

At noon the morning's yield is carried in shallow pans on heads to the "depot" where a private contractor sorts the stones into gems for Cambay, chalcedony for Bombay glassmakers, and rejects which are tossed away. The miners are paid by weight; a good day brings four rupees (50¢). By 3:00 p.m. an agate-loaded truck begins its journey north to Cambay.

The next day in Cambay, the stones are divided by dealers according to their shares in the Agate Society. The stones are first heated to soften them and bring out their color. Some are dried in the sun for a few months, but most are fired directly. The stones are packed with rice husks or sawdust either in open trenches or in overturned clay pots with holes broken in the bottom and burned for 24 hours.

Next a worker chips the stone into a crude shape (a roughout) by bracing it against the tip of an iron stake driven into the ground or mud floor. He strikes with a flick of his wrist using a water buffalo horn hammer mounted on a thin bamboo stick. Many chippers are independent, receiving stones from dealers and returning 250 to 500 roughouts a day for 8 to 20 rupees. Stones often go to a second chipper, who uses a small metal hammer for finer work.

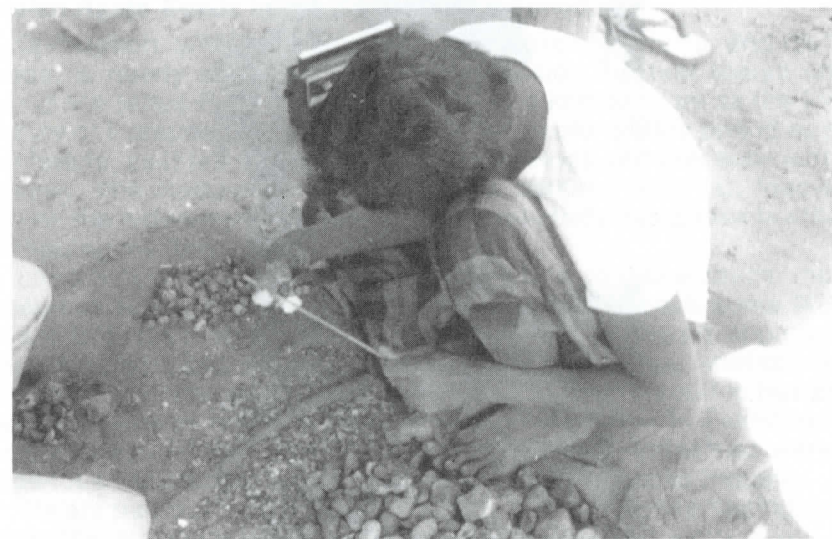


Plate 3: CAMBAY Chipping bead roughouts.

The roughouts are then ground on commercial wheels run by small electric motors. Machines have improved productivity, but the workers inhale the fine agate dust and develop pneumoconiosis, a virulent form of tuberculosis, or silicosis. Nearly half of them are affected (162: 9). The danger could be mitigated by one of several practices, but the workers reject these, as they slow down their rate of 200 stones a day, for which they earn 10 rupees. Despite attention having been drawn to this problem, it persists and yearly five or six agate workers die, apparently fatalistically.

Perforating is not done in Cambay city, but in outlying villages. We observed Himmat Bhai Ambalal Patel of Nagara. He sits on the floor with the stone wedged in a split board mounted on a wooden base. He makes his own drills from "chip" diamonds and two types of steel. He roughens a diamond with an old drill, bores a hole in the broken end of a sewing machine needle, and taps it into place. Alternately, he fits two diamonds into the corners of a flattened tip of an umbrella rib. He mounts the drills on wooden handles with metal pivots on the end, protecting his hand from the pivot with half a coconut shell when drilling.



Plate 4: CAMBAY Himmat Patel of Nagara demonstrates the boring of stone beads.

With the shell in one hand the drill is pressed down; a bow in the other hand rotates the drill. The single bit drill makes a pit about 2 mm deep, then the double bit is used for half the length of the bead, which is then reversed and drilled from the other side. This prevents shattering the end of the bead when the bore breaks through. Water dripped down an umbrella rib fixed into the side of a small clay pot with some string and a piece of wood cools the two-bit drill. The water also contains some fine agate dust which acts as an abrasive. This drilling proceeds at about a centimeter a minute.

Many drillers, other agate workers, and diamond cutters are independently employed. More than half of the diamond cutters of Cambay and elsewhere are from the Patel caste, 90% coming from farms (69: 60). The gem industries are a boon to skilled young men.

After drilling, the beads are polished, a step that has had two significant changes recently. It has been automated: stones, water, agate dust, and a polisher are put in a leather bag, immersed in tar or crude oil and rotated mechanically (159: 16; 121). The few polishing houses have also made the work a secret, well-kept enough that several Cambayans believe polishing is not done there. Motives for the new secrecy are not known.

Most carnelians undergo a final heating to bring out the red color. Beads and ash packed in clay pots are heated in furnaces. This sometimes cracks the beads, wasting all the labor spent upon them.

Indian Agate Beads in the Protohistoric Period

Civilization, with its urban centers, specialized crafts, and distant trade, is nearly as old in India as anywhere. The first Indian cities along the Indus River (now in Pakistan) are known to us as the Indus Valley or Harappan Civilization. We usually refer to this period as protohistoric, as it is known only from archaeology and precedes written history. The Harappans lasted from ca. 2800 to 1600 BC, following which the cities were abandoned; the post-Harappan phase is still an intriguing mystery.

Long before he built cities, man knew how to make beads. Indian beads of soft natural materials have been traced back some 20,000 years (65). Hard stone beads like agates had to await appropriate technologies. Bits for drills and mechanical rotary motion were Neolithic inventions. Our conception of the Indian Neolithic has been radically altered recently by excavations at Mehrgarh, Pakistan. We now understand that many of the later Harappan industries were indigenous Indian developments. This includes the bead industry.

We are particularly interested to learn that stone beadmaking dates from the 4th millennium BC at Mehrgarh, working lapis lazuli, turquoise, and carnelian. Of these, carnelian is the hardest to pierce; drilling was done with green jasper bits and bow drills (91: 130).

In the Harappan Civilization, agate and the rarer carnelian were the most important bead materials, drilled with chert bits (107: 208). It must be significant that in early India, granular microcrystalline

quartz (chert, jasper) was used to perforate the fibrous variety (agate and carnelian). Though both are considered to have the same hardness (6½ on the Mohs scale) the granular variety is apparently tougher.

Harappan beadmaking was done at most cities, but two were important centers of the craft: Chahnu-daro on the Indus in mature Harappan times (107), and Lothal at the head of the Gulf of Cambay somewhat later (130). Both centers made agate beads, including the famous etched carnelians. Reconstruction of Harappan beadmaking show that the processes remain essentially unchanged to the present day (105; 107: 211; 130: 103).

There appears to have been international trade in Indian carnelians at this early date. Harappan and Babylonian connections are shown by common finds of beads, seals, and other minor objects. Our ideas about the exact nature of this trade doubtless need revision (98). Nonetheless, Babylonian records probably contain the earliest references to the carnelian trade when they tell of red stones imported from Meluhha (100: 16, 124). Controversy surrounds this identification of Meluhha, but there is no doubt that carnelian and lapis lazuli were imported to Babylon. The Harappans, who controlled the lapis lazuli sources and had carnelian sources, were the most likely importers.

What were the Harappan carnelian sources? They must have gone outside the Indus Valley. Could they have exploited Ratanpur? Sites with Harappan affinities have been identified at the mouth of the Narmada, including Mehgam, Bhagatray, and perhaps Broach north of the river, and Telod on the south (72: 13; 78: 268; 130: 102). Was one of these a port for shipping Narmada Valley carnelians to the Indus Valley? Or were they simply small farming communities (117)?

Only excavation will answer these questions, but the possibility of agate mining is strong. The Harappans exploited far regions for semiprecious stones, including the most north-westerly Harappan site known, Shortugai, Afghanistan, apparently founded for the local lapis lazuli deposits (64).

An intriguing suggestion was made by the excavator of Lothal. Similarities in beadmaking there and at Cambay made Rao think the two cities were poles of an unbroken Gulf of Cambay beadmaking tradition, with nearby Nagara filling in the gap between them (130: 103).

The proposition may be attractive, but it cannot be maintained. Cambay was settled from Nagara in 6th century AD, but two objections throw the conjecture into doubt. The first is that beadmaking at Cambay does not predate the 16th century. The second is that there is no evidence for Nagara having been a major beadmaking center. This last assertion is based on examination of the Nagara site, the excavated material, and conversation with Mehta, the excavator of Nagara (117).

During Harappan times, we can identify important elements of agate beadmaking: possible sources, manufacturing sites, and trade.

However, this is by no means the whole story. We have pointed out that many agate localities exist in India. Stone beadmaking was a minor industry in many villages, never confined to a single or few centers (Appendix C). It is important to recognize that the Indian agate bead industry was mostly decentralized, yet simultaneously supported key centers. This paradox can be resolved: villages mainly supported an industry for the local market, while large centers were big businesses geared to the export trade.

This study focuses on the northern export center. This is not to deny the importance of local agate beadmaking, nor the possibility of a key southern center. The north/south division of Indian cultural regions is a vital one, evident even in the study of certain classes of beads, such as etched carnelians (47). Our devotion herein to the northern center must not blind us to the possibility of other centers being identified in the future.

The Post-Harappan Period

Our knowledge of the thousand years after the fall of the Harappans is limited. Without an urban focus, small farming communities seem to preclude a large-scale bead trade. Of course, Indians made and wore agate beads, but international trade is difficult to prove. Evidence for local beadmaking exists, but that for trade internationally is less secure. Let us consider both.

Inamgaon, Maharashtra, is known as a chalcolithic site, meaning that both stone and copper tools were in use when it was inhabited (ca. 1700 - 700 BC). It was a prosperous farming community, one of the largest in the vicinity. Across the river is a dry stream full of agate nodules, exploited by nomadic hunters long before the establishment of the village. When Inamgaon was built, the nodules served as raw material for tools and beads. Roughouts are found at the site all out of proportion to worked beads, especially on Mound V (ca. 1400 - 1000 BC). Though beads were made at Inamgaon, the number of roughouts suggests that they were exported to other villages for finishing elsewhere. When India is better explored we may find other such regional centers serving their neighbors with bead roughouts.

Were beads exported further in this period? A final answer is not yet available. Several writers cite Biblical passages as evidence for such trade. Early Indo-Israeli trade is by no means universally acknowledged, but is worthy of our attention.

In *Genesis* 2: 11-12 Pison, one of the rivers from the Garden of Eden, flows around Havilah, a land of gold, bdellium, and onyx. Many scholars believe the passage is a late addition to the text (51: 8), but it is an early reference to onyx shipped from or through Havilah. Gold, onyx, and bdellium (a gum resin) are no doubt Indian products, but not exclusively so. Havilah is usually ascribed to north Arabia (141: 311). India's connection rests on the dubious equation of Pison with the Indus or trans-shipping gold and onyx through Arabia (144: 42). As there is no indication of trans-shipment here, the text does not clearly point

to India.

The next passage describes the 12 stones on the breastplate of the High Priest (*Exodus* 39: 10 ff.). Translations of the 12 stones involved differ, but if we accept Kunz's considered opinion (97: 287) several stones — carnelian, onyx, amethyst, two jaspers and agates — are possible Indian imports. These stones were also available locally, though their high esteem may suggest importation. Certainly lapis lazuli was imported from Afghanistan.

