used in Thule research, expressed here mostly in speculative models crying for field verification. Also noticeable are trends away from classical typological studies and toward use of new sources of data such as faunal analysis, ethnohistory, European contact records, ecological and environmental studies, ethnology, and physical anthropology. Some of the contributions that draw on such sources puncture previously accepted dogma, and others indicate important new departures. Among the presumptions undermined is the hard-dying notion that Thule economy was based on large whale hunting. The idea of a "broad-spectrum" but opportunistic economy including whales has been with us since W. E. Taylor's paper in 1966, but only recently have midden studies begun to show the extent to which seals and walrus were utilized. This leads, however, to the persistent problem of how to determine the economic and social importance of whale hunting as opposed to utilization of beached or dead animals, since midden evidence rarely exists.

In addition to a more balanced view of Thule economy, a number of papers point to a refreshingly complicated anthropological view of Thule society and regional networks that fits nicely with the idea of a flexible and adaptive economic base. Papers by Amsden on periodic ecological crises in North Alaska and Hickey on regional economic integration models, trade, and political relationships in early historic Alaskan groups provide a promising framework for understanding population movements and spatial organization of local groups. Such a view suggests a regional demographic fluidity that makes arguments like Burch's for an overland Caribou Eskimo migration from the Arctic coast to Hudson Bay, or McGhee's suggestions of West Alaskan-McKenzie Delta contacts, plausible alternatives to the recent predilection of Arctic archeologists for strictly in situ explanations. In fact, recent work in ethnohistory and Eskimo-European contact archeology (a grossly neglected field now beginning to receive attention) is beginning to call into question developmental interpretations based on generalized typological studies and appearances of settlement continuity revealed through overconfident use of radiocarbon sequences. It is becoming apparent, especially in contact situations and where ecological conditions fluctuate unpredictably, that major population shifts occurred and are likely to have taken place in the earlier times as well. For these reasons, new theoretical stances must be combined with detailed studies of artifact attributes, raw material sourcing, and other methods.

These problems pose substantial challenges to Arctic archeologists. It is apparent that studies of Thule development must be pursued from a variety of different viewpoints, most of which cannot easily be reconciled, and that archeological information, no matter how diligently sought and applied, may be insufficient to demonstrate real historical events. However, the visibility and preservation of Thule sites promise to provide Thule students with a unique opportunity to integrate archeological, environmental, and other data toward a variety of goals. If not much success can be shown in proving that Sadlermiut were biologically or culturally different from other Central Eskimo groups, it may be either that our models of culture contact and change have been too simplistic or that the techniques used cannot detect the difference given a probable level of gene flow. This series of papers certainly shows that the view, which has been expressed more than once, that Thule archeology is pat and passé is far from correct. The future research opportunities are clearly great and exploitation of them is hindered only by the slowness of permafrost excavation, conservation problems, manpower, and cost. In some ways Mathiassen might have been depressed to see how little has been accomplished in the past 50 years in acquisition and publication of new field data. However, he would probably have been cheered by the progress in conceptual development and methods. McCartney's volume goes a long way toward pointing out both the weaknesses and strengths of recent Thule studies. One hopes that it will spur new work and that the many excellent speculative and discussion papers presented here can be translated into firm conclusions.

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Agricultural Adaptations

Farmers in the Forest. Economic Development and Marginal Agriculture in Northern Thailand. PETER KUNSTADTER, E. C. CHAPMAN, and SANGA SABHASRI, Eds. Published for the East-West Center by University Press of Hawaii, Honolulu, 1978. xiv, 402 pp., illus. $24.

The central concern of this book, as the subtitle indicates, is with the economic development of farms outside the mainstream of primary production in Thailand. These farmers inhabit the mountainous northwest, and most belong to tribal minorities. Their agricultural systems, emphasizing the shifting-cultivation or swidden (slash-and-burn) mode of production, are as variable as their social structures, languages, and customs. The variations of these systems, however, are as much adaptations to the environmental mosaic of the region as reflections of cultural imprints.

The four peoples whose agricultures are described are the Northern Thai, the Lua', the Karen, and the Hmong or Meo, who, in ascending order, occupy overlapping altitudinal zones ranging from the lowland valleys 200 meters above sea level to highlands at 2000 meters. The Northern Thai are traditionally cultivators of irrigated rice fields, whose expansion into the hills has required adoption of the swidden mode, but where topography and water sources allow all the groups except the Hmong have incorporated the permanent-field technique into their predominantly shifting systems. The flexibility of swiddening is exchanged for the greater reliability of production of terracing elements, indicating commitment to increased sedentariness. The Hmong, accentuating the commercial cultivation of the opium poppy in their swiddens, have resisted rice irrigation even when the opportunity has offered, for this is a decision that would require more intensive labor and loss of the relatively high cash yields from opium, whose production is a proven adaptation to the higher montane environments.

