

# Human Ecology of the Southern Arava Environmental Perspectives of Ancient Desert Dwellers

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The surveyed and studied archaeological remains of the Levant, with a focus on the Southern Arava, draw a rough blueprint for how ancient people solved certain social and environmental problems. In particular, we can learn from their wisdom in land use, adaptation ability and disciplinary mechanisms, and from their religious and spiritual mentality, all of which have a counterpart in present-day environmentalism.

## **WISDOM IN LAND USE**

Modern misconceptions about the barrenness of the desert and harshness of the living conditions do not do justice to the expertise with which ancient peoples drew agriculture, raw materials, and a solid livelihood from the land. Uvda Valley, at its height of settlement in the 3<sup>rd</sup> Millennium BC, supported around 3,200 people (about as many as live in the entire Hevel Eilot Regional Council) with a comprehensive system of agriculture, livestock, and trade goods (Avner, 2002b: 36). This they were able to accomplish without modern pumps, chemical agriculture, and machines—and without the accompanying salinization and boron-loading of the agricultural area. In fact, the area was considered some of the best fields in the Arava by local Bedouins, who harvested the area in secret even after the 1948 War (Avner 2002b: 30-31). Modern analysis will tell us that the limestone sand of Uvda Valley is very fertile and well-ventilated, and the low gradient allows flood waters to bed the soil naturally; wild grains even spring up naturally after floods (Avner, 2002b: 27). Human influence, such as the built *limans* in Uvda Valley (the first indication of water engineering in the world), made it possible to sow before the floods, while other innovations, like the *Qanats* found in Yotvata oasis and En Evrona, served to expand the cultivatable area considerably (Avner, 2002b: 28; Avner 2002a: 410-411). The *Qanat* system of the Early Islamic Period, which overlaps a technologically earlier system of pools near Yotvata, uses natural gradient to transport water underground from a point high on the water table, to a desired exit point (Avner 2002a: 409). This was labor-intensive work, but nevertheless provided sufficient water not only for agriculture, but also for a luxurious roman bathhouse (Meshel 1993: 1519). The *Qanats* do not suffer from evaporation and, after the high initial investment in building, do not require manpower to elevate the water.

The Evrona site bears evidence for the type of agriculture enabled by the *Qanat* system; findings indicate a “double story” type of agriculture, which allowed the cultivation of dates, olives, almonds, carob, wheat and barley, and other things (Avner 2002a: 411).

The abundance of remains for permanent settlement, including solid square buildings, investment in infrastructure and storage facilities, as well as 4,000 years of consecutive <sup>14</sup>C dating is in stark contrast to common views of ephemeral settlement in the harsh desert (Avner 2002b: 32-33, 36; Beit-Arieh 1982: 155 and Haiman 1992b: 93, in Avner 2003: 2). Quality of life in the desert has often been misinterpreted by scholars, such as Haiman (1992c: 304 in Avner, 2003: 2), who claimed the population was always “hungry, on the verge of death.” In fact, various estimates of the population and herding in Uvda Valley portray it sustaining 30 times more population and at least 3 times more livestock (Avner, 2002b: 37-38). In addition to the agriculture in Uvda Valley, the population had the extra capacity to allow luxurious sheep to graze (Avner 2002b: 20). This is not to say that there were not periods of diminished settlement or poorer conditions for agriculture, but that a blanket label of desperation does not describe ancient desert peoples. Ancient roads crisscross the Southern Arava, indicating the “busyness” of life in the desert; they show not only the existence of trade in agriculture, but also for copper, gold, and caravan servicing (Avner 2002b: 128). The efficient routing, efforts for maintenance and continual use of the roads indicate a high level of social organization and intimate knowledge of the land (Avner, 2002b: 127). This knowledge allowed the desert people to receive the most benefit from the traffic in, out, and through their domain.

Traffic through the Levant domain included, especially in ancient time, a sizable amount of game animals. Safaitic drawings discovered by Harding (1953 in Meshel 1974: 141, Fig. 8) in Jordan nearly cinched an ongoing debate over the function and use of the so-called desert kites found in many areas of Jordan and the southern Levant. Although geographical variations exist in the kites, the general function is to discreetly corral gazelles (often during migration) to enclosures, pits, or traps at the terminal points of the kites. The natural simplicity of the design and the efficiency in capturing game did not, however, lead to extinction of the gazelles. Perevolotsky & Baharav (1990: 245) estimates that, in Sinai, the maximum sustainable capture rate was 25% and that Bedouins hunting these gazelles were careful to take only what they needed. No evidence shows that extinction began before firearms were introduced in game hunting (Meshel 1974: 141). The sustainable hunt is combined with another environmental attribute of the kites, namely that they did not alter or damage the landscape; rather, they utilized the landscape to their benefit (Meshel 1974: 139).