The original breastplate was destroyed, probably at the time of the Babylonian captivity. During the construction of the second temple (6th century BC) another breastplate was made. Josephus, a Jewish historian (ca. 90 AD), gave a firsthand description of this breastplate with onyx, sardonyx, and beryl, all of which may have been Indian (169: 90/Book 3, 7:5). Still, the possibility of closer sources cannot be ruled out.

In the 10th century BC, Solomon's fleet sailed to Ophir (I *Kings* 9: 26). The trip took three years or a full year and parts of two, and returned with gold, silver, precious stones, ivory, fine wood, and two types of monkeys. Ophir was confirmed as a source for Israel's gold by an engraved potsherd found at Tell Qasileh (87: III 605). Where is Ophir? The Greek Septuagint Bible (ca. 250 BC) reads Sophir (= Sopher, north of Bombay) and monkeys and peacocks (native to India). But this reading has been rejected; Ophir and two monkeys are correct, and modern scholars look elsewhere for Ophir, especially Arabia and Somaliland (87: III 605; 54: 1414).

However, the question is not closed. The long journey involved and the non-mention of typical Arabian aromatics, frankincense and myrrh, argue against an Arab or East African location for Ophir. On linguistic grounds, the hard wood *algum* or *almug* has been identified with Indian red sanderswood (*Pterocarpus santalinus* L.) (142: 130), while the name for ivory for the throne of King Solomon has been traced to a southern Indian root from the Dravidian (Tamil) language (92: 274).

In sum, from about 1500 to 500 BC we are left with more questions than answers. We have hard evidence for local and regional agate beadmaking. Wider trade does not seem a mere fancy, especially in the case of Solomon's fleet. But whether the High Priest or his contemporaries wore Indian semi-precious stones (they were precious in those days) can only be suggested and not proven until more facts are discovered.

The Early Historic Period: Roman Traders

Clear references to the Indian agate bead trade appear in the West from the 5th century BC. Herodotus said that Romans were fond of onyx and carnelian, the leading Ratanpur products (159: 3). In the first century AD, Nero paid a million gold sesterces for a drinking cup of murrhine, a stone not satisfactorily identified. Pliny said it was, "a fact worthy of remembrance: that the father of his country should

have drunk from a vessel of such costly price." (8: I C 28) Indeed!

Specific information on Indian agates was left by the anonymous writer of the *Periplus of the Erythraean Sea* around 88 AD (31: 1). The author observed that the beads so popular in Rome were sold from the port of Broach at the mouth of the Narmada after being cut at Ujjain and floated down the river (two rivers are actually involved) (144: 42).

The account must be taken as altogether correct. Broach has been known as a great emporium since "hoary antiquity" (3: S 34). Likewise, Ujjain was an important ancient city, the capital of the rich Avanti region. Archaeological evidence confirms that Ujjain was a major beadmaker.

A bead workshop from the Mauryan period (324 to 187 BC) was found at Ujjain, giving an early date for the lapidaries. Unfortunately, the succeeding period, Ujjain III, is uncomfortably long — 200 BC to 1300 AD. Though beadmaking is evident at this time from two hoards of over 5000 finished and unfinished beads, we would like more precise dates (10: 27; 11). Nonetheless, we are sure that both Broach and Ujjain were parts of the Indian agate bead industry for a long time.

Ujjain was once one of the wealthiest cities in India. A glimpse of Ujjain is furnished in a passage from the famous Sanskrit play *Mrcchakatika* (*The Toy Clay Cart*) of the 3rd century AD. Though agate beads were made in another quarter than described here, the passage provides an insight to the times:

Mait (speaks): What is going forward here so busily? It is the jeweller's court: skillful artists are examining pearls, topazes, sapphires, emeralds, rubies, the lapis-lazuli, coral and other jewels, some set rubies in gold, some work ornaments on coloured thread, some string pearls, some grind the lapis-lazuli, some pierce shells and some cut coral...Whom have we here? Fair damsels and their gallants, laughing, talking, chewing musk and betel and drinking wine. Here are the male and female attendants, and here are the miserable hangers-on—men that neglected their own families and spent their all upon the harlot, and now are glad to quaff the drainings of her wine-cup. (170: 85)

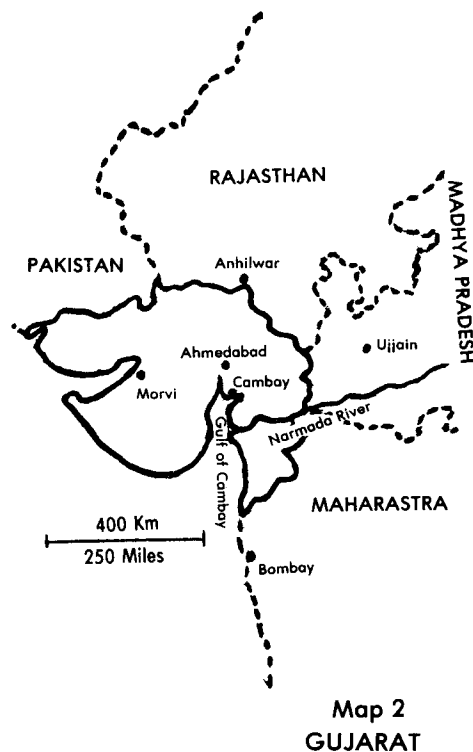
What was the source of stones cut at Ujjain and exported from Broach? The *Periplus* said carnelians came from Paethana (Paithan, Maharashtra) (144: 84), but this could hardly have been a steady supplier, for Paithan was controlled by unfriendly dynasties, and for some time was the capital of the rival Satavahanas. Banerjee suggested sources nearer Ujjain, but offered no proof of exploitation (12: 15).

If we examine the text of the *Periplus* we note that though Schoff translated "agates and carnelians," the transliterated Greek is *onychine kai lithia murrhine*, that is, "onyx (stone) and murrhine." Onyx points directly to Ratanpur (Appendix B). Ptolemy's "Sardonyx Mountain" has been identified with Ratanpur for a very long time; the map based on his *Geography* clearly shows the sardonyx source to be in a mountain range just south of the Narmada and politically controll-

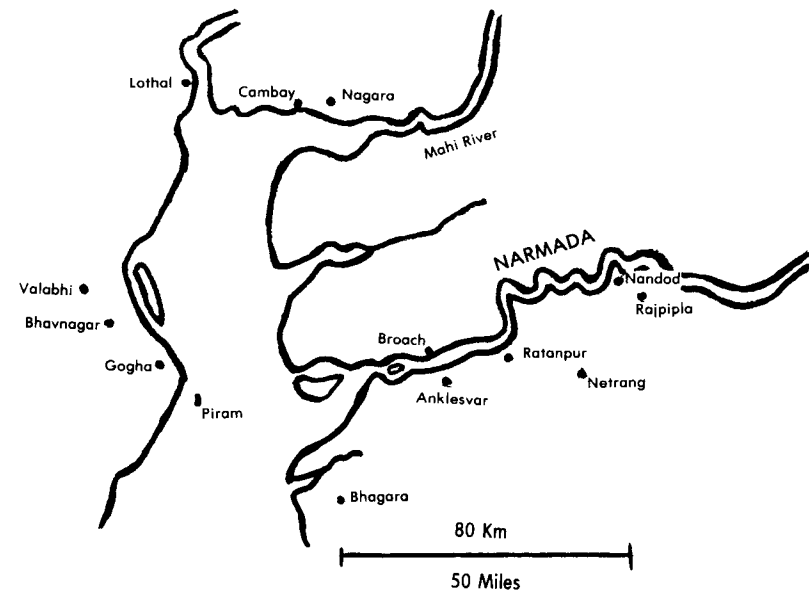
ed by Ujjain (59: 464; 9: 236). We are left with the problem of the elusive murrhine.

A century ago Ball said that more than 600 writers had attempted to identify murrhine (9: 234): one count lists no less than 18 candidates (161: 93), to which moss agate must be added (28: 205). Despite the evident risks, we have another suggestion to make, with the following argument: The murrhine of the *Periplus* was apparently a Ratanpur product. Many Latin sources refer to it as a yellow substance (*murra* means myrrh) (161: 88). Pieces large enough for the thirsty Nero's cup were very expensive. Cat's eye, always rare, particularly in large pieces, is a costly yellow stone from Ratanpur. We tentatively put forth the inference that cat's eye was the murrhine of the Romans.

Non-Indian sources, especially the *Periplus*, help pinpoint the industry at the beginning of the current era. Excavations at Ujjain confirm that it was a major beadmaking center. A glance at maps 2 and 3 shows how Ratanpur must have supplied the Ujjain lapidaries, who sent their beads to Broach for export to Rome, Persia, and beyond. We must not underestimate the wealth and power of Ujjain, and as long as it remained powerful, it controlled the Narmada Valley and Broach's docks, for these were the city's links to the outside world and fundamental to its livelihood.



Map 2
GUJARAT



Map 3
GULF OF CAMBAY

We need not rely exclusively on non-Indian sources for notices of the agate bead industry. From the 2nd century AD Indian records are also available, and to these we shall next turn.

Indian Sources in the Early Historic Period

The invasion of Alexander the Great into India (326 BC) sent shock waves through the subcontinent. One effect was the establishment of the Mauryan dynasty (324 - 187 BC) which ruled India from the capital at Patliputra (modern Patna, U.P.). The greatest Mauryan, and one of the greatest kings of all times, was the compassionate Ashoka (died 232 BC). The Mauryans were succeeded in northern India by the Sungas, and they in turn by the Sakas, a central Asian people driven into India by population pressures ultimately from China.

Ujjain was always a prize for conquerors, and a Saka satrapy was established there. The outstanding Saka ruler of Ujjain was Rudradaman I. About 150 AD, he had the first major Sanskrit inscription carved on a rock at Girnar (Junagedh) recording the repair of a dam. The same rock holds other inscriptions: an earlier one by Ashoka and a later one by Skandragupta.

The inscription proclaims Rudradaman's greatness by boasting of his territory, beginning with *Purvaparna Akaravanti*. Both of these words are compounds — *purva* (east) and *apara* (west) and *akara* (unidentified) and *Avanti* (the Ujjain region). Indraji translated this as

"eastern Akara and western Avanti," which makes *akara* a region east of Ujjain (86: 259). Kielhorn believed Rudradaman was "lord of eastern and western Akaravanti," without solving the meaning of *akara* (96: 41). It has been recently pointed out that *akara* is Sanskrit for mine or quarry; the phrase may be equivalent to "oil-rich Texas." The quarries best known in Avanti are the Ratanpur mines (11: 189; 90: 224). The argument, which has found favor among modern Indian scholars, means the Girnar inscription is the earliest Indian reference to the Ratanpur agate mines.

The Saka satraps fell to the irresistible force of the Imperial Guptas who controlled all northern India. Ujjain was captured in 388, but far from suffering, was greatly favored, and flourished as a second capital to rival Patliputra. The Guptas were progressive, and patrons of the arts and literature. It is commonly (but by no means universally) held that the final editions of the epics, the *Mahabharata* and *Ramayana*, and the religio-historical texts, the *Puranas*, are to be dated to this period. Some may have reached final form in Ujjain.

The earliest Indian texts, the *Vedas*, were composed by the Aryans in the late 2nd millennium BC. Their world-view did not extend far beyond their home in the Punjab. Mt. Abu (near Anhilwar) is the southernmost spot mentioned, still quite north of the Narmada (134: 148). The range was not greatly extended in the early strata of the epics. *Vaidura Parvat* in the *Mahabharata* has been identified as the onyx mountain in western India (i.e. Ratanpur) (99: 180). Current scholarship, however, identifies it with the lapis lazuli mountain of Afghanistan, as it is washed by the Oxus River (1: 90).

