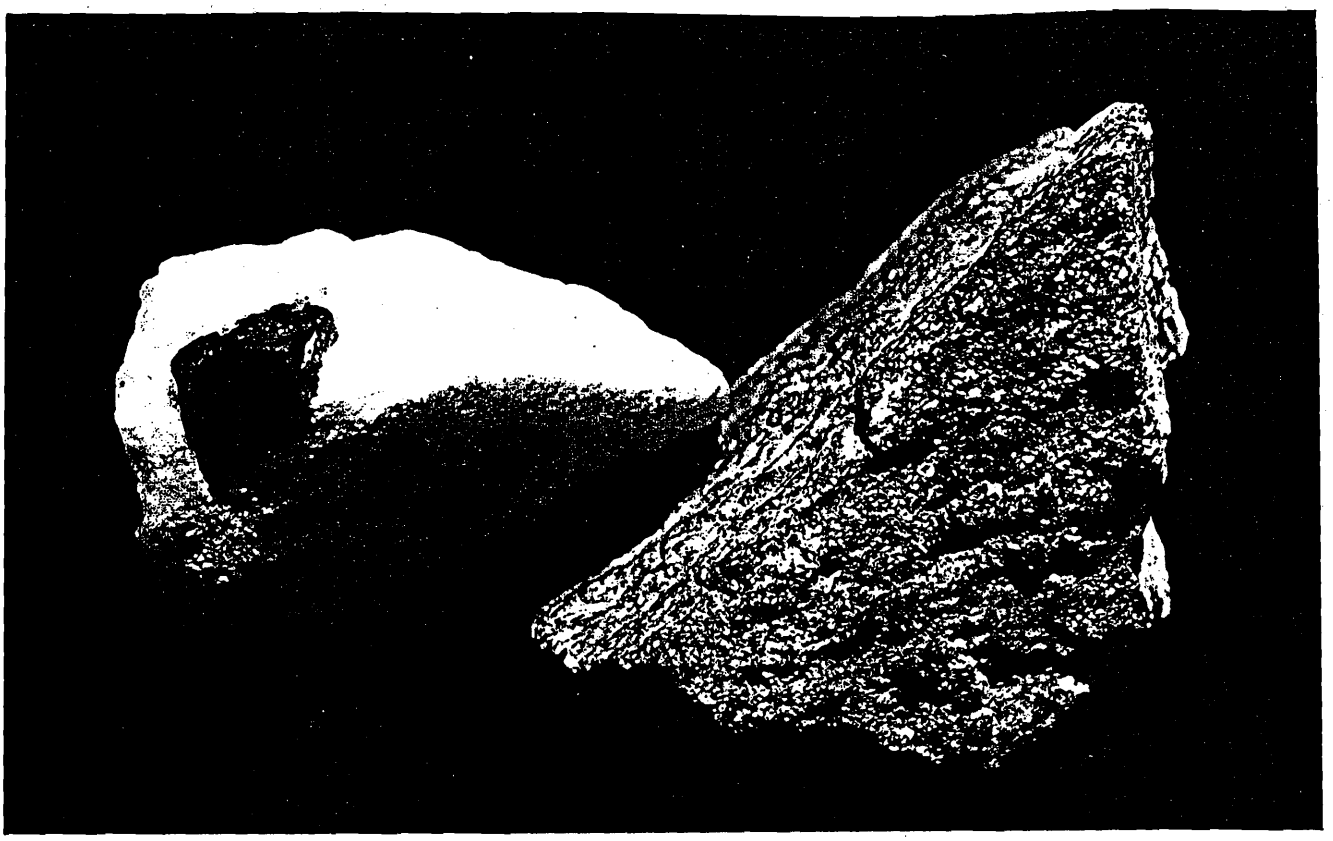


Lapis Lazuli

Beadmaking in Afghanistan and Pakistan

Jonathan Mark Kenoyer

Recent observations of artisans in Peshawar, Pakistan suggest that some techniques for making beads and other ornaments from lapis lazuli have not changed significantly over the millennia. Beads dating from approximately 6500 B.C. have been discovered in Neolithic burials at Mehrgarh, Pakistan (Jarrige, 1984; 1985; Lechevallier and Quivron, 1985; Samzun, 1984 ms; Vidale, 1991 in press). Other early sites include Rehman Dheri (Durrani, 1984; 1986), Mundigak (Casal, 1961), Shahr-i-sokhta (Tosi, 1970; Tosi and Piperno, 1973), Tepe Hissar (Bulgarelli, 1979), and numerous ones in Central Asia (Herrmann, 1968). All these locations were within trading regions composed of settled agriculturalists and pastoral nomads who had access to lapis lazuli mining areas.

