

Jeff Albert, Magnus Bernhardsson, Roger Kenna, eds.. *Transformations of Middle Eastern Natural Environments: Legacies and Lessons*. New Haven: Yale University Press, 1998. 498 pp.

Reviewed by Charles C. Kolb

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This volume in the Yale School of Forestry and Environmental Studies Bulletin Series is based upon an international interdisciplinary conference, *Transformations of Middle Eastern Natural Environments: Legacies and Lessons*, organized by Yale's Council on Middle East Studies. The conference, which was held from 28 October-1 November 1997 at the Yale Center for International and Area Studies, brought together scholars from a wide spectrum of disciplines and backgrounds, as well as journalists and environmental advocates. The conferees focused on the natural environment of the Middle East and hold the belief that environmental problems transcend national boundaries and present widespread concerns throughout society. The conferees represented disciplines including climatology, marine ecology, fisheries management, geography, remote sensing, international relations, anthropology, demography, human ecology, political science, and history, among others.

The published volume includes the original conference program (pp. 492-96) and a list of seventy conference participants (p. 497). The original conference included a plenary talk by Brian Spooner (Professor of Anthropology, University of Pennsylvania) entitled "History and Ecology at Cross Purposes," although Spooner's essay is not included in the printed volume. In addition, there were 49 papers grouped into ten panels (each panel had a discussant and moderator), a photo

essay, a round table discussion (three participants and a moderator), and 11 poster presentations. The three editors of the volume were, at the time of publication, doctoral students at Yale: Albert at the Yale School of Forestry and Environmental Studies, and both Bernhardsson and Kenna in the Department of History.

Abbas Amanat, Professor of History and the Chair of the Council on Middle East Studies at Yale, authored the "Preface" in which he provides a background and context for the conference and this publication. He is a recognized specialist on the modern history of Iran. In a seven-page "Introduction," the three editors characterize the historical, cultural, and environmental significance of the Middle East, and they propose five questions that were the focus of the conference: 1) What are the key elements that define Middle Eastern natural environments? 2) What are the core issues of environmental change in the Middle East as the 21st century approaches? 3) How have the human inhabitants of the Middle East interacted with these environments and how have both sides changed in the process? 4) How can perceptions of the value of natural resources, as well as the belief systems reflecting these values, be characterized? And, 5) Do our assessments of environmental legacies enable us to propose lessons to guide future policies? If so, what lessons can we offer? The editors' definition of the Middle East includes, from west to east: Morocco,

Algeria, Tunisia, Libya, Egypt, Sudan, Ethiopia, Eritrea, Turkey, all of the polities in the Arabian Peninsula, Syria, Iraq, Azerbaijan, and Iran. This geographic region encompasses peoples who are "linked by physiography, climate and culture" (p. 10).

The volume has five sections, a total of 25 (un-numbered) chapters, 16 color illustrations, 64 black-and-white figures, 25 tables, 201 notes, and a total of 874 bibliographic references. All of the chapters and nearly all of the references are in the English language. The five sections have no separate introductory essays, but the editors summarize salient points in their "Introduction" (pp. 8-14). Each chapter begins with a substantive abstract (ranging up to about 200 words), followed by the narrative text, "References," and biographical sketch and the affiliation and address (including e-mail) of the author(s). The narratives have in-note references accompanied by explanatory "side-bar notes" (not footnotes or endnotes). In addition, all of the chapters have key information in bold typeface as sidebars. The "References" are alphabetical by author (surname and first initial), and include complete bibliographic citations (date of publication, full title, place of publication, publisher, and pages numbers [as needed]).

Since each chapter "stands alone" as a complete essay with separate illustrations and references, these readings have significant pedagogical value. Notably, following the copyright symbol on the obverse of the title page is the following statement: "Permission is granted to reproduce this volume without prior written consent with the exception of "Playing Chicken on the Nile" by John Waterbury and Dale Whittington, which is reproduced with the permission of the National Resources Forum, a publication of the United Nations Department of Economic and Social Affairs."

I shall next summarize major points made by the authors of the individual chapters. Obviously, in this brief assessment, your reviewer cannot hope to capture all of the conclusions reported in

each presentation. The basic organization is as follows: "Section I: Agriculture and Pastoralism" (six chapters), "Section II: Water" (eight chapters), "Section III: Nature and Culture" (four chapters), "Section IV: Marine Environments" (four chapters), and "Section V: Monitoring" (three chapters).