Knowledge about the land allowed ancient geologists and alchemists to develop some of the pioneering copper mining and smelting operations in the world. While mining began as early as the 7th Millennium BC, it is not until the Late Neolithic, or the Chalcolithic period that copper production commenced (Avner 2002b: 42, 63). While copper ore was historically fashioned into objects, the smelting of copper only began after three technical hurdles were overcome, namely, charcoal production, fluxing materials, and concentrated oxygenation (Avner 2002b: 40). The so-called Yotvata Hill, upon which an Early Iron Age fortress was excavated by Ze'ev Meshel (1993), is a likely example of not only the existence of copper smelting, but of the social institutions that supported copper production. Yotvata oasis was likely a supply center, providing acacia charcoal, provisions, and water to the copper production in Timna and elsewhere, while the fortress on Yotvata Hill provided defense (Meshel 1993: 1518). Timna, however, was not the only center for mining; sites where modern copper industries have not penetrated, such as in Nahal Roded, Be'er Ora, and the copper veins in the former Etzion Air Base area, were all exploited at some point by ancient peoples (Avner 2002b: 44).

### **ADAPTATION ABILITY AND DISCIPLINARY MECHANISMS**

In many of the activities carried out by ancient peoples, adversity of the physical and social environment was overcome with a high level of creativity and innovation. Many of the obstacles are surprising to scholars who refer to the desert as harsh, barren, and ephemeral. In Uvda Valley, the majority of doors are east-facing to protect the house from the cold western winds, and catch early morning radiation (Avner, 2002b: 12). Heat and aridity are far less of a problem, considering houses were built for the winter, and the amount of fuel (wood) available more clearly defines carrying capacity. However, low roofs facilitated heating, and houses were designed in an integrated manner to hold livestock, provide grain storage, and be adequate dwellings (Avner, 2002b: 11-12; Avner *in Interview* 26 May 2006). Water was managed in an integrated fashion, with the locals making use of dams in the wadis for flood water, wells (some of the first ever), and the utilization of spring water (Avner, 2002a: 406-407). The majority of the houses were also built in the valley, and the absence of hilltop fortresses shows a high social order in which peace was the *status quo* and conflict a rarity (Avner, 2002b: 13-14).

In the absence of conflict and with the additional spur of adverse environmental conditions, ancient peoples were very innovative. Some of the first threshing floors and grain sledges in the world were developed and employed in this area, in addition to the water engineering discussed above (Avner, 2002b: 22-24). Descriptions of ancient peoples being

incumbent on the “support of a strong stable political and economic body” fall through, when we consider how the Egyptian “conquerors” who arrived to Timna depended upon locals for their mining expertise and had to yield to local culture in order to maintain adequate relations with the mining community (Beit-Arieh, 1984: 22 in Avner, 2003: 2; Avner, 1999 in Avner 2002b: 64; Rothenberg, 1999: 168-170). This goes against the account of Rothenberg (1999: 150) that mining was orchestrated by the Egyptians themselves. Smooth relations with the local population was possibly so important that an important vizier with Canaanite background was sent to Timna to manage joint Egyptian and local operation starting in 1300 BC (Schulman, 1988 in Rothenberg, 1999: 150). The local system for mining copper in Timna, which was based on the expertise of extended family’s (perhaps even stemming from the biblical *Kenites*, mentioned as experts in metalwork), enabled an inter-generational connection with the mined area and perhaps encouraged a closer stewardship of the Earth (Avner, 2002b: 47, 64).

### **ANCIENTS’ RELIGIOUS, SPIRITUAL MENTALITY HAS A MODERN COUNTERPART IN ENVIRONMENTALISM**

As exhibited by the range of adaptations to the physical and social environment of the desert, ancient peoples were clearly much attuned to the carrying capacity of the land, and perhaps because of this, they purposefully developed a social order that prevents conflict. The fragility of desert existence caused a reliance on God, and closeness to the land. A critique of modern Judo-Christian culture is that connection with the natural spirit of the land has induced a non-ecological mentality (White, 1967). Ancients in the desert were, by virtue of their fragile position in the desert, were forced to develop deeper and more protective environmental outlook. The desert people of Sumeria, the Rechabites, explained themselves as very non-materialistic, and very much focused on longevity and quality of life (Jeremiah 35:6). The organized Rechabites of ca. 600 BC maintained these values even 600 years after being displaced more northerly to a fertile area (2 Kings 10, from Avner *by Interview* 22 May 2006). The depth of their environmental outlook often paralleled their spirituality.

