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The Beads from Tomb 80 in the 'En Esur Cemetery

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A total of 24 beads was recovered in the excavation of T80 in the 'En Esur cemetery (see Gorzalczany and Sharvit, this volume), all from the soil sifted from Loci 175, 177 and 178. The beads may be divided into three groups according to their material: 22 beads are made of semi-precious stones, one bead is made of faience and another, of shell. Identification of the materials was based on visual examination alone.

The bead types are briefly described and basic data is presented in Table 1. Measurements

Table 1. Beads from T80

Type	Material	Perforation	Condition	Dimensions (cm)	Locus/Basket
II.5: Long Barrel	Rock crystal (transparent)	Chamfered	Partial	1.5 × 1.4 × 1.2	178/1567
II.9: Disk Cylinder	Carnelian	Double-cone	Whole	0.2 × 0.6 × 0.6	178/1588
	Carnelian	Double-cone	Whole	0.2 × 0.5 × 0.5	178/1604
	Carnelian	Double-cone	Whole	0.2 × 0.5 × 0.5	178/1719
	Carnelian	Double-cone	Whole	0.2 × 0.5 × 0.5	178/1694
	Carnelian	Double-cone	Whole	0.4 × 1.0 × 1.0	175/1534
	Carnelian	Double-cone	Whole	0.2 × 0.4 × 0.4	178/1709
	Carnelian	Double-cone	Whole	0.3 × 0.9 × 0.9	178/1721
	Carnelian?	Single-cone	Whole	0.3 × 0.9 × 0.9	178/1720
	Carnelian	Double-cone	Whole	0.3 × 0.9 × 0.9	178/1650
II.22: 'Doughnut'-Shaped	Carnelian?	Double-cone	Whole	0.1 × 0.4 × 0.4	178/1700
	Agate?	Double-cone	Whole	0.3 × 0.9 × 0.9	178/1701
	Carnelian	Double-cone	Whole	0.1 × 0.3 × 0.3	178/1698
	Carnelian	Double-cone	Whole	0.2 × 0.7 × 0.7	175/1608
	Carnelian	Double-cone	Whole	0.3 × 0.9 × 0.9	178/1629
	Carnelian	Double-cone	Whole	0.2 × 0.6 × 0.6	178/1586
	Carnelian	Double-cone	Whole	0.2 × 0.6 × 0.6	175/1609
	Carnelian	Double-cone	Whole	0.1 × 0.3 × 0.3	178/1697
	Carnelian	Double-cone	Whole	0.4 × 1.0 × 1.0	178/1691
	Carnelian	Double-cone	Whole	0.4 × 1.0 × 1.0	177/1555
	Carnelian	Double-cone	Whole	0.4 × 0.9 × 0.9	178/1587
II.24: Amorphous	Quartz	Plain	Whole	1.2 × 1.0 × 1.2	177/1557
III.2: Short Oblate Globular	Faience? (green glazed)	-	Whole	0.5 × 1.0 × 1.0	178/1720
VI.3: Modified Shell (Conus sp.)	*Conus mediterraneus*	-	Whole	1.4 × 1.1 × 1.0	178/1650

are given by length × height × width, the first (length) measurement being that of the stringing axis. Although referred to in this report, Beck's (1928) commonly-used typological apparatus for the classification of beads is not employed here, as it is based only on form. The present typology first distinguishes beads by material and then further classifies them by form. The typological framework employed in this report is based on that developed previously by the author (Golani 1996) and used in other studies of jewelry objects (Golani 2004; Golani and Ben-Shlomo 2005). As this typological scheme is being continuously refined and expanded, the present report includes some typological designations not found in previous publications.

STONE BEADS

Three distinct forms may be distinguished among the stone beads from T80.

Type II.5: Long Barrel Shaped (N = 1; Fig. 1:1).— This partially preserved bead is of transparent rock crystal, elongated in shape, with slightly convex sides (Beck Type I.D.1.b.) and a chamfered perforation.