The 18 *Puranas* received final form after the epics, and were composed at different times. The early *Matsya Purana* mentions no geographic features south of the Narmada, while later ones such as the *Vaya Purana* and *Brahmanda Purana* do. The geographic term *Kuliya janapada* may have corresponded to the area south of the Narmada, including Ratanpur (1: 146).

The *Garuda Purana* especially interests us, for it contains a section on the science of gemstones giving practical hints on testing and a mythic account of the origin of gems. The story relates that the demon Vela was tricked by the gods into playing the part of a sacrificial animal at a feast, whereupon the gods turned on him and killed him. His body began to turn into gem-seeds, and the gods rushed in to claim their share. His bones became diamonds, his bile emeralds, his eyes sapphires, etc. Agni took the skin:

The fire-god, having picked up the complexion of the lord of the demons, cast it into the waters of the Narmada, a portion of which fell into the low-lying lands of the vicinity, occupied by the communities of vile caste. From the complexion so cast about (arose a stone), coloured like the hue of the Indragopta insect (ladybug; *Coccinellidea*) blended with that of the mouth of a parrot, and is characterized by a uniform elevation and brightness in all its parts.

Blood-stones of various colours have been obtained on different occasions, some of which are extremely clear and coloured pale red and like the disc of the half-moon...(They are) looked upon as possessing the mystic value of increasing the wealth and number of servants of the wearer. (149: 207)

The passage is an unmistakable reference to mining carnelians around Ratanpur. Although the translator literally rendered the word *rudhirkhys* as "bloodstone," the green jasper we call bloodstone is certainly not meant; the stone of the passage is carnelian.

We also learn that mining was carried out by "vile castes." The term is *jati*, which may mean either tribe or caste. We cannot say whether the reference is to the Bhils of Ratanpur, but it seems likely, as Hindu settlements were few south of the Narmada at that time. In either case, the area was clearly underdeveloped.

A similar story is told in Buddhahatta's *Ratnapariksha*, a treatise on gemstones. Written in the 6th century, it apparently post-dates the *Garuda Purana*, as it gives additional details on carnelians. The most interesting addition is that some carnelians fell in China and other countries, suggesting a wider perception of their distribution (56: 55).

Buddhabhatta also left us confusing information. He said the stones were the size of the *pilu* fruit (*Salvadore oleoides* Dcne. or *S. persica* L.). These are only about a centimeter in diameter. Ratanpur carnelian nodules are smallish, but more the size of one's fist. Perhaps Buddhahatta was describing the size of a finished bead rather than a stone (*ibid*).

Early historical Indian records neatly complement what we know from non-Indian sources and archaeological explorations. The agate trade in the first few centuries AD was concentrated along the Narmada at Ratanpur, Ujjain, and Broach. We lack precise dates and many details, but the evidence strongly points to a lively bead industry in these centuries.

The Gujara Dynasty

Ratanpur has always been on the fringe of crucial movements in Indian history. Conquerors of the north and south crossed the mighty Narmada without giving Ratanpur a second thought. The area was considered wild country, abounding with tigers. The agate mines were either too little known or of too minor importance for kings to make them specific targets. Much of the area's history is obscure. Local dynasties were minor actors on the Indian stage, though they are of great interest to us. The first of these local dynasties was the Gujara.

After the Gupta's eclipse, Broach was seized by the Chalukyas of the Deccan by 595 (21: 182). Ujjain (the area is now called Malwa in place of Avanti) passed in and out of the hands of a half dozen dynasties. However, our interests shift from Ujjain to closer to Ratanpur.

The Gujara dynasty was founded about 580 by Datta I, a cousin of the powerful Pratiharas. The most illustrious Gujara was Datta II, a

consummate politician, who preserved independence despite troubled times and powerful, acquisitive neighbors. He allied himself with Pulakesin II of the Deccan to prevent the powerful army of Harsha from crossing the Narmada south. Later Dhurvasena IV of Valabhi sought refuge with Datta after Harsha invaded Valabhi. Datta convinced Harsha to restore Dhurvasena and marry his (Harsha's) only daughter to the Valabhi king. This neat stroke of diplomacy happened shortly before the Chinese pilgrim Hiuen Tsang visited the Buddhist shrine at Valabhi in 640.

A land grant issued by Dhurvasena at Broach in 644 has been taken to prove that he turned on his old friend and overran Datta's territory (24: 34). One explanation for this postulates not ingratitude, but that the grant was issued while Dhurvasena was Datta's guest (111: 147). These interpretations assume that Broach was the Gujara capital, but this may not have been so, and the location of Datta's capital is of real importance.

Datta issued land grants in 630 and 635 giving away a village near Anklesvar. The grants open with the formula: "Om (Peace), hail! From the camp of victory at Nandipura..." Buhler first noticed that this line is identical to that used by the Valabhi kings when they were physically present in their capital city. It follows that Nandipura was the Gujara capital.

Though first identified as a small fort outside Broach (22: 62), and more recently with Nandeval village near Broach (122: 25), the weight of opinion favors a different identification. Nandipura is probably Nandod, south of the Narmada and a bit east of Ratanpur. This has come to be accepted by the majority of scholars over the last century (85: 72; 57: 81; 3: S 28; 136: 328). Moreover, if Nandod, not Broach, were the Gujara capital, several historical problems are solved, including the Dhurvasena grants from Broach, the ability of the Gujaras to prevent Harsha from crossing the Narmada, and the existence of the Latas, known to be contemporaries holding power north of the river (136).

Here is a key to our story, for Nandod is only 35 km from Ratanpur, as goes the crow, and was a regional seat of power in later times. Thus from 580 to 735, the Gujaras controlled Ratanpur from Nandod and were masters of the raw materials for the Indian agate bead industry.

We can safely assume that the Gujaras exercised a hold over the Ratanpur mines. In theory, at least, the state maintained strict control of mineral wealth. The renowned treatise of government, Kautilya's *Arthashastra* specifically states:

Commerce in commodities manufactured from mineral products shall be centralized and punishment for manufacturers, sellers, and purchasers of such commodities outside the prescribed locality shall also be laid down. A mine-laborer who steals mineral products except precious stones shall be punished with a fine of eight times their value. (It was capital punishment for

stealing precious stones.) Any person who steals mineral products or carries on mining operations without license shall be bound (with chains) and caused to work (as a prisoner). (148: 97)

Unfortunately, we do not know how the Gujaras disposed of their mineral wealth, of little value until turned into beads. They likely continued mutually profitable trade with Ujjain, but other possibilities also exist.

The Gujaras could have begun beadcutting in their own territory. A late legend says Baba Ghor set up beadmaking at Nandod (28: 206), but on the face of it, this seems unlikely. Bose reported finding no trace of a bead industry at Nandod, and assumed the account confused Nandod with Nimodra (Limodra) (17: 177).

Another possibility was alternate lapidaries at Valabhi, where many unfinished beads and rings have long been observed (26: 78; 117; 121). Valabhi may have used local stones (117), but its proximity and general good relations with the Gujaras suggest Ratanpur stones being cut at Valabhi. Only more work is going to give us a clearer picture of this period's agate trade.

Later Gujara history is spotty, punctuated by war. Datta III fought the "kings of East and West," which may be Valabhi and Malwa. Jayabhata IV, the last Gujara, fought in the rout of the Arabs at Valabhi in 725. The Gujara's cousins, the Pratiharas, swallowed Nandod, Valabhi, and possibly Malwa, as they rose to become the undisputed rulers of north India.

Tug-of-War: The Solankis and the Paramaras

The Pratiharas declined as suddenly as they rose. By 867 Broach was taken by the Deccan Rastrakutas (23: 176). Malwa, which the Pratiharas may never have held, was ruled by the Paramaras by 800 (25: 225).

The Rajput Paramaras waxed strong under Vakpati II (973 - 997) and Bhoja I (ca. 1000 - 1055). Both were great fighters, and their favorite target was to Malwa's west, Gujarat (named after the Gujaras). Bhoja so ravaged the Gujarat capital that the expression "the sack of Anhilwar" became proverbial (50: 127).

The Solankis (or Chaulukyas) of Anhilwar dominated Gujarat. When Bhoja attacked, the Solanki king, Bhima II, was fighting the Arabs in Sind. Soon thereafter, the Arabs destroyed the great Hindu temple at Somnath, also in Gujarat. Bhima was not dispirited by this double blow; throughout his reign and those of his son and grandson, the Solankis were a force to be reckoned with. They not only had military victories, but were builders, art patrons, and shrewd businessmen.

Bhima's grandson, Jayasimha Siddharaja, conquered Ujjain in 1137, after 12 years of warfare. He put the Paramara king in a wooden cage and paraded him through the rebuilt streets of Anhilwar, to repay for his ancestor's deed. Jayasimha also took the Ratanpur area. We do not know precisely when, but a Paramara idol dated 1064 was

found at Limodra inscribed by Udiyadita, the last strong Paramara king, who died about 1080 (95: 83).

Solanki control of Ratanpur began between 1064 and 1137, say about 1130. This was of great importance to the agate bead industry, because for the first time in 1000 years Ratanpur's stones could no longer be cut at Ujjain, for the political connection between the two was severed. We know the Solankis controlled the Ratanpur area for some time. They appointed two families in turn to act as feudatories, their cousins, the Chahumanas (58: 80), and later the Viajavapayanas, with their capital at Nandod, whose last king was ruling in 1290 (129: 200). The area south of the Narmada was called Antar-Narmada (134: 135) and/or Narmadatata-mandala (123: 411).

The significance of these two Solanki feudatory families had never before been appreciated, especially the Viajavapayanas, whose very existence was unknown until the recent discovery of a copper plate grant (129: 200). Now we understand something about them as we learn about one of the industries in their small kingdom. It is gratifying to see that our investigations are contributing to a fuller understanding of Indian history.

Solanki control of the Ratanpur mines from ca. 1130 to 1290 left them with the problem of exploiting the wealth of stones which were no longer cut at Ujjain. The Solankis were good businessmen, and we can well imagine them saying, "If the stones can no longer go to the beadcutters, then let the beadcutters come to the stones." The solution was to set up a new beadcutting center much closer to the Ratanpur sources. The new center chosen was the village of Limodra, near the bank of the Narmada, to take advantage of water transport, and only five km from the Ratanpur mines.

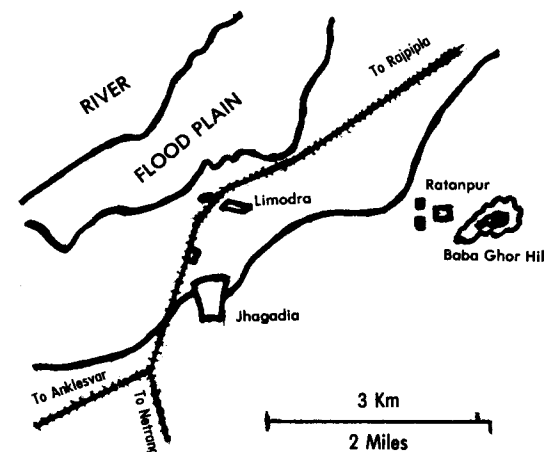
The last stages of beadcutting at Limodra are documented by an early visitor to India, the Portuguese, Durante Barbosa, who reported on beadcutting at Limodra in 1518. The memory lingered in the last century: "The trade in onyxes, cornelians, and agates from the sardonyx mountain of Ptolemy not many miles from Broche (sic), has been transferred from thence to Cambay," wrote Forbes in 1834 (59: 464). We are obliged to look closer at the sleepy village of Limodra.