Section I: Agriculture and Pastoralism

"Middle Eastern Irrigation: Legacies and Lessons" by Peter Christensen (Department of History, University of Copenhagen); 16 pp., 30 references, and 18 side-notes. The author investigates the history of irrigation cultivation and assesses the limitation of irrigation systems and the damage these works cause to human populations and natural systems. Christensen argues convincingly that the pre-modern Middle East suffered a long period of political and economic decline following the end of the Sassanian Empire (c. 50 C.E.), and uses Wittfogel's concept of "Oriental Despotism," Jacobsen's analysis of Mesopotamian soil salinization, and hydraulic system data from Iranian and Afghan Sistan. He concludes that modern European technologies introduced during the nineteenth century have exacerbated the problem, that irrigation systems have inherently limited life expectancies, and that achieving further agricultural growth without serious environmental degradation is not feasible.

"Biodiversity and Sustainable Agriculture in the Fertile Crescent" by A. A. Jaradat (International Plant Genetic Institute, Aleppo, Syria); 27 pp., 67 references, and 2 tables. Jaradat examines the Fertile Crescent as a center of biotic origin and biodiversity since the Neolithic. Cereals, pulses, spices, fruit, nuts, and pasturage are noted, and data on native plant species from twenty-one countries are considered, as well as topics on the conservation of biodiversity, interrelated factors (sociopolitical, ecological and climatic), types of farming systems, and land use management. He suggests a holistic approach to sustainable agricultural development and concludes that the di-

versification of crop production and a broader diversity in crops are essential.

"Use of Land by Nomadic Pastoralists in Iran: 1970-1998" by Lois Beck (Department of Anthropology, Washington University, St. Louis, MO); 23 pp., 41 references, 6 side-notes, 2 maps, and 1 photo. Beck presents an overview of her extensive fieldwork among the pastoral nomadic Qashqa'i of southwestern Iran and their changing relationship with the natural environment during the political changes that have taken place in Iran during the past three decades. Traditional land use strategies have been modified to adapt to intrusive urban and technological pressures. A combination of customary and new strategies, including new patterns of local social organization, is used to adapt to environmental constraints. Cautionary tales are also offered that are important for national planning and multinational corporations.

"Gender, Pastoralism, and Intensification: Changing Environmental Resource Use in Morocco" by Susanne H. Steinmann (Ph.D. Candidate in Geography, Clark University, Worcester, MA); 27 pp., 78 references, 6 bar graphs, and 1 map. Based upon her extensive fieldwork, the author presents a critical analysis of gender-specific behaviors among the Beni Guil nomadic pastoralists of eastern Morocco, and she demonstrates how gender-based resource exploitation is modified through sedentization, urbanization, and commercialization. The collecting by women of mushrooms, truffles, medicinal plants, and fuelwood as a part of nomadic lifeways was altered as households became more fixed in villages and towns, and these collection activities shift from women to men.

"Environmental Degradation in Eastern Turkey: The Case of Contract Farming" by Behrooz Morvardi (Development and Project Planning Center, University of Bradford, UK); 15 pp., 12 references, 3 side-notes, 6 tables, and 1 figure. The author assesses the case of commercialized contract sugar beet cultivation in Igdir, Turkey to ex-

amine the "disconnect" between centralized agricultural planning and local conditions. He hypothesizes that damage to land resources may be attributed to the nature of the socioeconomic relationship between the farmers and the government. Erosion, irrigation, salinization, and production costs are evaluated.

"Monitoring Desert Locusts in the Middle East: An Overview" by Keith Cressman (AGP Division, Food and Agriculture Organization of the United Nations, Rome); 18 pp., 20 references, 1 table, 4 diagrams, and 2 maps. The Desert Locust, *Schistocerca gregaria* (Forsk.) a short-horned grasshopper, has been the primary culprit in six plagues (one lasting thirteen years) in Southwest Asia during this century. Swarms may contain billions of the dramatically multiplying insects, and they can migrate over hundreds or even thousands of kilometers (up to 6,000 km in one documented case). Cressman considers the insect's life cycle, migratory behavior, past plagues, current historical surveys, analysis and forecasting, traces an outbreak in the Arabian Peninsula (1996-1997), and its adaptation to changing ecology. Locust management strategies need to be adopted throughout the Middle East.