Since many of the uplanders have occupied the region for hundreds rather than thousands of years, these adaptive transformations must be of recent date. Now further change is in prospect for the area. In an introductory chapter Kunstadter and Chapman describe the constraints of the cultivation cycles of swiddening and the environmental effects of the differentiated systems. Problems of economic development in the region are posed in the familiar formulations of in-

creasing population, questionable productivity, and finite land resources.

The case for agricultural development is the connecting theme of the 16 contributions that make up this book. Following the introduction, a group of chapters headed Institutional Constraints represents the official view of legal aspects of land tenure and reform, with forestry as the one clear commitment for development. The illegality of occupation (and slash-and-burn farming) of land regarded as state property and the formulation of laws to accommodate the situation are addressed by Judge Sophon Ratanakhon of the Thai Supreme Court. The devising of the special legislation contemplated to incorporate features of traditional tenure systems will require considerable anthropological input—hardly a feature of developmental plans in most of the Third World. Planned also, with population registration, is the issuance of identity cards, conferring only partial citizenship to hill people. The administrative and constitutional issues raised by such measures may be the reason for the tentative nature of their presentation here.

The data-rich portions of the volume are parts 3 and 4, on the subsistence systems and on the more commercially oriented modes of agriculture. (A separate section of photographs complementing the text should also not be missed by the reader.) The ecological balance of the Lua' and Karen systems is convincingly expounded in two chapters by Kunstadter, the second of which, coauthored by Paul Zinke and Sanga Sabhasri, describes the control of soil fertility and erosion that has been achieved by the indigenous systems and the dangers of intensifying these problems. Together, these two accounts provide, in this reviewer's experience, the first comprehensive substantiation of what many of us who have worked with shifting cultivators in relatively closed systems have "known" impressionistically. Kunstadter presents significant quantitative data on rice production by his sample populations over two seasons in the Mae Sariang district, elegantly organized in terms of social units, land use, labor inputs, the indigenous credit system, distribution, consumption, nutrient yields, and the success of farming as indicated by deficits or surpluses in production as compared to familial requirements. Overall, this is economic anthropology in a situation of population change at its best.

Chapman's major contribution deals with the northern Thai of the Nan province, well to the east of Mae Sariang. On the lower valley slopes, the farmers are more commercially inclined, with some trading in local rice and opportunity for extra-agricultural wages. In this case, agricultural labor and production can be reduced to monetary terms and added to cash from external sources. These analyses demonstrate the stresses associated with rice production under the existing cultivation methods. In this area there is a Thai-Australian project aiming to convert swiddening to more productive permanent-field techniques that may relieve pressure on land of gentler slope. J. L. Charley and J. W. McCarthy, by experimental means, demonstrate the problems of soil fertility encountered in such a conversion and stress the cash inputs for chemical maintenance of soil nutrients that would be necessary to improve production under the prospective regime. Indeed, this paper accentuates the environmental rationale of the traditional swidden methods, without denying the requirements of a changing economic context.

Kunstadter, Chapman, and their associates demonstrate through their analyses of the sample groups in their diverse ecological and social settings the deficits of production that in themselves are evidence of population excesses. They produce the statistical evidence so often unavailable to development planners, who therefore are unable to project the production that must be reached before self-sufficiency can be attained at local levels or to determine whether land requirements and labor inputs will allow farmers to take advantage of further investment in new cash-cropping opportunities.