Limodra/Manipur Shahr

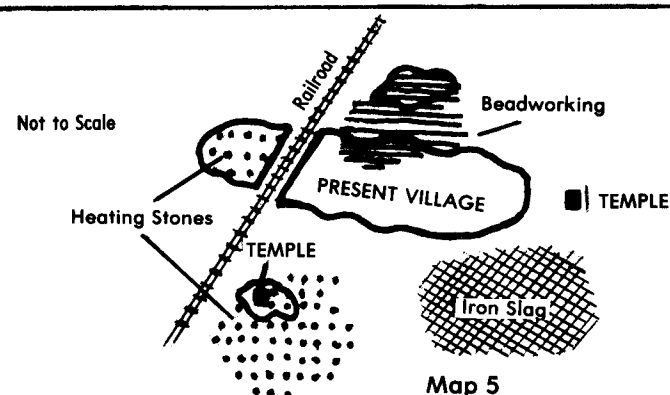
The memory of Limodra's "golden age" persists. Our questions brought immediate responses from our informants (especially Bukkar Bhai Balasingh Thakkur, Jina Bhai, and Antur Dipsingh). They said the plain from the river's edge to the foothills was anciently known as Manipur (Bead Place), and Limodra itself as Manipur Shahr (Bead City). It was once a great town.

Two field explorations have confirmed the claims of past glory. Limodra (pop. ca. 4000) was once at least twice its present size, graced with temples, served by a sophisticated drainage system, home to an iron foundry, and had a quarter devoted to beadmaking. The village sits on a mound which is at least partially artificial. The north-west

sector is littered with stone chips and bead and ring roughouts, including a small northern mound with traces of abandoned buildings. A seasonal stream between these mounds has exposed terracotta and stone drains.



Map 4
MANIPUR



Map 5
LIMODRA/MANIPUR SHAHR

East of the village a clogged water tank and canal and a stone with the monkey god Hanuman are all that remain of a temple, whose fallen stones were recently sold at Jhagadia market. A second temple on the southwest of Limodra sat on a small rise. This ruin is surrounded by many potsherds, suggesting that this was an area where initial firing of stones was done. South of the village is an impressive scatter of iron slag, first noticed by Fulljames in 1832, and estimated by Bose

to be up to five feet deep and cover six acres (17: 183). Near Vaghapura village, half-way between Limodra and Ratanpur, stood a temple made of the same conglomerate as the south-west temple of Limodra, now covered with soil save a few blocks and some brickwork.

Though little remains, the three temples suggest Solanki architecture, as each were massive structures with little or no foundation, and no mortar. The Solankis introduced masonry to their realm and were eager builders. These characteristics are typical of Solanki architecture (109: 364; 89: 247).



Plate 5: BABA GHOR HILL, RATANPUR The walkway up to the shrine. The stones once formed the temple of Makkhan Devi.

Beyond Ratanpur, Baba Ghor Hill has the most interesting features of the area. At the summit once stood a small, finely carved yellow limestone temple, the blocks joined with metal pins, and the whole on a mortared brick foundation. The temple is gone, but we can describe it because over 900 of its blocks — carved pieces, small columns, and fancy shapes — have been preserved as flagstones for the walkway to Baba Ghor's shrine (Plate 5). Below the temple site on the ridge of the hill, a natural hollow has been used to build a fine-grained sandstone tank for catching rainwater. It seems likely that the tank and temple were part of the same complex.

Lastly we must consider an idol of the goddess Rikhadeva found by farmers near Limodra in 1864 and installed in a temple built in 1872. A short Paramara inscription on the footstool which dates to 1064 or

1070 gives us a late date for Paramara control of the area. Unfortunately, we know nothing else, as it appears never to have been properly published. No amount of inquiry led us to the idol or its temple. Its loss is regretted; it was probably carried off long ago to some museum where it gathers dust (28: 99, 162; 17: 177).

Limodra was rightfully called Manipur Shahr. Its size, the temples and iron foundry, and the evidence of beadcutting there confirm that it was Bead City. The Manipur region (Vaghapura and Baba Ghor Hill) also has interesting features. Excavation in this area would pay off handsomely in new and more accurate data about this phase of the Indian agate bead industry.

The Coming of Islam

Muslim incursions into India began in the 8th century. One by one, Hindu armies were defeated and Muslim rulers dominated northern India, including Malwa and Gujarat, by the 13th century. Limodra and Ratanpur were caught between the new conquerors and the last of the old princely houses.

During Muslim domination, the same dynastic ebb and flow that characterized the Hindu period existed. Delhi's central government shaped events for a while, then power would diffuse and local princes become dominant again. Whenever Delhi was weak, Gujarat and Malwa retained their independence and continued their old rivalry.

The Viajavapayanas, the Solanki feuditories at Nandod, are last known in 1290. Tradition says that about this time Chokarna, a son of the last Paramara of Malwa, quarreled with his father and set up independently at Pipla, a village hard of access high in the Satapura Range (28: 99). Perhaps he displaced the Viajavapayanas.

Meanwhile, Muslims under 'Ala-ud-Din Khalji subdued Malwa (1305), ending five centuries of Paramara rule. They may have taken Nandod, made it a local capital, and issued coins from there (28: 99). No documented history for Chokarna or the Muslims at Nandod in this period has emerged. Nor are Muslim coins from any 14th century Nandod mint recorded, at least to the author's knowledge. If Muslims did take Nandod, it may have been they who unseated the Viajavapayanas.

Chokarna's story is elaborated enough to have the ring of authenticity. He had no sons, so he married his only daughter to Mokherji, the pirate king of Gogha and Piram in the Gulf of Cambay. Mokherji's outrages provoked the wrath of a stronger prince; Mohammed bin Tughluq overthrew him in 1347. He left two sons, grandsons of Chokarna. Dungarji fled, later to return and set up anew at Bhavnagar, close to Gogha. Samarsinghi (or Gamarsinghi) was an infant carried across the Gulf by a nurse to Bhagara, where he either waited for his grandfather to die or was adopted by Chokarna and succeeded to the throne of Pipla in 1370 (59: 297; 28: 99; 84: 80; 167: 280).

Northern India was ruled from Delhi in the 14th century first by the Khaljis, then the Tughluqs. By 1400 Tughluq power weakened and Gu-

jarat and Malwa broke from central authority, both under dynasties founded by men originally appointed governors from Delhi. The powerful rivals were again independent, both now Muslims.

There was also rivalry south of the Narmada. The Hindu king built a new capital at Rajpipla, retaining Pipla as a stronghold. Muslims held Nandod, usually as Gujarat feudatories. From 1400 to 1550 we have little evidence as to who controlled Ratanpur's mines and Limodra's lapidaries; the little we do know suggests Manipur was under Muslim influence.

As for the greater powers, in Gujarat, Zafer Kahn proclaimed independence from Delhi about 1401, eventually succeeded by his grandson, Ahmed Khan, one of the most glorious of Indian rulers. He was virtually invincible, a capable ruler, and builder of the splendid capital of Ahmedabad. His one serious defect was his religious intolerance (112: 345). He was no friend of Malwa.

In Malwa, Dhillwar Ghor acted independently from about 1390 without proclaiming it. He was a respectful host to his nominal king, the last Tughluq, Mohammed, who had asked for his protection in 1401. This generosity displeased Dhillwar's eldest son, who poisoned his father in 1402. Hoshang made an outstanding king, building the capital of Hoshangabad on the Narmada, and engaging in many adventures, including disguising as a merchant to trick the king of Orissa into giving him elephants. The elephants were to fight Ahmed of Gujarat.

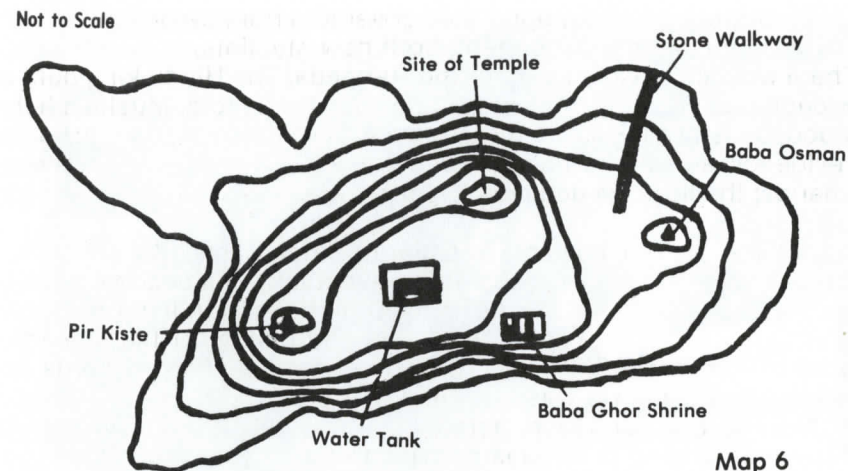
Fighting between the big rivals spilled into Rajpipla and even Manipur more than once. Two invasions of Rajpipla by Ahmed are known: 1416 after Rajpipla had tried to revolt, and 1431 when Ahmed razed Nandod and sent the Hindu King, Harising, into exile, which lasted until 1443, after Ahmed's death (28: 99; 20: IV 30).

The wars must have affected Manipur; this is the time the temples must have been destroyed. The finger points clearly to Ahmed, who in 1414 ordered that all pagan temples in his land be destroyed (36: 80). Such action was unthinkable to Hindu kings, and the Malwa Ghoris were known for their religious tolerance (40: 21, 63). Only Aurangzeb was as intolerant as Ahmed, and he seems to have had nothing to do with our area.

Another effect of the wars was the death of Baba Ghor. Though his story lies on the border between history and legend, as the patron saint of the agate industry, he is crucial to its history. To his story we must next direct our attention.

Baba Ghor

The patron saint of Ratanpur is enshrined on Baba Ghor Hill. Ratanpur miners and Cambay beadworkers pray to him, thousands flock to his annual festival, guilt and innocence are proved at his tomb, and stones are named after him. At 387 feet above the sea (119 m; *Survey map 46 G 2*) his hill dominates the area as the westernmost peak of the Rajpipla Hills, themselves the most westerly of the Satapura Mountains.



Map 6
BABA GHOR HILL

Despite his importance, Baba Ghor is a shadowy figure. The Muslim historian, ad-Dabir (17th c.), first mentioned Ghor saying that the young Gujarat king, Qutbuddin Ahmed, visited Ghor's tomb while traveling to Broach in 1452 (103: 4).

But who was Baba Ghor? There is no lack of conflicting answers. The oldest, and on the face of it, best, answer was given by John Copland, the first man to leave an account of a visit to Ratanpur, in 1814. He said local tradition held that Baba Ghor was a prince of the house of Ghor (of Malwa) killed in battle nearby (36: 269). This agrees with a burial date of pre-1452. Which Ghor he was is difficult to say; he was not a brother or son of Hoshang, but many nobles adopted the Ghor name in the 15th century. To this day, there is a small Muslim community of Ghoris in Gujarat, though nothing is known of their history (119: 82).

Baba Ghor was next mentioned in 1756 by Ali Mohammed Khan, who said that Baba Ghor Habash was buried in a village near Broach (2: 119). The names Mulik Habash, Sidi Habs, and Abbas are all synonyms for Baba Ghor (pers. observ.; 159: 55), but these names have also become people in their own right. Summers reported separate graves for Ghor and Abbas in 1851 (154: 322), and the *Gazeteer* recorded that Habash was a brother who had come to look for Ghor after a 12 years' absence (28: 168). A tomb for Baba Abbas atop a neighboring hill was dedicated on 6 February 1981, paid for by a daughter of Ratanpur who now resides in the U.S.A.

