

of the physical landscape. The particulars of place and period he offers primarily to reflect on a slowly changing concept, an ideal type, borderland. The many manifestations of its explication and implementation become the structure of the book. The attention which Stilgoe pays to visual detail suggests that landscape was a vital signifier of borderland conditions. Vegetation, architectural style, color, the organization of outdoor space, and the intrusiveness of transport systems are recurrent themes as he assesses literature on and living practice in the region. Taste—as it was reflected in the landscape, as it governed the provision of services, and as it influenced the behavior of men and women—he defines with care and precision.

One hundred years is a long period over which to maintain the power of an idea influencing any group's assessment of urbanization in America. The thesis presented here is certainly bold. Stilgoe's concept has both a timelessness to it and the almost infinite capacity for adjustment, at least until the automobile opened up once and for all the wide fringe regions around our largest cities. It is, however, difficult to understand how much commonality of outlook the residents of Shaker Heights near Cleveland in the 1920s could have with the women and children of the 1830s who overlook Cincinnati in a much discussed illustration in the book. In defining "borderland" as he does, Stilgoe suggests a problematic inherent unity of concept and period. Another challenge to the reader comes from his attitude toward the literature which he so meticulously mines. The diversity of outlook, of opinion, and of purpose which lay behind the many writings that he analyzes receives little analysis; instead, he presents a remarkably coherent development of thinking. This is a measure of his interpretive achievement, which any appreciative reader must yearn to challenge.

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ENVIRONMENTAL MANAGEMENT AND DEVELOPMENT IN DRYLANDS
by Peter Beaumont. *The National Environment: Problems and Management Series*, London and New York: Routledge, 1989.

Peter Beaumont has written an extremely interesting book which is a must for anyone interested in dryland development. Drylands are pervasive throughout the world, two thirds are found in a belt stretching across N.Africa into S.W. and Central Asia. Since World War II there has been an extensive population growth in drylands and an area like the Middle East, for example, which was a net food exporter as late as the 1940s was importing over 30% of its cereal needs by 1980.

The author devotes the first part of his book to a systematic study of the physical characteristics of drylands, defined here as all those areas which experience regular water shortage on a seasonal or longer-term basis. Given that most arid countries are found in areas of high evaporation and evapotranspiration the author makes a persuasive case for emphasizing water balance rather than mean annual precipitation. There is an illuminative discussion on the extensive dam building which has been taking place throughout the world since WWII and its effects on river regimes and water allocation. The political implications of the damming activity on the Euphrates are discussed in some detail. I particularly enjoyed the section on groundwater which is very lucid.

Beaumont then treats us to a review of human use of drylands from early hunter-gatherer societies, through the domestication of cereals in a sedentary environment, and a description of some early irrigation systems (Jericho 9000 BP and rainwater harvesting by the Nabateans of the Negev 2000 BP). The review continues with present day traditional societies some of whom exploit alluvial fans and terminates with a description of postindustrial modern societies.

A chapter dealing with intensive use of the dryland environment includes urbanization, irrigation and mineral exploitation with their competing demands for land and water. This is followed by a chapter on extensive use of drylands: rainfed agriculture and pastoral systems both traditional and commercial.

For those who think of technology as the universal panacea Beaumont brings a series of case studies in which regional resource management of a subset of the arid environment is compared in a Third World and a developed country. Dryland pastoralism is compared in the Sahara and Central Australia, river basin development is contrasted between the Nile and the Colorado, and development around oases is described in Isfahan and Salt Lake City. The very different nature of the societies, regimes and histories of these regions overrides their geographical similarity and leaves the reader with the impression that here is another field in which it is not feasible to implement solutions which work well in one area of the world to any other.

Given the limiting role of water in dryland development the author then provides a series of case studies in which very diverse methods of providing a reliable source are utilized. The history of settlement in the Great Plains of the USA is described with particular emphasis on exploitation of the Ogallala aquifer in Texas. An awareness of the limited life span of this water source together with increasing cost of extracting the water from ever greater depth led to a great improvement in water conservation techniques and to a change in attitude. Irrigation became to be recognized as a supplement to precipitation and not the other way round.