Type II.9: Disk Cylinder (N = 9; Fig. 1:2).— These short cylindrical beads portray straight sides (Beck Type I.A.2.b.). Eight beads have a double-cone and one bead has a single-cone perforation. All are made of carnelian of uniform color, except for two that vary in color between dark red-brown to light brown.

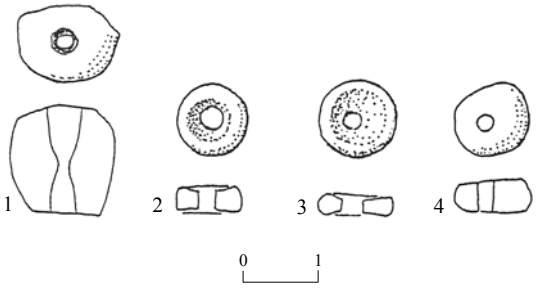

Fig. 1. Bead forms.

Such beads were common during the Early and Middle Bronze Ages, probably due to their short length, which facilitated the drilling of a wide double-cone perforation. At Gezer, Macalister (1912:104) notes that "a form very characteristic of the First Semitic [period] is a small flat cylindrical disk of carnelian, counter-sunk [a double-cone perforation] on both sides." This description would seem to refer to our Type II.9, disk cylinder, and Macalister's observation is generally upheld in the examination of bead assemblages from the late fourth and early third millennia BCE.

Type II.22: Doughnut Shaped (N = 11; Fig. 1:3).— These short disk-shaped beads are of similar technique to Type II.9, yet they bear abraded and rounded sides (Beck Type I.A.4.f.b). All these beads have a double-cone perforation. Ten examples are of carnelian: seven of uniform color and three with dark brown inclusions in the stone. One bead is made of agate with dark brown, orange and milky-white bands.

Type II.23: Amorphous (N = 1).— One such bead, of opaque milky quartz with a plain perforation, was recovered in the excavation.

Materials and Techniques

Aesthetically pleasing color, and possibly certain symbolic attributes, determined the material chosen for the production of stone beads (Clark 1986:65 ff.). Hardness was of importance primarily to the craftsman, while scarcity or availability was only of secondary importance (Boardman 1996:7–8). Carnelian, commonly found in the eastern deserts of Egypt (Ogden 1982:108; Andrews 1990:41), was very popular and was one of the earliest hard stones used in jewelry production in the ancient Near East. This stone's reddish color—suggesting an analogy to blood and hence to life and energy—made it highly valued in antiquity for beads, amulets and inlays. Opaque milky quartz and rock crystal are found in Egypt, Syria, Cyprus and Anatolia. This stone was used in jewelry

manufacture in Western Asia from as early as the third millennium BCE (Ogden 1982:106). Agate is common in Egypt, the Negev Desert and Jordan, and has been used in jewelry since the third millennium BCE (Ogden 1982:109).

Stone beads were initially formed by roughly sculpting the semi-precious stone into the desired shape. This may have been done by chipping the stone with a soft hammer (bone or antler) upon an anvil, or by grinding the stone between two large flat stones (Lucas and Harris 1962:42), as is commonly seen in Egyptian Old Kingdom funerary representations of lapidaries at work (Ogden 1982:145–146). Ethnographic parallels, especially from India, reveal that prior to shaping, many of the harder stones, such as carnelian and agate, were heated or baked to facilitate their chipping and also to improve their color (Roux 1995).

After initial forming, the stone was perforated through the desired axis. At the beginning of the third millennium BCE, most perforations were probably made with a flint or metal bit on a vertical hand-rotated drill of the kind well known from the Old Kingdom (Andrews 1990:73). The drilling and boring of a bead is a difficult task, and the pressure exerted on the stone can easily cause it to fracture. To avoid this, perforation was usually carried out from both sides of the bead, resulting in a double-cone perforation, the holes meeting, hopefully, in the middle of the stone. Long beads were invariably perforated in this way, while for very short beads, a conical perforation executed from one side often sufficed.