Our problems are only beginning: the exact location of Baba Ghor's tomb is in doubt. In 1814 Copland passed the water tank to visit the tomb on the summit of the hill (36: 269). That tomb was ascribed to Baba Habash in 1880 (28: 168), and today Pir Kiste is said to be buried

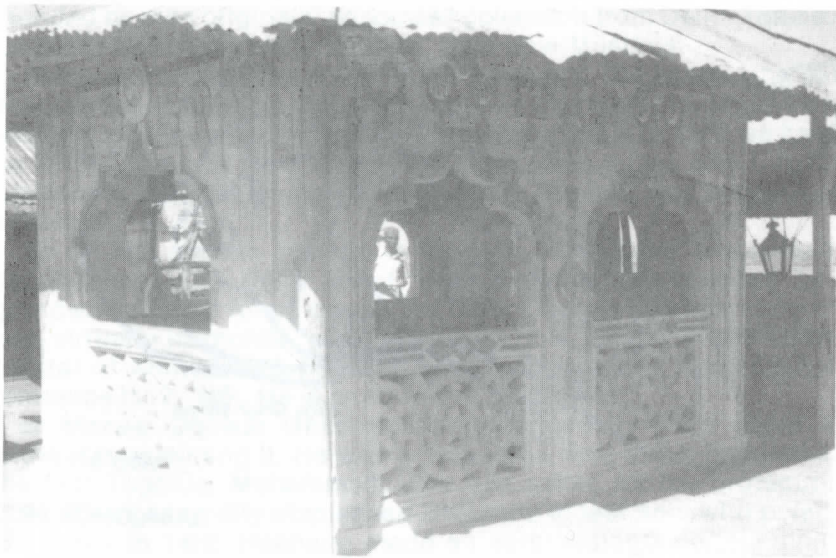


Plate 6: RATANPUR The shrine of Baba Ghor.

there (See Map 6). In 1880 the Hindu beadcutter of Cambay complained that Baba Ghor's new shrine (the present one; neither on the summit nor past the water tank) was erected over their saint's tomb, not Baba Ghor's (28: 206).

Moreover, the Baba Ghor legend has grown. Two stories in the *Gazeteer* account of 1880 are completely different. One, collected from the *mujaver* (tomb servant), says Sheik Ghor Siddi was sent by the Prophet Mohammed from Mecca to investigate a light on the hill, caused by the pagan goddess, Makkhan Devi, burning 50 pounds of butter in a lamp (*makkhan* means butter). The goddess sank into the ground at Ghor's approach, and the saint settled there and worked miracles (28: 169). In another section, we are told of a saintly Abyssinian bead merchant who began the mining with Muslims, later training the tribals, and starting beadcutting at Limodra (here recorded as Nandod). He died rich, and was buried where the Cambay beadcutter complained about the usurpation of their saint's tomb (28: 206).

In the 20th century, the stories of Baba Ghor and the Abyssinian bead merchant had merged, as evident from two reports of the *Census of India, 1961*, one covering the agate bead industry (159), and the other the Siddis of Gujarat (160). The Siddis' story is quite embellished. We are told that Baba Ghor was a hermit in the woods who noticed the effects of his campfire on the stones. He started the agate bead in-

dustry while his brother, Baba Sabun, traveled to Africa, Arabia, and elsewhere selling beads (160: 24). Sabun is buried in Cambay (159: 55).

The Siddis worship a pantheon of saints related to Baba Ghor, who reportedly has four sisters and three, nine, or eleven brothers, always including sister Mai Misra and brother Habs/Habun. Siddi songs are dedicated to the saint and his family, but it is obvious that Ghor is taking second place to an older mother goddess:

Mother goddess!

You sit on the swing with gold kalash (on your head)

Mother! walk slowly (refrain)

Mother you are enshrined in Ratanpur town

Your jhula (seat) is on the hill (160: 27)

The mother is Mai Misra, the only officially recognized sister today, buried next to Baba Ghor. Another Siddi song says in part:

The chundadi of mother goddess is red

She is spirited

and none can don her chundadi (refrain)

Baba Ghor, the Jangli Pir, came from Mecca

and is enshrined in Jhagadia

where also lives Mai Misra

Habs Khan came from Mecca

and is enshrined in Ratanpur

where also lives Mai Khinna (160: 25)

Here Baba Ghor is split in two and identified with Pir Kiste, the Jangli Pir (Old Man of the Forest). Note that Ratanpur is in Jhagadia subdistrict, but Jhagadia town is a few kilometers from Ratanpur and one south of Limodra. In the song, it is Habs buried at Ratanpur.

The most recent Baba Ghor story was gathered by the author from the current *mujaver*, Babuji Badshah, and his nephew, Noormohammed. Baba Ghor was a Negroid magician who heard of the destructive magic of Makkhan Devi while at Mecca for the pilgrimage. The goddess terrorized the people, marking her victims with stripes of blood up their foreheads. Ghor came to Ratanpur and battled with her and her hosts, though it was really Mai Misra who killed Makkhan Devi with her slipper. Ghor had a platonic relationship with Vagan Devi, another local goddess/priestess (remembered in Limodra). After the battle he ordered the destruction of Makkhan's temple; Muslims rarely go there and believe the tank is haunted, though they use the water. Interestingly, the Bhils worship at the temple site and the tank, as is evidenced by pieces of coconuts (used for worship) and confirmed by questioning. The only siblings officially recognized today are Mai Misra and Baba Abbas.

What are we to make of all these conflicting stories? Though we shall never know the whole truth, considering the elements in their historical and ethnic contexts give us a picture we believe to be fairly

accurate. This summation, however, is only an hypothesis.

Baba Ghor Hill was a holy place long before the Muslims came to Ratanpur, with a fine temple of Makkhan Devi and the tomb of Pir Kiste, the Old Man of the Forest. Abbas, a scion of the Malwa Ghors, died nearby and was buried on the hill, his tomb becoming a counter-magnet for Muslim worship in the area. If a battle were fought, Abbas was opposing either Ahmed Shah's troops or those of the Hindu king of Rajpipla (Pipla).

Credit for elaborating the Baba Ghor story goes to the Siddis, descendants of African slaves of Muslim officers. They first migrated into Gujarat in large numbers in 1519 after the "Abyssinian dynasty" of Bengal was destroyed by Hussain Shah (171: 271; 140: II 135). It was difficult for the Siddis to assimilate after manumission, largely because of their distinctive physical appearance. They long lived in a state of anomie, a condition of most of them today (160: 28). Given this background, religious eclecticism is not surprising; a Muslim base was incorporated with Hindu and earlier elements. The Baba Ghor cult is reminiscent of others, such as the quasi-Muslim, quasi-Hindu cult of Imam Shah, also in Gujarat (88). The brothers and sisters and Ghor's equation with the bead merchant, the miner, and the hermit are all parts of this eclecticism.

The Siddis of Ratanpur are better off than most of their kin. They command respect and the *mujaver* is highly esteemed. Badshah is a surname in Ratanpur; it is said elsewhere to be a derogatory term meaning "carefree" (160: A 1). It is not difficult to see that the Ratanpur Siddis have gained from association with Baba Ghor, who is revered by all Siddis in Gujarat. Apparently the early elaboration of the Ghor story in the *Gazeteer* was also Siddi work. We are not told if the *mujaver* in 1880 was a Siddi, but they have held the post for a long time and Ghor is called Sheik Ghor Siddi (28: 168). Perhaps they gained office after Copland's visit in 1814. *Mujaver* Kazi began to rationalize the Ghor legend some time ago (160: 24); the process continues today under Babuji.

Baba Ghor is not for the Siddis alone. On Thursdays, hundreds of people come from afar to his shrine to gossip, picnic, and watch the *mujaver* administer justice. On one such occasion, accused thieves and a woman called an adultress by her husband were tested by the spirit of Baba Ghor. They put single open rings of iron on each ankle and held a rope connecting the rings. Then they ran up to and around the tomb. The saint freed the innocent, but indicated the guilty by not loosening the ring; these unfortunates would face legal proceedings. This replaces an earlier trial in which the accused passed through the branches of a tree near the tomb which admitted only the innocent (28: 168). The tree has since died, and the rings have taken its place.

Though the true history of Baba Ghor remains unknown and we can do little else than demythologize the legends about him, he remains important. He is a symbol that stands for the passing of the old dispensation and the coming of Islam to the area. Though we know

that mining did not begin with him, in his day the Hindus lost control to the Muslims, the temples were destroyed, the old gods thrown down, Limodra began its decline, and the industry took on a new look. A new order and a new beginning are both symbolized by Baba Ghor. If we lack specific historical data about this process, we are at least left with a colorful substitute.

Muslim power in Manipur and their take-over of the industry led to the shifting of beadmaking from Limodra to Cambay, the city which is today famous as the center of the Indian agate bead industry. Before continuing our history of Ratanpur and Limodra, then, we should direct our attention to the once great port of Cambay.

Cambay — The Earlier History

Cambay is favorably situated at the head of the Gulf of Cambay. Trade in the vicinity is very old, and before Cambay was founded, Nagara, a few miles away, was a great port. A change in the course of the river channel of the Mahi River forced Nagara's traders to abandon the city in the 6th century. Tradition says they then founded Cambay. As a living city, Cambay is not open to excavation, but the authorities allowed archaeologists from the M.S. University, Baroda, to supervise the digging of water tanks in the old city. This work confirmed tradition, showing that Cambay was founded in the 6th century or so (115: 116: 20; 120: 177).

An early British historian recorded the tradition that Cambay was once called Papavati (the Sinful City), then Ameravati (the Immoral City), Baghavati (Abode of Tigers), Trimbavati (City of the Copper Wall), and then Khumbavati (City of the Pillar) (158: 247). The copper wall is associated with Nagara, although Khan expressed disbelief in the story back in 1756 (2: 241), and excavations have found no trace of it. The pillar (*khamb* in Hindi) was explained by Shah Jahangir (died 1627) as set up by the king when rebuilding the city after his idol had warned him in a dream to flee to the open sea as the old city was about to be destroyed (53: IV 353). Modern scholarship traces the etymology of Cambay not to a pillar, but to the Gujarati word for cliff (*khambha* or *khambabhalu*) (116: 23).

In any case, Cambay prospered, especially under the Solankis, who turned it into an important port. It early attracted Arabs and, save for Delhi and the Punjab, the oldest Indian Arabic inscriptions are in Cambay (46: 352). The port grew and was visited by Masu'ud, Al-Idrissi, Marco Polo, and others.

In 1297 'Ala ud-Din Khalji captured Cambay. The Friday mosque was finished by 1325, and the city expanded (116: 21, 27). In the mid-14th century, Ibn Battuta observed that many Arabs had settled there (73: 229). Cambay became the focus of Indo-Arab communications and the main departure point for the Meccan pilgrims. Ships visiting Cambay are noted from Hormuz, Kish, Basrah, Aden, Baghdad, Damascus, Alexandria, Zanzibar, and Sicily by various authors (152: I 81).

During these early years, Cambay is never associated with the bead

trade. Only in the 15th century are agates mentioned at the port. Athanasius Nikitin, a Russian visitor (1469 - 1472), said agates were "grown" in the Kingdom of Cambay (Gujarat) (108: III 30). Nicoli Conti, a Venetian (1444), said the precious sardonyx was to be found in Cambay Kingdom (108: II 5). Neither mention the working of stones at Cambay.

Nikitin also left us with a notice the full significance of which is yet to be learned. While visiting Gulbarga, Karnataka, he went to "Kooroola where the akhik is produced and worked, and from where it is exported to all parts of the world" (108: III 30). More must be learned about this apparently important southern industry. We note that while some scholars see a "consensus" about Nikitin's accuracy (132: 127), at least one holds that he wrote more from hearsay than observation (152: II 45).