Section II: Water

"'Virtual Water': An Essential Element in Stabilizing the Political Economies of the Middle East" by J. A. Allen (Water Issues Group, School of Oriental and African Studies, University of London); 9 pp., 35 references, 2 tables, and 2 figures. Allen asks why there have been no wars over water despite the fact that many economies in aid regions have only half of the water they require? As a result of his analysis on the political economy of water, he considers the water/food nexus and the role of international trade in the avoidance of violent conflict over water. He posits that the Middle East has been able to access water in the global system via trade. "Virtual water," the water embedded in key water-intensive commodities such as wheat, is examined as a case study.

"Playing Chicken on the Nile: The Implications of Microdam Development in the Ethiopian Highlands and Egypt's New Valley Project" by John Waterbury (President, American University of Beirut) and Dale Whittington (Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill); 18 pp., 12 references, 16 side-notes, 1 table, and 1 map. The authors evaluate the River Nile, the problem of a growing populations in Egypt and Ethiopia, the new Egyptian land reclamation and settlement scheme known as the New Valley Project, and Ethiopia's microdam strategy and the Tekeze River Project. These nationalistic unilateral plans are in direct conflict. Waterbury and Whittington examine the issues and comment on the need for dialogue between the two nations and a revised Nile Waters Agreement--sooner rather than later.

"Restructuring of Water Use in the Tigris-Euphrates Basin: The Impact of Modern Water Management Policies" by Peter Beaumont (Department of Geography, University of Wales, Lampeter); 19 pp., 13 references, and 5 tables. Late twentieth century water management practices introduced by the Republic of Turkey and that nation's "command" of the headwaters of the two rivers are examined. The massive hydrologic and agricultural implications of the Turkish Southeast Anatolian Project (GAP) for Syria and Iraq are considered, as are future water requirements and issues of water quality. Beaumont believes that the full impact of these changes will not be realized for another decade.

"Qanats and Lifeworlds in Iranian Plateau Villages" by Paul Ward English (Department of Geography, University of Texas, Austin); 19 pp., 41 references, 4 drawings, and 1 aerial photo. English presents an overview of the qanat, one of the most significant hydraulic technologies of the pre-modern Middle East. The origins, diffusion, construction, ownership, and productivity of the qanat system is evaluated and compared to the digging of deep wells. The former emphasizes that

water is a renewable resource but that from deep wells, water is a non-renewable resource. The short-term benefits of the wells have long-term costs that are as yet unseen.

"Disease and Water Supply: The Case of Cholera in 19th Century Iran" by Amir A. Afkhami (Department of History, Yale University); 15 pp., 41 references and 19 side-notes. The origins of the Asiatic cholera pandemics, the deficiencies of central political administration, urban sanitation and neglect, religious and cultural factors, and pathogenesis are examined. The author demonstrates that the transmission of cholera in Iran was facilitated by the qanat system, an otherwise efficient and benign hydraulic technology. He demonstrates how "prince and peasant" became infected, and that bazaars became the centers of infection through which nomads and farmers transmitted the disease to surrounding campgrounds and villages.

"Hydrostrategic Decisionmaking and the Arab-Israeli Conflict" by Aaron T. Wolf (Department of Geosciences, Oregon State University, Corvallis); 32 pp., 96 references, 21 side-notes, and 15 maps. In this detailed chapter, Wolf, an expert on the interactions between water science and water policy, considers the concept of hydrostrategic territory (land over which sovereignty is sought politically or militarily solely because of its access to water resources). He argues that although water resources are a critical factor in interstate and international relations in the Jordan River watershed, these resources have not been the sole determinant in strategic affairs. His assessment begins in 1913 and follows all historic events, changes, and negotiations through 1997. Wolf presents the historical context for Arab and Israeli hydrostrategies and refutes the "hydraulic imperative" hypothesis.

"Water Agreements between Israel and Its Neighbors" by Uri Shamir (Water Resources Institute, Technion, Israel Institute of Technology, Haifa); 23 pp. and 1 side-note (plus a 13-pp. appen-

dix). Shamir, Professor of Civil Engineering and Director of the Water Research Institute, reviews and reflects upon the 1994 and 1995 water agreements between the Israelis and the Palestinians and Jordanians, respectively.