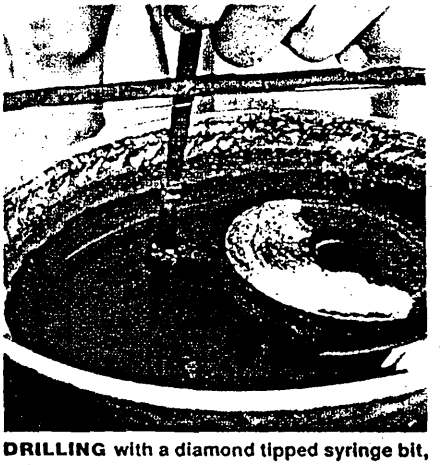
Only two places along the borders of the South Asian subcontinent (see von Rosen, 1988 for other sources) are lapis lazuli sites: the little known mining area of the Chagai Hills of southern Baluchistan (Jarrige, 1988) and the more famous region of Badakshan, northern Afghanistan (Herrmann, 1968), which date to the mid-third millennium B.C. (Ligabue and Salvatori, 1988). It appears that during the height of the Indus Valley Civilization, around 2000 B.C., the Harappan colony of Shortugai was established in northern Afghanistan near the Badakshan mines (Francfort, 1989).

Lapis lazuli is composed of many minerals, the most important being lazurite, which gives it a distinctive azure color (Schuman, 1977). Its coarse granular crystalline structure does not flake easily and when hammered will shatter irregularly (Schuman, 1977). Large blocks are sawed or incised with chert blades and then snapped with wedges and/or hammer stones to avoid unnecessary waste (Piperno, 1973; Tosi, 1989). This results in rough blocklets that can be modified for specific bead shapes, and then roughly ground or chipped prior to drilling. Most prehistoric lapis lazuli beads appear to have been drilled with tiny chert drills (Piperno, 1973); some of the tiniest drill holes are less than one millimeter in diameter. While no tiny bits have been recovered, it is not unlikely that some will be found. Actual drills with lapis lazuli dust adhering to the surface have been recovered, but most of these drills are relatively large (Tosi, 1989).

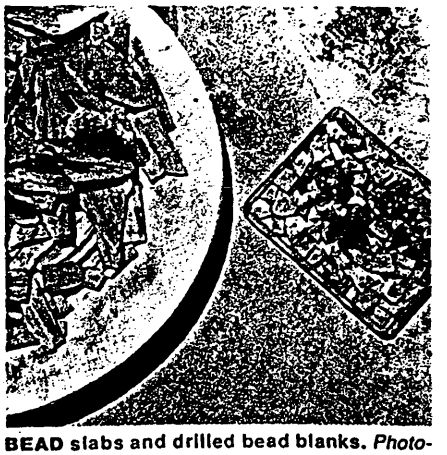
The lack of tiny chert drills which match the size of these holes leads some scholars to suggest that they were made by copper drills and abrasives (Piperno, 1973). There has been considerable discussion but no conclusive evidence regarding the use of bronze or copper drills and abrasives (Gwinnett and Gorelick, 1979, 1981). Experimental research with a hand-powered bow drill indicates that the use of copper and abrasives such as garnet or corundum is much more time consuming than with a chert drill. Numerous impressions of lapis lazuli beads found at Harappa, Mohenjodaro and Rehmandheri, and all drill hole impressions reveal the use of a chert or jasper drill, and none indicate the use of abrasives, even from the early Neolithic period. A pump drill may have been used for tiny flat disc beads, but it would not have been possible to drill long beads with one. A perforation technique for short (thin) agate beads is by pecking from both sides (Dales and Kenoyer, 1989), but this has not been documented for lapis lazuli beads.

Tiny cylindrical shapes, short and long—common to the Neolithic and Chalcolithic peri-

MULLAH ASHUR, drilling. *Opposite page:* **Lapis lazuli crystal in matrix and large blocklet of raw lapis lazuli.**



DRILLING with a diamond tipped syringe bit, using a bow drill.