Only from the 16th century, can we ascribe Cambay a role in the bead industry. The first reference to beads exported from Cambay was by Ludivica di Varthema in 1503 (17: 176). The more detailed record of Durante Barbosa described Cambay beads and stone workers, and says that agates were worked there. These three do not necessarily add up to an agate bead industry. Cambay beads may have been glass, wood, or some other material, while stone work may not have been in beads. Only when speaking of Limodra does Barbosa clearly describe beadmaking, including boring, and some bead types. He said, "The dealers come hither (to Limodra) from Cambaya to buy them and they (thread them and) sell them..." (39: 142).

By the 17th century, Cambay was the beadmaking center, as notices of Mendelslo in 1638 (35: 15) and of Thevenot in 1666 (146: 18) make clear. Only the initial firing was done at Limodra and Ratanpur.

Sometime in the six score years between the visits of Barbosa and Mendelslo, Limodra had lost beadcutting to Cambay. We do not know exactly when this took place, but the most favorable circumstances were during the reign of the Gujarat king, Bahadur (1526 - 1536), who conquered both Malwa and Nandod, and is said to have especially gloried in Cambay (5: 11). Gujarat was made part of the Mughal Empire by Akbar in 1572, and as the Mughals did not favor Cambay, they are not likely to have enriched it with a new industry (116: 28).

Ratanpur — The Recent Centuries

The destinies of Ratanpur and Cambay were connected in the 16th century, perhaps by Bahadur about 1530. As king of Gujarat, he was the sovereign of Nandod. It was to Nandod that the last Gujarat king, Muzzafer III, fled after his defeat by Akbar in 1566 (16: I 355). A coin of Muzzafer dated 1570, found at Limodra, makes it likely that Limodra and Manipur were under Muslim control.

The *Ain-i-Akbari*, a court record of Akbar's reign (1599), tells us that Nandod was a state of the Mughal Empire which was divided into 12 *mahals* (places). Not all 12 are easily identified, but it is clear that Nandod state included some territory north of the Narmada (Tankhala and

Tilikwada) as well as south. One of the *mahals* is Netrang, a town 20 km south-east of Ratanpur, strongly suggesting that Ratanpur was included in Nandod state (16: II 259). The *Ain-i-Akbari* also mentions the autonomous region of Rajpipla:

Between the Sarkars of Nandod and Nandurbar is a hilly district 60 kos in length and 40 in breadth (1 kos = ca. 3 miles or 5 km), which the Gohel tribe of Rajputs inhabit. At the present day a Brahmin named Tewari has the management of affairs, the titular Rajah being of no account. He resides at Rajpipla or Khulu, and has a force of 3000 horse and 7000 foot. The water of this tract is very unwholesome. Rice and honey of the finest quality are here produced. (16: II 257)

Muslim control of Ratanpur is also deduced from an order issued by Akbar in 1592, systematizing coin weights and requiring them to be made of *babaghori* (16: I 36). This is an early reference to the stone named after the patron saint of Ratanpur; it is straight banded agate or onyx (see Appendix B). Akbar would hardly have required the use of a stone not mined in his own kingdom. All of this suggests Muslim control of Ratanpur in the 16th century.

At the beginning of the 18th century, an event took place which turned the tide of all Indian history. The Marathas of Poona had long coveted territory north of the Narmada, invading Malwa as early as 1399. Real success had to wait for 300 years, but in 1705 Dhanji Jadhava and a force of 15,000 moved north, meeting the Imperial Muslim forces under Safdar Khan Biki and Nazar Ali Khan. The forces met at Ratanpur, and there fought a great battle. The Marathas won the day, wounding and capturing Biki; Nazar Ali burned his tents and fled across the river. Thus the north lay open to the Marathas. The day was 4 March 1706, and it is the one historical event for which Ratanpur is remembered (37: 212; 5: 17, 24).

The Marathas allotted Gujarat to the Gaikwad family. With the Muslims out of Nandod, a new see-saw battle for our region began between the Gaikwads and the Raja (king) of Rajpipla. An alliance was formed between them in 1718, but Pilaji Gaikwad invaded Rajpipla in 1723 (28: 100), and the following year he was granted Nandod by Ahmed Khan (5: 33).

In 1751 Damaji Gaikwad and Bala Baji Rao, the Peshwa (leader) of the Marathas, partitioned Gujarat between them to avoid further conflicts. The partition favored Damaji, as he knew Gujarat better than his titular lord. Rajpipla, now including Nandod, fell to the Gaikwad as his tenth richest state, with five districts and an annual tribute of 70,000 rupees (5: 46, 365).

Exactly how much tribute Rajpipla paid is difficult to say. In 1780 it was only 30,000 rupees (71: III 68), perhaps because of the depredations of the rebel prince Govindrao, who burnt and pillaged Rajpipla's villages daily in the 1770s (71: II 182). Alexander Walker, an English agent, said in 1808 that Rajpipla had never paid any tribute (71: VIII

558). In 1876 it paid 65,001 though the tribute had been raised. It seems that 70,000 was only on the books. This situation was common in Indian politics, for the "Lord" often allowed debts to pile up so to have an excuse for invasion later.

The Baroda Gaikwads constantly meddled in Rajpipla affairs. In 1763, when Raja Raising was but seven years old, Damaji invaded on some pretext, and did the same in 1786 on Raising's death, raising the tribute (whether ever paid or not). The Bhils revolted during this unrest with Arab and Sind mercenaries helping (28: 101).

Raising was succeeded by his idiot brother, Ajabsing, who died accidentally on 14 January 1803, not to be discovered until the next day by his wife. There was an immediate struggle for succession. The Gaikwad first backed the eldest son, Ramsingh, but he was a wastrel and a drug addict, and was dropped in favor of Pratabsingh, said to be Ramsingh's son. Naharsingh was a sober younger brother with a better claim than Pratabsingh, but had two handicaps: he was blind and he lacked the blessing of the Gaikwad. The stalemate, kept lively with a few battles, attracted the attention of the British East India Company, which controlled the Gaikwad's finances. They forced him to guarantee a cease-fire (71: V 92, VIII 358).

After 16 years, nothing had been settled, so the Assistant Resident at Baroda, Willoughby, was sent to arbitrate. He spent eight months weighing claims and investigating the internal affairs of Rajpipla state. In the end, he accepted Narharsingh's claim, virtually a foregone conclusion, echoing his superior's opinion on record from May of that year (71: X 56). As Narharsingh was blind, his 13-year old son, Versalji, was installed as Raja of Rajpipla by Willoughby on 21 October 1820 (28: 102). The protracted incident involved more than a new king, for the British had gained a foothold into Rajpipla in a manner not unlike that of other Indian states.

The Gaikwad gave up Pratabsingh's claim (he was not Ramsingh's son after all), and raised a 612,000 rupee loan to pay for the Rajpipla affair (5: 196). On balance, he gained by becoming a trusty client of the British, who negotiated his independence from the Marathas and the cancellation of his debts in 1817 (5: 156).

While in Rajpipla, Willoughby also looked into the question of the Bhils. Many mountain-dwelling Bhils were raiding villages. But he also recognized that the settled Bhils ("Quiet Bhils") were capable of self-government and that it was enough to insure that they were not oppressed. Ratanpur was singled out as a village of model Bhils; they must have been miners (28: 105).

What was the quality of life in Rajpipla? We noted that in Akbar's time (1599) the water of the state was called unwholesome. Willoughby agreed, saying that anything boiled in it became "a nasty, dirty yellow, uneatable except to the very hungry." He thought the climate was unhealthy and the residents looked dropsical (28: 93).

Such unflattering remarks contrast with Sleeman's in 1844. The English civil servant rhapsodized:

If the valley of the Nerbudda should continue for sixty years longer under such a government as it has enjoyed since we (the British) took possession of it in 1817, it may become infinitely more rich, more populous, and more beautiful than that of the Nile ever was. (150: 22)

While not prepared to go as far as Sleeman, the author's personal opinion is closer to his position. In fact, without prompting or discussion, an elderly teashop owner of Jhagadia remarked how healthy the water of the area was. The valley is rich in produce as well as minerals, and the people appear quite healthy.

Resuming the dynastic history of Rajpipla, Versalji reigned until 1850 and was succeeded by his son, Gambhirsinhji. He was first honored by the British with the patent of adoption and the granting of an 11-gun salute by 1867 (76: 38). Of the 56 small kingdoms of the lower Narmada, only Rajpipla had the right to try all criminals except British citizens (113: 374). But Gambhirsinhji troubled his British patrons. In 1880 it was observed that though he had improved his police force and built a jail, a dispensary, and the Anklesvar-Nandod road, he was "opposed to change" (28: 110). In 1887 the British deposed him for maladministration (76: 38). To his credit, he must have been the Raja who built the temple for the idol in Limodra (1872) and Baba Ghor's shrine (ca. 1875).

On Gambhirsinhji's death, Chhatrasinhji became king. In his reign the narrow-gauge train was completed from Anklesvar to Jhagadia and from there to Netrang and to Rajpipla. 1899 to 1902 were also years of severe famine in the Kingdom (84: 81).

In 1915 Vijayasinhji ascended the throne. He was a favorite of the British, with a martial education from the elite Cadet Corps at Dehra Dun. Honors were heaped upon him: Captain in 1919, 13 guns and Maharaja (Great King) in 1921, Knighthood (K.C.S.I.) in 1925, and Major in 1932 (76: 38). No matter how glorious, all Rajas lost their thrones by 1949 when the Indian states were absorbed into the world's largest democracy.

From the time of Copland's visit in 1814, visitors to the Ratanpur mines do not report many differences except for one aspect. In 1892 the work was said to have stopped due to slack business (127: 185), and the same was reported for the winter of 1907-08 (17: 181). In 1961 it was reported that no mining had been carried out for 40 years (77: 758). The author spoke to no one who could recall a time when the mines were shut. The yearly filling in of the mines and the haphazard schedule of the Bhils must account for these premature obituaries pronounced on one of the world's oldest continuing mining operations.

Cambay — The Recent Centuries

Cambay was a vital Muslim port by the 14th century, and cutting and exporting beads by the 16th. But a slow decline began by the 17th. The suburbs collapsed, and the trade was diverted by the Mughals to

roads and ports they controlled better (116: 28).

Cambay declined for another reason: the silting up of the Mahi River. Today the city is separated from the sea by great stretches of mud flats, and the process has been going on a long time. The *Ain-i-Akbari* (1599) said that large vessels docked at Gogha; goods were sent to Cambay in smaller boats (16: II 248). The situation got worse. Tavernier in 1676 (156: I 68) and Careri in 1695 (146: 162) reported Cambay losing much former trade. The port was used until 1933, but is now listed as a "minor port" by the United Nations (152: II 103). Local agitation to force the port open ignores geologists' opinion that the death of Cambay port is irreversible (15: 3).

A third factor in Cambay's decline was that it was on the wrong side of India's political struggles. Trade with Europe began with the Genoese in 1314 (152: I 81), and the Portuguese and Dutch established factories in the early 17th century (159: 52). But the British passed Cambay by. Though they bought agate beads from Cambay when they recognized the profit in the East African trade (66), their first purchases of *babaghori* and related stones were from Ahmedabad (60: 52), a city filled with jewelers to serve the court (75: 485). The English did not esteem Cambay, and a crippling blow was dealt in 1860 on the opening of the Bombay, Baroda, and Central Railway, which completely bypassed the city (5: 235; 159: 3).