"Toward a Unified Management Regime in the Jordan Basin: The Johnston Plan Revisited" by Sharif S. Elmusa (Institute of Palestine Studies, Washington, D.C.); 17 pp., 18 references, 14 side-notes, and 2 figures. The Johnston Plan, an unrati-fied 1955 agreement concerning water allocations and the joint management of the Jordan River, is reexamined as a viable proposal for regional accommodation among the Israelis, Jordanians, Lebanese, Syrians, and Palestinians. The author contends that the original Plan can be fine tuned and that a water agreement in the Jordan Basin is a key to overall Arab-Israeli accommodation.

Section III: Nature and Culture

"Cultural Ecology, Perceptions of Nature, and the Advent of Monotheism in the Ancient Middle East: An Hypothesis" by Daniel Hillel (Center for Environmental Studies, University of Massachusetts, Amherst); 6 pp. and 1 reference. Hillel defines five ecological domains in the Middle East (highlands, steppes, river valleys, seacoasts, and deserts) and presents a precis of his book, *The Natural History of the Bible: An Ecological Reading of the Scriptures* (New York: Oxford University Press, in press 1999).

"Gardens of Eden: Exotic Flora and Fauna in the Ancient Near East" by Karen Polinger Foster (Department of Near Eastern Languages and Civilizations, Yale University); 10 pp. and 36 references. The author, employing evidence from art, texts, and archaeology, assesses the concept of the garden, the role of exotic plants, animals, and birds, and aspects of exotica in Mesopotamia and Egypt. She concludes that carefully tended gardens of exotic and indigenous species were the original Gardens of Eden, and that "it was in just such a garden that God planted the two most exot-

ic trees of all: the tree of life, and the tree of the knowledge of good and evil" (p. 328).

"Between Paradise and Political Control: The Semiotics of Safavid Isfahan" by Heidi A. Walcher (Department of History, Yale University); 19 pp., 61 references, and 58 side-notes. Isfahan became the capital of the empire of the Shah Abbas I during the late sixteenth century. Walcher examines the organization of the city, its gardens, and the symbolism and allegories related to the concept of "paradise." She concludes that political-functional and metaphysical-sacred or theological interpretations are not necessarily contradictory.

"Rethinking the Islamic Garden" by Attilio Petriccioli (Islamic Environmental Design Research Centre, Comi, Italy); 16 pp., 19 references, and 22 side-notes. The form, function, and structure of Islamic gardens are assessed in terms of the need for a common basis for research that will organize the field and foster future scholarly work. The new method will shed new light on the garden's formative process and in informing new urban development. Power, symbolism, territoriality, and interdisciplinary research are assessed.

Section IV: Marine Environments

"Middle Eastern Environments" An Overview of Anthropogenic Impacts" by Menakhen Ben-Yami (Fisheries Development and Management Advisor, Kiryat Tiv'on, Israel); 10 pp. and 35 references. The author defines four major marine basins in the Middle East (Levant Basin, Red Sea, Gulf of Aden/Arabian Sea/Gulf of Oman, and Persian Gulf). These have been affected significantly over the past century by human activities (fishing, construction, and effluent pollution). Marine and coastal fishing, tourism, biodiversity, and future coastal management needs are evaluated. International cooperation among neighboring countries is essential without which whole marine ecosystems may collapse.

"Impact of Red Sea Fish Migrants through the Suez Canal on the Aquatic Environment of the Eastern Mediterranean" by Daniel Golani (The He-

brew University of Jerusalem); 13 pp., 43 references, 2 tables, and 2 figures. The "Lessepsian migration" (named after the canal's builder) of organisms, the invasion of tropical Indo-Pacific (Red Sea) organisms into the temperate Mediterranean is the direct result of major human changes following 1869. Golani examines colonizing and non-colonizing Mullidae (goatfishes)--54 species in all--and concludes that no local species has disappeared since the study of Lessepsian migration. He also suggests that two species require further study.

"Fisheries Development in the Arab World" by Izzat H. Feidi (Fisheries Department, Food and Agriculture Organization of the United Nations, Rome); 19 pp., 14 references, 1 side-note, and 3 figures. Arab fisheries resources (coastal, inland, and aquicultural) are significant, renewable, and self-replenishing. He reports import and export fisheries data on fifteen Arab states from Morocco east to Saudi Arabia and elucidates prospects and future challenges, and he suggests a need for cooperative activities and enhancing national priorities related to fisheries development.