BEAD slabs and drilled bead blanks. *Photographs courtesy of author.*

ods—were probably made by perforating a flat piece of lapis lazuli and then stringing a large number on a cord and grinding them together to make tiny cylindrical shapes. This time consuming technique results in delicate and beautiful beads. The extremely small short bicone beads illustrated below required the use of a dop stick, and each bead individually ground and polished. Other larger beads were made in a variety of tabular and geometric shapes as well as in various animal or bird shapes (Ligabue and Salvatori,1988).

A recent ethnographic account of contemporary beadmaking in Afghanistan (Wright, 1982) provides a general overview of stone beadmaking in Kabul but does not give specific details about manufacturing stages and tools. In the summer of 1991 in Peshawar, I recorded the work of Mullah Ashur, a Turkoman, originally from the village of Farakabad, District Daulatabad, Province Balkh, Afghanistan. His parents had migrated to Balkh from the Bukhara region, and he moved to Peshawar in 1986 to avoid being drafted by the Communist regime in Kabul.

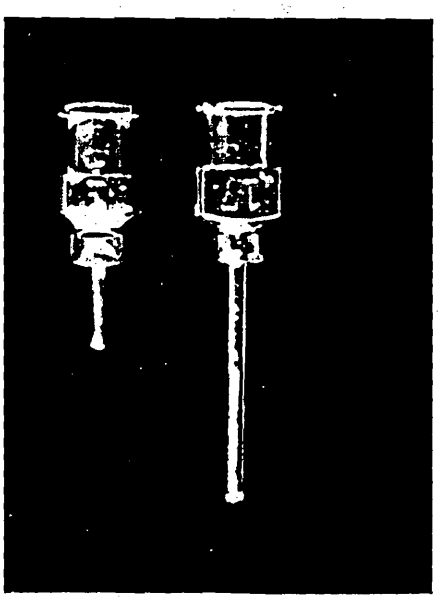
Ashur did not learn from other beadmakers, but began making lapis lazuli beads after observing a china cup repairman use diamond tipped drills to perforate broken china cups and teapots. After purchasing all the repairman's diamond tipped drills, he initially gathered ancient blocks of lapis taken from old mounds in the desert. Now a more reliable supply of fresh materials from the Badakshan region makes up his stock.

A lapis lazuli block is cut by Ashur into thin slabs, with thicknesses varying according to the desired length of the finished bead. A similar process of reduction has been documented for steatite bead manufacture during the Harappan period (Vidale, 1991 in press). By using a wire cutter or pliers, small angular chips or bead roughouts are broken from each slab, and then trimmed into circular-shaped disc bead blanks before being drilled.

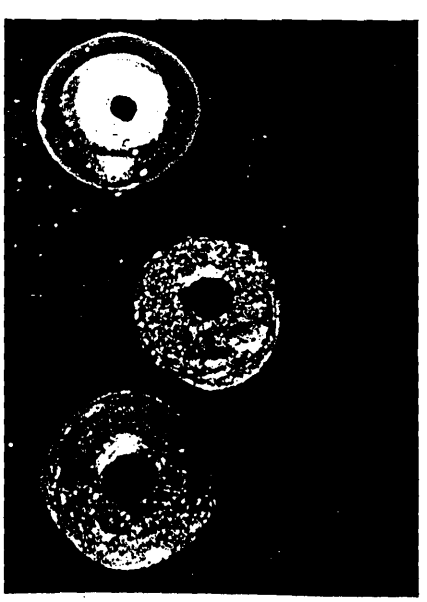
Bead blanks are perforated by drills made from modern syringe needles with a tiny diamond chip inserted into the tips. According to Wright, in Kabul drills were made by rolling a thin sheet of metal and embedding a diamond chip in the tip. The syringe allows for a sturdier and finer drill bit. Different sizes of syringes are used by Ashur depending on the type of bead being produced; the smallest diameter syringe (0.7 millimeter) is used to make tiny cylindrical beads that are replicas of early neolithic and chalcolithic beads.

The syringe tip is cut off, then ground on both edges to make a tip with two prongs, and the syringe hole slightly enlarged with a sewing needle. Diamond chips are crushed and a small chip selected and inserted into the syringe hole. The projecting prongs are crimped over the edge of the diamond chip to hold it securely. The diamond bit must be slightly larger than the syringe shaft otherwise the drill will jam when perforating the bead blank. Before drilling, the syringe is fitted onto a specially prepared drill shaft and the bit seasoned by drilling into a piece of emery to smooth away any pieces of metal and to eliminate projecting edges of the diamond chip.