Rapid economic development in the Gulf supported by oil revenues and a desire for self sufficiency in food is described for Saudi Arabia. High technology modern agricultural systems have been established with Western knowhow. Due to the almost unlimited oil revenues development in the Gulf has taken place without any reference to the arid nature of the environment. However, it is doubtful whether continued subsidized capital investment can take place in an open-ended manner. The actual food costs have been extremely high and the government has had to introduce large subsidies for the farmers. The extensive utilization of ground waters has drawn poorer quality ground water to the surface. Even desalination has not been without problems: marine ecosystems have been disrupted by the dumping of the highly concentrated brines back into the sea. Beaumont examines the costing of desalinated water as a book-keeping exercise in which the major charges can be allocated either to the electricity or water side of the production process. The unique dual distribution system which existed in Kuwait city for fresh desalinated and for brackish water mined from the aquifers is described.

Integrated water development in Israel is treated to a chapter on its own. Water resource development including the National Water Carrier and the reuse of waste waters are described. A subsection called "The Future" written about 1988 makes a good companion to the State Comptroller's 1990 report decrying the lack of development of the water system and the dangerous decline in both quantity and quality.

For the Soviet Union the expansion of irrigated agriculture in Central Asia and Kazakhstan is described at length. Excessive water use coupled with poor drainage in heavy, saline soils has led to a serious loss of irrigated soils. Water transfer schemes and their potential environmental impact are discussed.

The last case study is of the Los Angeles conurbation where the provision of an adequate water supply to a population of 11 million people enjoying a high standard of living in a semi-arid climate has been based on water import from wetter areas of California. Schemes such as iceberg mining and water import from the Canadian arctic are mentioned but the author envisages demand management by price mechanism as the most likely way of ensuring future supply. An accompanying discussion of sewage treatment, storm runoff management and air pollution make this an integrated chapter on the management of the complex demands of a densely populated modern conurbation in an arid environment.

The author concludes that given the very diverse often mutually incompatible objectives for the development of drylands in the face of growing population pressure, the correct balance of strategies designed to preserve the arid zone ecosystem, maximize food production and supply the needs of

growing urbanization and recreational activity is a matter for societal choice with the onus of decision resting in the hands of government, a sombering thought.

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THE FOOD RESOURCE by John T. Pierce. Harlow and New York: Longman and Wiley, 1990.

John Pierce presents a well-reasoned and thoroughly documented analysis of the food resource for the intensely growing population of our globe. In his own words, he attempts "to develop a better understanding of the relationship between agriculture and the global environment. This is done through an examination of major physical factors, defined in resource and environmental terms, which affect the productive capabilities of the food system. Influencing these physical factors were both human/institutional constraints and natural constraints. The analysis has indicated that the failure to maintain and expand productive capacity was due as much, if not more, to institutional than natural constraints. This statement does not deny the importance and significance of natural limits to growth in the food system. Parenthetically, these limits will have more influence on food development options in the future, as societies make increased demands on the ecosystem and use up the surplus capacity now available for development." (p. 298)

The nine chapters following the opening statement deal with resources, trends in world food production, prospective studies, population pressure, water, land degradation, climate and energy, and conclude with chapter 10—sustainable food systems.

Throughout the book the environmental implications of agriculture are carefully assessed and the socio-economic and management aspects of food production are given no less attention than the physical resource base. Two examples may illustrate this. By an FAO estimate 62 percent of the total population of developing nations (41 countries) lived in the late 1960s on an average intake of less than 2200 calories. Their number declined to 48 percent (31 nations) ten years later.

An illustration of the different standards of living is the use of cereals. In the early 1980s, 87 percent of all cereals produced by developing nations, exclusive of rice, were for human consumption, as against only 29 percent in developed ones, which used 72 percent of cereals in the feeding of livestock.

Some of the many illuminative facts presented by Pierce may be quoted. Cereals are grown on about 52 percent of cultivated lands and account for about half the total per capita calorie supply. Between 1960 and 1970 more