"Assessment of Damages to Commercial Fisheries and Marine Environments of Fujairah, United Arab Emirates, Resulting from the Seki Oil Spill of March 1994: A Case Study" by Walter H. Pearson, Saif M. Al-Ghais, Jerry M. Neff, C. Jeffrey Brandt, Katherine Wellman, and Thomas Green. Pearson and Al-Ghais are with the Environmental Research and Wildlife Development Agency, Abu Dhabi, United Arab Emirates; their co-authors are with the Battelle Memorial Institute/Battelle Seattle Research Center. The chapter is 22 pp., and has 31 references, 3 tables, and 1 map. A major crude oil spill (16,000 MT) in March 1994 is assessed in terms of the marine environment and habitats, and through damage and exposure assessments (fisheries and market economies, and climate). The authors draw lessons for both science and public policy concerning oil spill damage assess-

ments, including the need for the classification and mapping of coastal habitats.

Section V: Monitoring

"Global Climate Variations Over the Past 250 Years: Relationships with the Middle East" by Michael E. Mann and Raymond S. Bradley (both, Department of Geosciences, University of Massachusetts, Amherst); 15 pp., 32 references, 1 table, 5 figures, and 5 color illustrations. Global temperature reconstructions are analyzed and demonstrate that there are at least two distinct patterns related to the climate of the Middle East: 1) the North Atlantic Oscillation (NAO) dominated by inter-annual and decadal time scales, and 2) a pattern of atmospheric response to multi-decadal oceanic variations. The authors predict that it may soon be possible to predict spatio-temporal variability of the global climate back 500-1000 years.

"Rapid Population Growth and the Fertility Policies of the Arab Countries of the Middle East" by Onn Winckler (Department of Middle Eastern History, University of Haifa, Israel); 23 pp., 63 references, 1 side-note, and 4 figures. Winckler documents that from 1914 to 1994 the region's total population grew by nearly a factor of five, in the main, as the result of natural rates of increase in indigenous populations (the exceptions being Israel and the Gulf States). The demographics of Egypt, Algeria, Saudi Arabia, Syria, Tunisia, Jordan, Kuwait, and Bahrain are assessed in light of differences in fertility policies, and via declared and undeclared anti-natalist policies (Egypt, Tunisia, Syria, and Jordan). Rapid population growth is viewed as the most critical socioeconomic problem in the Arab Middle East, and the authors also make demographic projections.

"Monitoring the Distribution, Use, and Regeneration of Natural Resources in Semi-arid Southwest Asia" by Nicholas Kouchoukos, Ronald Smith, Art Gleason, Prasad Thenkabail, Frank Hole, Youssef Barkoudah, Jeff Albert, Paul Gluhosky, and Jane Foster. Eight authors are with Yale Uni-

versity; Barkoudah is Professor of Botany at Damascus University, Syria. At Yale, five departments are represented among the co-authors: Kouchoukos and Hole (Anthropology), Smith (Geology and Geophysics and Mechanical Engineering), Gleason and Thenkabail (Center for Earth Observation), Jeff Albert and Foster (Yale School of Forestry and Environmental Studies), and Gluhosky (Geology and Geophysics). The chapter is 25 pp. and has 16 references, 2 tables, 7 figures, and 10 color illustrations. The authors employ satellite-derived datasets to evaluate regional climatology, natural vegetation, and the expansion and intensification of agricultural production for this region. Conventional climate observations, multispectral satellite data, and computer-intensive interpolation and clustering algorithms are used. Remote sensing tools are valuable in the modeling and assessment of environmental change, offering insights into interannual variability and biophysical parameters.

In conclusion, speaking as an anthropologist trained in cultural and human ecology, your reviewer found this volume to be superbly edited; the individual contributions well written, informative, and compelling; the bibliographic citations current; and illustrations excellent and readable. The five questions that were the focus of the conference are answered either directly or partially and indirectly by the data, evidence, and interpretations presented by the authors of these chapters. Nonetheless, the answers to question five--providing lessons to guide the development of future policies--are allusive. The editors and contributors have created a very valuable compendium that will be useful to a variety of scholars and researchers who are concerned with natural and human ecological parameters in the Middle East or in other semi-arid regions of the world.

The Yale School of Forestry and Environmental Studies, 205 Prospect Street, New Haven, CT 06511, sells the volume for \$35.00 (checks or mon-

ey orders, including postage and handling). Additional information is available on their website: <http://www.yale.edu/forestry/publications>.

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