A possible technique for the perforation of the disk-cylinder beads may be reconstructed as follows: after initial preparation of the unperforated disk (blank), pecking on one side would have provided a slight indentation in the center to allow a drill to be placed in position. The drill would then perforate approximately halfway through the blank, leaving a conical depression. The completion of the perforation may have been achieved by placing the drill bit in the depression and striking it, producing a conical fracture scar on the reverse side of the disk (Grace 1989:149). This technique was identified at Neolithic Kumartepe in Turkey (Grace 1989) and also at Larsa in Iraq, dating three millennia later (Chevalier et al. 1982), and was probably the technique used to produce numerous disk beads of carnelian and rock crystal dated to the Early Bronze Age and later periods.

The final step in stone-bead manufacture was usually the finishing process of shaping and polishing. Final polishing of stone beads was done with the use of abrasive materials, such as fine sand or clay mixed with a lubricant, e.g., oil. The beads were probably rubbed in the abrasive material within a straight groove cut into a stone. Such stones with a deeply-cut, elongated groove are known from archaeological excavations and are often identified as bead-polishing blocks (see Tufnell 1958:71, Pls. 21:4; 26:1, the blocks from Tel Lakhish were dated to the fourth millennium BCE). Mass-production methods for polishing the beads may have included passing a wire through several beads and rolling them on an abrasive material, or affixing beads to the end of a drill and rotating them in a small depression (Ogden 1982:150; Andrews 1990:81).

SILICEOUS BEAD

A single siliceous bead was recovered from T80.

Type III.2: Short Oblate Circular (N = 1; Fig. 1:4).— This faience bead is of rounded, slightly oblate and flattened form (Beck Type I.B.1.a.) with traces of green glaze. Faience is an inexpensive artificial medium that may be formed into almost any shape in almost any color, thus effectively becoming an artificial 'precious stone' (Nicholson 1993:9). It is defined as a glazed composition, consisting mainly of crushed quartz (silica or fine sand), mixed with a solution of natron (for alkali content, interchangeable with salt or plant

ashes) and calcium carbonate (lime), creating a pasty mass that can be hand shaped or pressed into a mold and, after drying, glazed and fired into a hardened state (Lucas and Harris 1962:156–167; Kaczmarczyk and Hedges 1983; Andrews 1990:57–58; Moorey 1999:166 ff.). The technique of producing basic faience was apparently first invented in the fifth millennium BCE in Mesopotamia from where it spread to Western Asia and Egypt (Kaczmarczyk and Hedges 1983; Peltenburg 1992; Nicholson 1993).

The first attempts at using a fired glaze were undertaken on steatite beads, apparently in an effort to imitate a semi-precious stone, such as malachite (Moorey 1999:170–171). Over time, with the development of various metal-oxide additives, almost any color could be achieved and thus, almost any semi-precious stone could be imitated.

Faience was a common material used in the manufacture of jewelry items, primarily beads, and is found locally as early as the Early Bronze Age, for example at ʻArad (Amiran et al. 1978: Pls. 69:9, 10, 16–19; 118:10c, d; 119:3, 4, 6, 7). In the present example, the glaze was probably applied after the formation of the bead and contained an alkaline pigment solution of copper oxide, which produced the green color.

SHELL BEAD

One shell was found among the beads from T80.

Type VI.3: Conus Shell (N = 1).— Shells of the *Conus mediterraneus* species are found throughout the Mediterranean. They were commonly used in Greece and in the southern Levant during the Neolithic and Bronze Ages as ornaments and burial offerings (Reese 1983). Many of these shells are naturally holed at their apex and may have been used as beads, strung through the apex and out the labial opening.

SUMMARY

Most beads have generalized forms that are not culturally or chronologically instructive. The beads from T80 are typical of the Early Bronze Age (e.g., Qiryat Ata Stratum I, see Golani 2003: Fig. 7.11:2–5), but are not exclusive to this period; they may be found in earlier and later periods as well.

Beads are nearly always the most common jewelry item found in excavations. Although they are commonly perceived as components of a necklace, beads are often found in tombs as single items.

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