Though agate beads are no longer exported from Cambay, the industry continues and new prospects present themselves. Cambay is the center of India's largest and most developed oil and gas fields. The wealth of the Gulf was first noticed when Chinoy recognized gas near Gogha and persuaded Canadians to test drill in 1934 (32: 46). Oil was struck at Cambay in 1958 and Anklesvar in 1960, with Anklesvar the first commercial field, opened in 1961. In 1974 the first Indian offshore rig (Bombay High) began operating in the Gulf of Cambay (164: 12).

This exploitation has brought new wealth to Cambay, but the streets of the old section still ring with the sound of the chipper's hammer and the grinder's wheel, and the shops proudly display the beautiful agate items which have been a specialty of western India for many millennia.

Summary

India had hard stone beads added to its repertoire of bead materials by the 4th millennium BC. The early civilized Harappans prized agate and carnelian beads. Their sources for stones may have been Ratanpur, as Harappan sites are known at the mouth of the Narmada. Lothal and Chahnu-daro were the principal beadcutting centers, and it is likely that the Indians exported these beads as far away as Babylon.

After Harappan times, evidence for the bead trade is scant. Local beadmaking is documented, but we know little about exports. Of the Biblical references cited as examples of Indian trade, the story of Solomon's fleet (10th century BC) is the most likely.

By 300 BC there is no question of a lively bead trade. The *Periplus* said beads were cut at Ujjain and shipped out from Broach. Rudradaman's inscription and the *Garuda Purana* point to Ratanpur as the source of the stones. This three-cornered structure dominated the agate bead trade for more than 1000 years. The mines were controlled by the Gujars of Nandod from 580 to 735; they may have sent stones to Valabhi for cutting.

No matter who ruled Malwa and Gujarat, they were always competing. The Solankis of Gujarat ended Ujjain control of Ratanpur about 1130. They held the area up to 1290 and established beadcutting at Limodra, endowing it with temples and an iron foundry. The wealth of the district was always in beads, as shown by the name given to Limodra, *Manipur Shahr*, Bead City.

By 1300 the Solankis were gone and the new rivals were the Muslims at Nandod and the Hindu dynasty at Rajpipla. Around 1400 Ahmed of Gujarat destroyed the temples, and at this time Baba Ghor died. Baba Ghor symbolizes the profound changes that came to the region. The old order was destroyed, and Muslim control led to the removal of beadmaking from Limodra to Cambay, perhaps around 1530.

Muslim power in the area was broken by the Marathas with a great victory at Ratanpur in 1706. Their feudatory, the Gaikwads, quarreled with the Raja of Rajpipla, eventually leading to British dominance of Rajpipla state. The state lived quietly under British rule until it was absorbed into the Union of India in 1949.

India is a land rich in agates; external trade in the beads of these stones is thousands of years old. Though never completely centralized, the export industry was always focused at Ratanpur, as far as can be determined. Many centers have cut the Ratanpur stones, very likely Lothal, Chahnu-daro, and Valabhi, and certainly Ujjain, Limodra, and Cambay. The story of every Indian agate bead, whether bought new or antique, excavated from an ancient city or found in a foreign bazaar, is an exciting one. It is long and colorful and full of adventure and even death. It is not really a simple one, but then none of the great stories ever are.

APPENDIX A

HISTORICAL CHANGES IN CAMBAY BEADMaking

Cambay has attracted much attention, and a number of reports on beadmaking have been published. Comparing these reports and what we know of ancient practices allow us to pinpoint changes in the industry. The following accounts from the last 130 years are considered:

- a) Summers 1851: Early first-hand report.
- b) Balfour 1871: Probably not first-hand.
- c) Campbell 1880: First-hand and published sources.
- d) Arkell 1936: Quotes Rancholal and Girdhulal, Bombay bead merchants.
- e) Upadhyaya 1942: First English account by an Indian.
- f) *Gazeteer* 1961: Mostly quotes Campbell verbatim.
- g) Chatterjee and Basu 1961: Brief first-hand report.
- h) Trivedi 1964: Most complete report to date.
- i) Rao 1973: Short visit to compare Lothal material.
- j) Francis 1981: The author's investigation.

Beadmaking processes were outlined at the beginning of this work; here we consider only variations.

1. Heating the Stones for Softening Man has softened silicas by heating them for more than 15,000 years (133: 37). In Ujjain agate tops covered clay pots for firing, suggesting that they were not set upside down (11: 193).

Heating in overturned pots was done at Limodra until about the mid-1940s, when it was transferred to Cambay. The newer trench method bakes the stones better with less waste (Trivedi); both techniques are used today.

2. Chipping Stones to Roughouts This step has hardly changed through the years; horn hammers and iron stakes are mentioned from 1851 on. Horn hammers for chipping beads are discussed in a 10th century work with an acid bath for softening (11: 194). The hammers were reported as goat or buffalo (Trivedi), and stag horn (Rao), which seems unlikely. We were told that only water buffalo horn was suitable.

3. Grinding This step has changed radically. Most beads were once clamped in wood or bamboo and rubbed against a plain stone, and then on a stone or grooved board covered with emery bound with lac. A few beads were ground on copper or teak plates mounted on bow lathes. Electric motors were introduced about 1954. One advantage of electrified grinding is in making spherical beads quickly. A grooved board about 10 by 35 cm (4 x 14") holds five to 12 roughouts on one end and is put under a wide grinding wheel. The stones bounce against the wheel, the board, and each other, producing a row of perfect spheres in 30 seconds.

Mechanized grinding gives the worker lung disease from inhaled

agate dust. This was first noticed by Chatterjee and Basu.

4. Perforating Surprisingly, the home-made diamond-bit drills were in use as far back as 1851. Drilling is not adequately described until Trivedi; the usually informative Balfour merely said "a hole is drilled" (p. R 26).

In Harappan times, the polishing preceded drilling, perhaps helping the driller to see (106: 502). At Ujjain, perforating preceded polishing, as is done today (11: 193). In these earlier periods, the ends of the beads were pecked or chipped to give the drill a place to "bite." This is no longer necessary.

The device that cools the drill with water is reported differently. Summers and those who quote him call it a "reed or metal tube," while Chatterjee and Basu said it was a thread (?). The dripper examined by the author was a solid rod. There could be individual variation on this point.

5. Polishing The secrecy of this stage does not predate 1961. Older accounts say that beads and abrasives were put into a leather bag with straps which was rolled across the floor by two workers who alternately pulled the bag toward them with the straps. This took no less than 15 days to polish the beads. A finished cabochon found at Limodra is polished, suggesting this process; older beads were polished by hand rubbing, which left tiny parallel striations on the surfaces.

6. Social Structure In 1851, 2000 Hindu and Muslim workers were divided into guild members and less skilled non-members. There were five guilds: 100 masters (the Akkikia), 300 wheel cutters (Gassia), 200 rough polishers (Dholia), 50 fine polishers on wood (Pattimar), and 100 borers (Bedars). To join, a man or a boy's father gave a feast for the guild and paid a fee to the Nabab.

The guild system is now abolished; beadcutting is dominated by men with enough capital to buy stones and finance the work (Akkikia or Karkhandars). This remnant of the masters' guild formed the Agate Society (Akik Udyog Vikas Shakari Mandel) in 1949 with 37 members, growing to 169 by 1962. It held long term leases on Ratanpur stones. The system works, but the cream of profits are skimmed off at the top. The Society no more has a monopoly; the government now leases small plots of Ratanpur land yearly to non-members as well.

Work volume fluctuates greatly from year to year, but seems steady over the long run. The Census of 1878 reported 600 families working beads at Cambay; in 1961 there were 448, not a significant fall considering the introduction of mechanization.

Conclusions Three important changes in Cambay beadmaking have occurred in the last 130 years:

1) In the early 1940s the preheating of the stones was moved from Limodra to Cambay, and the more efficient trench method was introduced. This was the last role Limodra played in the industry after 800 years of involvement.

2) Mechanization has affected two stages. Grinders work faster and produce perfect spheres, but at the cost of disease and death from breathing the clouds of agate dust thus produced. Polishing has lost employees, causing the few polishers left to shroud it in mystery.

3) Social change has been even greater. The break-up of the guild system after Independence (1947) opened work for many skilled young men. Apparently the Agate Society was a reaction to the demise of the guilds by the old masters, and succeeded in keeping benefits from filtering down to workers. The breaking of the power of the Society at present may herald another significant change in the industry.

On the whole, however, the surprising thing is that so little has changed over the years. Most steps of beadmaking in Cambay today are just as they were in Summers' day. Indeed, many of the processes of the Indian agate bead industry have not changed for many centuries, even millennia.

APPENDIX B

SOURCES OF STONES CUT IN CAMBAY

Most stones cut in Cambay are from Gujarat; others are brought from farther away to use the skill of the Cambay craftsmen. Sources here include: Summers, Balfour, Campbell, Arkell, Trivedi, and Francis (see Appendix A), and Sukheswala 1948, a report on Gujarat geology.

Agate See varieties: moss, orange, veined, etc.

Amethyst Not reported, presently worked, source unknown.

Babaghor: Today applies to any Ratanpur stones, but was more limited in the past. In 1518 Barbosa said it was a grey and white agate (39: 144); Summers said a grey agate or dark sardonyx. Tagore said it was Persian for "cat's eye" (i.e. sardonyx) (155: II 867). Campbell called it black and white or grey and white agate. In short, *babaghor* was straight banded agate or its derivatives, onyx or sardonyx. It is the stone Beck inquired about (14) that led to Arkell's famous study of Cambay.

Bloodstone Tankara near Morvi, Gujarat; recently from Mardak Beyt in the Little Rann of Kutch mined by Good Earth Industries of Jamnagar. Seen rarely at Ratanpur.

Carnelian Only Ratanpur ever mentioned as a source.

Cat's Eye Again, only Ratanpur.

Chalcedony The blue-white variety is from Mardak Beyt (Trivedi) and Ratanpur.

Chocolate Stone Probably a heavily weathered jasper; it does not take a polish. Summers reported it from Tankara and Ranpur near Ahmedabad; no reports in this century.

Chrysoprase Green chalcedony, reported only by Arkell, no source mentioned.

Crystal, Rock Greenish crystal from Kapadvanj, Gujarat, was cut at Cambay in the 16th century (145: 211). Tankara is an old source; later (1964) from Madras.

Fortification Agate Reported only by Balfour; unknown if it is the same variety called this in the U.S.A.

Glass See Turquoise.

Jade Not genuine, but an unidentified stone from Mysore and Bangalore, Karnataka (Trivedi).

Jet Summers said this was obsidian imported from Aden and Bokhara; Campbell's jet from Aden and Basra had no hint it was not genuine. Not reported since. Turkey and the U.S.S.R. are both sources for jet and obsidian.

Lapis Lazuli Summers said it was found in river beds in Persia and Bokhara; virtually all comes from the Badakhshan province of Afghanistan.

Limestone (Maimarium) A brown fossiliferous stone that takes a high polish. From Dhokawara, Rann of Kutch; not noted since Summers and Campbell.

Lydian Stone Black chalcedony used for touchstones and beads. Not reported; old roughouts seen at Limodra.

Moss Agate A popular material from Gujarat: Tankara, Bud Kota, Kapadvanj (Summers), Latipur, Timbri, Otal, and Veratia (Sukheswala). Feddon reported it "worked in a desulatory way by the villagers for a number of years" at Khijaria near Tankara in 1885 (p. 62). Reddish moss agate is rarely found at Ratanpur.

Obsidian Summers said it was sold as jet.

Onyx Ratanpur is the only source mentioned.

Orange Agate Trivedi reported it from Poona.

Plasma Green quartz, only Arkell listed, no source.

Precious Stones Diamonds, rubies, emeralds, and sapphires are cut at Bombay, Madras, Delhi, Jaipur, Surat, and Kapadvanj, but the Cambay craftsmen are said to be the best (Trivedi; 69: 60).

