

the abundant hard data to appendices also adds immeasurably to the book's readability. Finally there are numerous illustrations, nearly one per page. Of these, the photographs stand out as exceptionally beneficial. Graf's liberal use of old photographs paired with those he took recently from the same vantage points vividly portray just how such change has occurred during the past sixty years. If ever anyone needed

evidence of stream dynamics, she or he would need go no further than this book. Plutonium is its explicit subject. Implicitly, though, the book is every bit as much about the general dynamics of biophysical environments. It is geography at its very best.

Key Words: environmental change, fluvial geomorphology, plutonium.

*Medieval Agriculture and Islamic Science: The Almanac of a Yemeni Sultan.* Daniel Martin Varisco. Seattle: University of Washington Press, 1994. xv and 349 pp., map, index. \$40.00 cloth (ISBN 0-295-97378-1).

Reviewed by Karl W. Butzer, Departments of Geography and Anthropology, University of Texas at Austin, Austin.

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As a result of intensive fieldwork and long residence in Yemen, Daniel Varisco, anthropologist, has emerged as an expert in traditional Near Eastern land use. He also is a scholar of Arabic and of Islamic civilization. While the subject matter and organization of this book will be unfamiliar to most geographers, it reveals a wealth of cultural information encoded in the seemingly arcane history of science.

Almanacs are calendars with entries for each month and day that offer overlapping kinds of information. Popular from classical antiquity to the modern *Farmer's Almanac*, early examples prescribed times for planting, tending, and harvesting specific crops, together with astrological or magical prognostication. After the third century A.D., interests shifted to liturgical concerns such as Christian feast days or the mathematical calculation of the changing dates of Easter ("Paschal tables," P. L. Butzer 1995). This avocation among Egyptian scientists made Coptic liturgical-agricultural calendars a major genre, so that Christian feasts continued to be identified in later Islamic almanacs that also incorporated Arab astrological lore and weather-signs. Almanacs therefore became multicultural vehicles that reflected cultural continuity, reminiscent of persistent Muslim participation at certain Christian rituals (see Gervers and Bikhazi 1990).

Whether climatic or agricultural notations reflected local conditions or older lore from distant regions depended on whether an almanac was just a perfunctory copy or revised by a competent and strong-willed editor. The almanac presented by Varisco represents an original contribution by the Rasulids, a Turkoman dynasty installed in Yemen by

Saladin. Written in A.D. 1271 by Al-Ashraf Umar, it offers direct evidence on local agriculture: a young crown prince, he had the advantage of a scholarly father and the presence of foreign scientists at the court, despite the peripheral location of Yemen.

The structure of Varisco's book resembles that used by Classicists and Arabists, namely an introduction, then an original text and its translation, followed by commentaries and footnotes mainly related to textual matters. But Varisco's notes are brief, and the commentary is expanded to seven thematic chapters (169 pages compared with seventeen for the translation); it deals with calendrics, astronomy, weather phenomena, the natural world, agriculture, medical miscellanea, and maritime navigation. This commentary is substantial and collates data from other medieval Yemeni sources, but Varisco takes a conservative stance, emphasizing literary details, hesitating to offer his own observations, and drawing few synthetic conclusions. The gazetteer of place names is helpful, but many do not appear on the rudimentary maps. To understand these chapters and their implications, therefore, involves hard, if rewarding work.

Like all extant almanacs, al-Ashraf's was based on the Julian, solar calendar, rather than its Islamic, lunar counterpart—if only because solar reckoning remains indispensable for the agricultural cycle. He gives rough equivalents of the old Himyaritic months and refers to the Coptic, Persian, and Indian New Years as well as major Christian, Persian, and Jewish feasts. Observations included detailed sun shadow-lengths and star angles at specific dates, although the "unreformed" Julian calendar already was eight days

“fast” at the time. Notations on typical rainy spells and other weather phenomena are difficult to interpret because of al-Ashraf’s unsuccessful efforts to reconcile Yemeni phenomena with lore from other parts of the Arabian Peninsula, with its complex spatial patterns of different rainy seasons.

Yemen, anchored on its semiarid highlands, is separated from the winter rainfall belt of the Near East by desert Arabia, and by 30 km of water from the shores of tropical Africa. Late summer monsoonal rains dominate the high country, but upper airflows bring March rains as well, while the hot and arid Red Sea lowlands experience “wet fogs” and light rains in late winter. Thus, Yemen enjoys overlapping tropical and westerly rainfall, just as it links the threads of Mediterranean and African agriculture.

The medieval documents reveal a tight interdigitation of wheat and dhurra sorghum cropping, using the Mediterranean scratch plow in valleys with flood or spring irrigation or on rainfed, terraced hillsides (see Varisco 1982, 1983). Limited to the cooler highlands, summer wheat was mainly planted in either July or December. A small-eared variety was adapted to summer rains on terraced mountain sides, and there are hints of durum wheat (planted mid-autumn) and a summer breadwheat. The planting schedule for reputedly fifty varieties of sorghum was even more complex. The main sowing times in the mountains were late spring and early autumn, compared with August, early autumn or mid-spring in the lowlands. Local scheduling targeted planting of one kind of crop right after harvesting another. In some areas, two sorghum plantings were made on the same plot within a year, intercropped with peas, cowpeas, chickpeas, sesame, cucumbers or melons. Such tightly stacked routines spanned most of the year, smacking strongly of a long-term adaptive endemism. Together with recent identification of cattle pastoralism in coastal Hadramawt, it begins to look as if the Mediterranean-style agricultural features of northern Ethiopia reflect prehistoric cultural interchange between Africa and Arabia, rather than South Arabian immigration or hegemony.

How deeply was Mediterranean arboriculture embedded within Yemeni lifeways, as opposed to a symbolic or ornamental role limited to an ostentatious or academic elite? Olives and olive oil were imported from Syria and Egypt because that tree was not grown locally. But grapes were very popular for the table and as raisins. A great number of varieties and the explicit planting, watering, and pruning schedules all suggest

considerable experience, next only to date palm cultivation. Sown from seed or grafted, figs were equally well established and a subject of Arabian folklore. Peaches, apples, pomegranates, and quince were also represented by several varieties each, while walnut, plum, apricot, and the mulberry tree had less apparent time-depth. One of the two banana variants was probably of African origin. Overall, however, arboriculture played little or no role in the rural economy, being characteristic of irrigated estate gardens. Fruit was commonly picked and eaten before fully ripening, whereas the Islamic agronomists of Mesopotamia or Spain dealt with wine making, oil pressing, and processing or preserving of fruits, as implicit part of an arboricultural strategy emphasizing risk-minimization (K. W. Butzer 1994, 1996). Given the small size of Yemeni towns, there was little market demand for commercial fruit products, so that arboriculture did not become a key part of the subsistence strategy.

In sum, Varisco’s book is richly informative on cultural processes. One of the charges directed against academic “orientalism” had been its supposed preoccupation with elite esoterica. This volume makes every effort to understand “the other” and, with some interdisciplinary “translation,” it does illuminate the lifeways of common people.

Key Words: Africa, Arabia, cultural continuity and interchange, ecological adaptation, Mediterranean agriculture

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