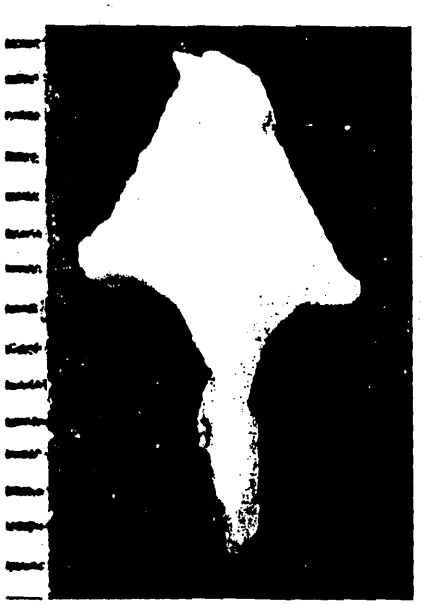
Diamond bit preparation and setting is quite different than



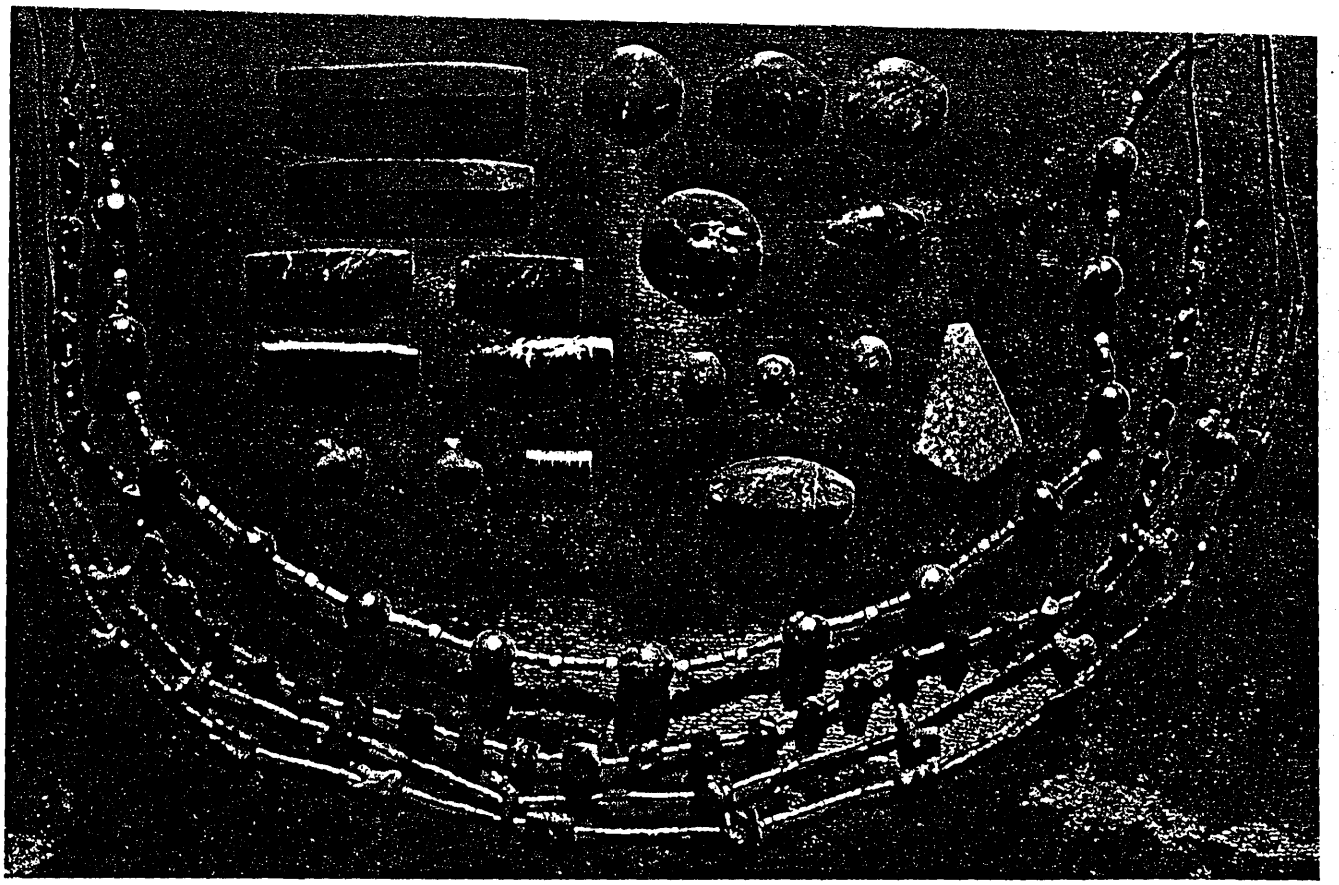
SINGLE diamond tipped drills made from hypodermic syringes; 1.9–2.8 cm length.