Sodalite Sold presently as blue jade, from Madras.

Turquoise In the last century a glass (composition) that took a high polish and was imported in flat 200 gram pieces from China was cut as turquoise.

Veined Agate Ranpur; Sukheswala reported "Landscape agate" from Kapadvanj.

White Agate From Mandipore near Tankara (Summers) and Rajasthan (Trivedi). White and clear banded agate is today cut into large barrels (6.5 cm long, 2.5") for export to Africa; source is Indore, Madhya Pradesh.

Yellow Agate Ratanpur.

We should also note that although Ratanpur is the center of the agate mines, the following villages in a seven square mile area (18 sq. km) around Ratanpur also produce gem agates, though none are currently being exploited: Andharkachha, Bhilwada, Kharchi, Kharia, Kunvarpura, Limodra, Malpur, Simadha, Sultanpura, Vaghpura, and Zarna (159:10).

APPENDIX C

MINOR BEADMAKING SITES IN INDIA

Though rarely found in print, Indian archaeologists confirm the decentralized nature of beadmaking. Two students of beads have noted this pattern especially in the Deccan (S.B. Deo) and eastern India (L.A. Narain).

The situation raises many questions: Was local manufacturing geared to export, as Hunter suggested (42: 32)? Were local bead-makers community members or itinerant craftsmen? Were they served by regional sources, as at Inamgaon? The answers must await more work.

The following incomplete list is offered only as a guide to the wide spread in time and space of beadmaking, as evidenced by unfinished silica beads. The site name is followed by district, period (CH = chalcolithic; EH = early historic), and references or the excavator when unpublished material was personally observed.

- | | |
|-----------------------|--|
| Andhra Pradesh | (1) Dhulikatta, Karimnagar, 1st/2nd c. BC (V.V. Krishnasastry) |
| | (2) Kondapur, Medak, 100 BC/200 AD (48:8). |
| Gujarat | (3) Valabhi, Bhavnagar, 5/9th c AD (26: 78) |
| | (4) Karvan, Broach, Satavahana (110: 51) |
| | (5) Nagara, Kaira, 1st 1/2 of 1st m BC (R.N. Mehta). |
| Haryana | (6) Baghwanpura, Kurukshetra, 1000 BC (J.P. Joshi). |
| Madhya Pradesh | (7) Adamgarh, Hoshangabad, EH (93: 94) |
| | (8) Arva, Ujjain, Mauryan (90: 132) |
| | (9) Navdatoli, Nemar, EH (41: 9, 20). |
| Maharashtra | (10) Nevasa, Ahmednagar, CH (138: 346) |
| | (11) Kaudinyapura, Amaravati, EH (49: 44) |
| | (12) Pauni, Bhandara, early AD (45: 85) |
| | (13) Prakesh, Dhulia, CH (157: 109) |
| | (14) Kolhapur, Kolhapur, EH (139: 90) |
| | (15) Mahurjahari, Nagpur, Megalithic & EH (42: 32) |
| | (16) Ter, Osmanabad, 1st/3rd c. AD (29: 98) |
| | (17) Chandoli, Poona, CH (43: 352) |
| | (18) Inamgaon, Poona, CH (H.D. Sankalia, Z.D. Ansari & M.K. Dhavalikar). |
| | (19) Pauner, Wardha, EH (44: 79). |
| Pondicherry | (20) Arikamedu, 1st/2nd c. AD (168: 45). |
| Rajasthan | (21) Bagor, Bhilwara, Mesolithic (67). |
| Tamil Nadu | (22) Kodumanel, Periyar, Roman (124: 338). |
| Uttar Pradesh | (23) Jaugada, Gamjam, Iron Age/Kushan (118: 30) |
| | (24) Kumrahar, Patna, 150 BC/450 AD (4:133). |
| Pakistan | (24) Depar Ghange, to 10th c. AD (38: 54). |

APPENDIX D

THE TRADE IN INDIAN AGATES

The bead trade with Babylon, Israel, and Rome was discussed in the text, as it furnished us with early references to the industry. Here we consider trade following the decline of Rome.

In the 6th century, Persia monopolized Indian Ocean trade, bettering her rivals, the Byzantines and Arabs, and opening the Ceylon to China route (81: 65). A Chinese chronical, the *Wei-shu* (ca. 572) tells of the Persians bringing luxury goods to China: European coral and amber, and Indian items, including carnelians (81: 83).

The Persians also carried Chinese and Indian goods west. Abdullah Mohammed detailed imports to Oman in 985, brought by the Persians from the east. These luxuries included ivory, pearls, rubies, and onyx, the latter presumably from Ratanpur (81: 127).

Indian agates were traded in great numbers to East Africa. Indians were involved in this trade, settling in Africa quite early (52: 7), and trading in a minor way through Medieval times (18: 1). Indian agates have been identified in many East African sites, such as the important port of Kilwa (33: 473), and even in West Africa as far as Senegal (114: 73).

Arabs succeeded Persians as masters of the waves by the 10th century. Their activity produced a surfeit of gems in Egypt. The 12th century *Book of the Balance of Wisdom* by Al-Kazini said that lapis lazuli, crystal, amethyst, glass, and all but the purest turquoise were of little value. Onyx remained prized, but not carnelian:

Men have long tired of the carnelian, so that it has ceased to be used for seal rings, etc., even for the hands of common people, to say nothing of the great. (94: 64)

The carnelian devaluation in Arab markets may have had another cause: the opening of mines in Yeman. Carnelians are often called "Yeman stones," as by Khan in 1756 (102: 11) and Tagore in 1879 (155: 954). But did Yeman produce the stones or merely sell them? An 18th century German reported a carnelian mine near Damar, Yeman (143: 64), but the age and extent of the working is crucial. 19th century books on Yeman do not mention local carnelians, only chalcedony, but not mined (83: 2), and iron and gold (128: 2). Arabian Mecca is an important bead emporium, but all agates sold there 50 years ago came from India (7: 296). It is common to claim a local origin of Indian agates, even in the U.S. and in Britain (8: C 28). English merchants in Cambay sold carnelian beads to Yeman in the 17th century (61: 161). Was this coals to Newcastle or are Yeman stones actually Indian? Only more work will tell us.

Indian agates also went east. In the 14th century the Chinese recorded stones brought by Arabs. One is cat's eye and another:

gu-mu-lan has an irregular colour; it is red mixed with dark, yellow. This stone is found in large pieces, and is the least valuable of the above mentioned (including rubies and garnets).

(19: 174)

The translator attempted identification with opal, but this is not very successful. It seems much more likely to have been an Indian carnelian.

Indian agates are found elsewhere in Asia and have been identified as far apart as Malaysia (70: 467) and the Philippines (101: 68).

Arab traders were muscled out by Europeans, who took the major share of the lucrative Indian Ocean trade. Barbosa wrote in 1518:

Dealers...sell (beads) on the Red Sea coast, whence they pass by way of Cairo and Alexandria. They take them also to Arabia and Persia, and to India (*i.e.* Goa) where our people buy them to trade to Portugal. (39: 144)

Early letters of the East India Company show the British introduction to the trade (66). By 1630 letters showed how their rivals profited (62: 39) and how 12 long beads bought a cow in Madagascar (62: 42). The popular long beads were replaced by round beads and glass beads from Venice by 1640 (63: 220, 289).

The far-flung trade even reached slave graves in the West Indies (80). Though a "minor mineral" in Indian commerce today (165: 3), the place of agate beads in international trade has not been minor; it is a role we are only beginning to appreciate.

APPENDIX E

TYPOLOGY AND CHRONOLOGY OF AGATE BEADS

Bead collectors, researchers, and Indian archaeologists agree on the usefulness of a chronological ordering of Indian agate beads. Regrettably, such a classification is elusive, due to the youth of bead research and Indian archaeology, and the great age of many bead styles. Older records help little: Barbosa listed "long, eight-sided, round, and olive-leaf shapes" (39: 143) and Summers said "cut beads, diamond cut, almond shaped, oblong, flat spear shaped, round, etc." beads were cut in Cambay (154: 325). But we can only guess which beads were meant by these writers.

Dikshit attempted an ordering of bead styles a bit before his death, dating some in north India with some certainty (49: 95). We draw on his observations here; to date, no world-wide topological survey has been attempted. Many bead shapes (oblates, cylinders, bicones, barrels, etc.) are nearly universal.

Oblates were rarely perfectly round until mechanized grinding in the 1950s. **Tiny oblates** are not found in India until after ca. 200 BC (49: 95).

Short square bicones, often with convex faces, are restricted to 500 - 100 BC (49: 95).

Hexagonal tubes before 200 AD were flat in section with two faces wider and closer together than the other faces, assuming a more regular section after that date (48: 1). This likely happened to octagonal tubes as well.

Collar beads have extra material at the ends. They were first elliptical, then flattened into "lug collars" or tabulars after 200 AD, becoming rare after 300 AD (139: 92). An old tradition among southern jewelers was using them as a clasp, tying the end of the string on a necklace to one of the collars (125: 25).

Short hexagonal, heptagonal bicones were very popular from the 5th century BC to the 2nd AD in India (139: 89) and Persia (e.g. Persepolis, pers. observ.), but not confined to these dates; they are found much later in East Africa (33: 474).

Cornerless cubes are generally thought to have been introduced from Rome, where glass ones appear from the 5th century BC (13: 17), though the type is found in Harappan contexts much earlier (106: 516). However in India carnelian ones do not seem to pre-date Roman contact, though the question of origin is still open.

Round tabulars are found in south India (e.g. first century AD Pedabankur, pers. observ., V.V. Krishnasastri, ex.) earlier than north India, where they appear in Muslim times (139: 89). They are often by-products of finger-ring production (See Color Plate I, row 6), and were especially popular in Persia.

Completely faceted oblates are thought to be products of the 18th century, as techniques for such work was rare before that date. It is the date for their greatest popularity in Europe (151: 69).

Stone pendants representing the horizontal **charm case** may predate the Muslim period (they are featured on Buddhist statues). The first one known to the author from an excavation is from early Muslim Dwarka (6: 41).

A specially shaped flat pendant of agate appears to have been a Mughal invention. (Color Plate II, row 6). The striking design is not known from excavations, but gold coins of Akbar (1574) were made of this design (79: XXVI, 274).

Finally, we note that export of these beads seems often to have been selective: round tabulars in Persia, short fat bicones in Africa, large scaraboidal oval tabulars in Afghanistan, tapered square tubes ("date beads") in Africa, etc. The mechanism for these choices, whether originating with the beadmakers, the traders, or the customers, is not known; they may even be a function of time. Our ignorance here only exemplifies how much needs to be learned about this long-lived and world-serving industry.

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COLOR PLATE II

Older beads collected from Iran, presumed Indian:

- Row 1: 1) Flattened hexagonal tube.
2) Flattened octagonal tube of green jasper.
3) *Babaghor*i barrel.
4) Color-altered onyx.
- Row 2: 1) Green jasper cornerless cube.
2) Hexagonal truncated bicone.
3-4) Multi-faceted oblates.
5) Melon bead.
6) "Tooth" pendant.
- Row 3: 1) Large scaraboidal tabular.
2-5) Round tabulars.
4) The type Tagore called "*Babaghor*i cat's eye."
- Row 4: Charm case beads. Note banding in 1.
- Row 5: Bicones. 3) Faceted bicone.
- Row 6: Shield pendants, Mughal period.

Beads from Cambay, Modern:

- Row 7: Various bead shapes and stones. Large heart is heat spalled.
- Row 8: Various stones and shapes.
- Row 9: Large white agate bicone made for the African market.



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