Religious ideals of the larger region were often imported from desert peoples, who were particularly effective at incubating spiritual ideas in connection to their existence. Pantheons of gods assembled in the animistic tradition, normally developed in hierarchical urban societies, were created in the desert long before such societies existed (Avner, 2002b: 96). Modern monotheism has, in many ways, been overlain on the mantle of animism. Animistic beliefs are perhaps the early foundations of modern-day Land Ethic, a concept developed by Aldo Leopold

(1981) to describe the extension of the human community to environmental visages. Innovation continued with *matzevot*, the plain rock standing stones, which became the first abstract representation of God (Avner, 2002b: 98). The “unhewed” and non-polluted aspect of these simple formations has been immortalized in Exodus 20:24 (Avner, 2002b: 84).

Present in the spiritual existence of the ancients was also a deep respect for ancestors and a corresponding evolution to a cyclical view of life that enabled *inter-generational stewardship* (Avner, 2002b: 92). The size and extent of tombs and the work that went into them often goes beyond resources devoted to quality of life in the present—a disciplined lifestyle that only deep spiritual belief could sustain (Avner, 2002b: 154). This might be a result of the ideal that ensuring one’s position in the world of eternity meant living righteously in the present. This cyclical ideology, combined with the respect shown to ancestors by ancient people, has deep ecological undertones (Avner, 2002b: 157). Major fertility symbolism is found at almost all levels of burial, with frequent references to the womb (Earth) and vulva (bringer of new life), in addition to the embryonic fetal position of burial exhibited in Eilat region tombs of 5<sup>th</sup> to 6<sup>th</sup> Millennium BC (Avner, 2002b: 70-71). Open air sanctuaries, of which there are hundreds (at least 156) remaining from the 6<sup>th</sup> Millennium and later, often mimic a paired or dual ideal of female-male in their left-right orientation and inclusion of phallus and vulva symbols (Avner, 2002b: 120-122).

The system of roads, which is intimately connected to the sanctuaries, is also dotted with cairns, which are individual burial sites, respected with libations and frequent visits by the living (Avner, 2002b: 105-106). The reigning view of death was merely an extension of life, which involved current generations in actively providing accoutrements of life (food, stones, scrapers, jewelry), and positioning the dead for rebirth in their tombs, in order to encourage the continuance of ancestor’s eternal livelihoods (Avner, 2002b: 80, 83).

The building of an inter-generational mentality and fertility ideal in connection with the Earth imparted strong ecological ideology to the ancients. In Timna, they sought permission from the Goddess Hathor to “penetrate” the Earth for mining and expended enormous energy refilling the holes to bring the environment back to equilibrium (*Stela 90, Serabit el-Khadim by Interview with Avner; Rothenberg, 1999: 170-171*). Ancients’ clear connection with animals, shown by frequent carvings on rock and stone drawings of local species, is represented by their integration into cult sites (open air sanctuaries) (Avner, 2002b: 118-119). This may have also resulted, for instance, in the desert kites of Sinai being only used for a sustainable yield of antelope animals (Perevolotsky & Baharav, 1990: 245). By the lack of significant destruction of archaeology, it may be assumed that inner-conflicts within desert societies were at a minimum—

perhaps as a result of ancients' own views towards stewardship of the fertility of their Mother Earth and a fear of inter-generational retribution by ancestor spirits.

### **Bibliography:**

- Avner, Uzi. 2002a. Ancient Water Management in the Southern Negev. *ARAM* 13-14: 389-407.
- Avner, Uzi. 2002b. *Studies in the Material and Spiritual Culture of the Negev and Sinai Population During the 6<sup>th</sup>-3<sup>rd</sup> Millennia B.C.*: Ph.D. disst., Hebrew Univ., Jerusalem.
- Avner, Uzi. 2003. Settlement Pattern in the 'Araba Valley and the Adjacent Desert Areas, in P. Bienkowski (ed.) *Proceeding of the 1<sup>st</sup> Wadi Araba Conference*, Atlanta.
- Leopold, A. 1981. The Land Ethic, in *A Sand County Almanac*, pp. 237-265. Oxford U. Press.
- Meshel, Ze'ev. 1974. New Data about the 'Desert Kites'. *Tel Aviv* 1, pp. 121-144.
- Meshel, Ze'ev. 1993. Yotvata. In E. Stern (ed.), *The New Encyclopedia of Archaeological Excavations in the Holy Land IV*. pp 1517-1520. Jerusalem.
- Perevolotsky, Avi and Dan Baharav. 1991. The distribution of desert kites in eastern Sinai and subregional carrying capacity. *Journal of Arid Environments* 20, pp. 239-249.
- Rothenberg, Beno. 1999. Archaeo-metallurgical Researches in the Southern Arabah 1959-1990, Part I. *Palestine Exploration Quarterly* 131, pp. 68-89, 149-175.
- White, L. 1967. The Historical Roots of Our Ecological Crisis. *Science* 155, pp. 1203-1207.