LAPIS lazuli and carnelian beads from Harappa (ca. 2000 B.C.); ca. 0.5 cm D.



CHERT drill, Harappa, Pakistan (ca. 2000 B.C.); metric scale.



LAPIS lazuli beads made by Mullah Ashur.

in Khambhat, where a single diamond bit drill, known as a *tekni*, is used only for the initial depression. The perforation itself is made with a double diamond bit drill called a *sayedi* (Kenoyer, 1986; Kenoyer, Vidale and Bhan, 1991). Another important difference is that the diamond chips used in Khambhat are first rounded by chipping or bruting the rough edges with another larger diamond chip, and annealed by wrapping them in some cotton twine moistened with water and a paste of chalcedony powder (from earlier drilling), with the twine then burned on a piece of charcoal. After annealing, the tiny diamond chips are removed from the ashes and crimped into the tip of the iron drill. The rounding of the diamond chip removes any projections that might pull the diamond out of its setting. The function of the annealing process is not clear, but it is possible that heating relieves stress planes in poor quality diamond chips, making them last longer.

The final perforation size of beads made in Khambhat is much larger than those made by single diamond bit drills used in Afghanistan. By comparing the drill hole impressions, it is possible to differentiate from a single and a double diamond drill hole on the basis of the perforation diameter as well as the patterns of the drilling striae.

Lapis bead blanks are drilled with a traditional bow drill. For flat disc shaped blanks, the bead blank is placed in water in a shallow flat bottomed pan to keep it and the drill bit cool and avoid heat fracture. Small disc beads are drilled from one side only. When drilling long beads, Mullah Ashur uses pliers to hold the bead upright. Long beads are drilled from both sides and it is difficult to connect the drill holes precisely, but Ashur is able to guide the drill bit in the right direction regardless of the shaky vise holding the beads.

Wright (1982) refers to the use of two sizes of drills in bead perforation in Kabul. A large drill is first used to make a depression on the surface of the bead and then a smaller tipped drill perforates the bead approximately two-thirds of the way through. The undrilled side is marked with a dot at the point where the perforation should begin and then the same process is repeated. Drilling from both sides is necessary to avoid chipping when the drill breaks through the outer surface of the bead. The technique of drilling with the flat disc bead blanks placed in a pan of water helps protect the drill from bursting through the opposite side and may be one reason why flat beads are usually drilled from one side only.

On the basis of ten samples, the drilling rate is approximately one millimeter in 6.532 seconds. Recent experiments with chert drills average one millimeter every 600 seconds. By using a

Continued on p. 86

LAPIS LAZULI *from p. 73*

copper drill bit with garnet or corundum (ground ruby) as an abrasive the time is considerably increased to one millimeter per 1800 seconds. Needless to say the diamond tipped drills are a great improvement.

After the beads are drilled the final shaping takes place. Disc bead blanks, strung on a long piece of wire, are slowly ground into cylinders on an electrically powered emery wheel. The process results in a considerable waste of raw material; bead blanks at five millimeters diameter end up as small as two millimeters. Larger beads are shaped individually by hand on the same type of emery wheel. Animal and bird shaped beads are made individually by hand combining the use of the emery wheel and hard metal files. Polishing with a fine emery wheel and buffing and oiling the beads enhances their deep blue color. Sometimes Ashur makes antique beads by tumbling finished beads in a pottery vessel with sand slurry and using a power drill fitted with an egg beater-like tip to agitate the beads and sand slurry.

The criteria for determining the authenticity of specific types of beads, for example Tibetan Dzi beads, rests to some extent on the diameter of the drill hole itself and not simply the bead shape and color. The drill hole reflects an important cultural choice that represents very different technologies. It is not unlikely that these differing choices and the technologies associated with them have considerable historical depth, and archaeologists will need to pay more attention to the size and nature of bead drill holes when defining bead types.

ACKNOWLEDGMENTS

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