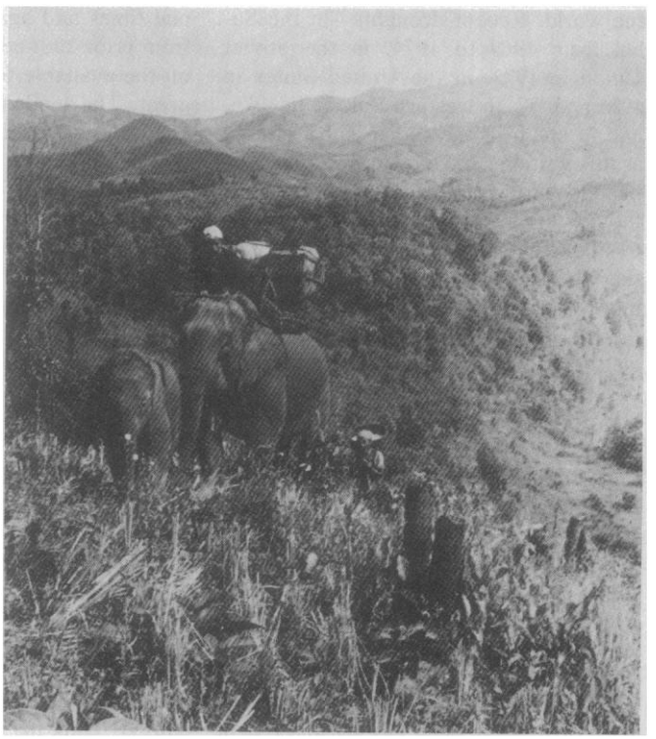
The two examples of successful cash crops in the montane region are opium and *miang* or fermented tea, both products of comparatively high value, grown by the Hmong and Northern Thai respectively. Sabhasri summarizes the legal and ecological problems of the high-altitude growing of opium in general, and F. G. B. Keen describes the system of cultivation. The long cultivation period for the poppy on the same plot (up to ten years) debilitates the soil and, accompanied by intensive weeding, destroys the natural seed sources essential for forest succession in the long (up to 40 years) fallow or abandonment, to result in unproductive and erodable grasslands. The *Camellia* shrub from which *miang* is produced would seem to be a desirable crop for montane terrains. However, in Keen's interesting account he observes the deleterious effect on the forest caused by the collection of firewood for use in processing the leaf as well as the difficulties of costs and financing that reduce the cash yield. With both of these cash crops, future development may be limited. It is ironic that the *Papaver* poppy is a plant with which breeding and agronomic research could have considerable success. As do other case studies incorporated in this book, these examples of negative effects on the ecology of the region further substantiate the thesis of population pressure.

Kunstadter, summarizing all the data in an effective conclusion to the volume, tabulates in cash terms the potentials and benefits to workers of present production and of the alternatives in cropping and lumbering. It must be noted that the only agricultural pursuits yielding respectable levels of existence are opium (illegal), irrigated rice (limited areas suitable without heavy capitalization), and *miang* (declining market). The commitment is to modern economic development. The internal features of the systems are now apparently unable to cope with the changing environments, economic and political and demographic, as Peter Hinton concludes in his chapter on declining production among the Pwo Karen. The alternative strategies of development, presented in terms of increasing production and value of the crops produced, changes in land tenure, improvement of distribution, and measures to decrease population, are all in the mold of Third World development plans, and the case is convincing. With respect to social effects of development, the matter of most concern is the conversion of land from group proprietorship, whose flexibility is adapted to the traditional swiddening mode of production, to individualized and capitalized ownership for commercial ends. A recognized consequence is voluntary dispossession through sale of titles and overexploitation of land, with results possibly more serious than were the status quo to be maintained. As an anthropologist, Kunstadter expectedly warns that such conversions in land tenure, the basis of more rural development schemes, here strike at a cultural core, the kinship system and its roles in leadership, production, and inheritance pertaining to land. On this point, the volume is not quite clear. In keeping with a prefatory statement that farmers' views have been sought, it is not difficult to see that they must agree with the production, ecology, and population equations that are offered and must anticipate the benefits of directed environmental development. But are the accompanying prospects of fundamental cultural changes really taken into account?

Since the "problems" in the equations are largely the result of population, per-

haps that extra-agronomic factor should have precedence in development over the environmental. Control of population is seen as requiring two kinds of extended investments: administrative and political, to limit immigration into the hills from lowland Thai and neighboring foreign sources, and programmatic, in the form of birth control education, which has already had success in the rural sectors of the country—for example, in the international program emanating from Chiangmai (C. Mougne, personal communication)—with apparently little cultural consequence.

The advantage of a modulated developmental approach initially emphasizing the fundamental population issue over a



Scenes of swidden agriculture in northern Thailand. (Top left) "Each field user makes a small offering to the field spirits and reads the omen from a chicken's gall bladder to determine if he should cut his field in this location. Lua', Pa Pae, January 1967." (Top right) "Lua' man in foreground holds the taboo sign he will plant in his field before beginning cleanup of swiddens as soon as the fire burns out; in the middle ground are bamboo poles split for the flooring of field shelters. Pa Pae, March 1967." (Bottom left) "Making a hole with an iron-tipped digging stick, a Karen woman plants cassava in her swidden before beginning to clean and reburn. Laykawkey, March 1968." (Bottom right) "A few families have elephants to help carry rice from the swiddens. Karen, Laykawkey, November 1978." [From *Farmers in the Forest*]

holistic approach that upturns whole systems, environmental and social, is that it allows for continuation of the internal adaptive process. The responses that have already been demonstrated should be more effective if the Malthusian effect were diminished. This is not to deny the great value of this book as making a realistic case for development; rather, it is a suggestion for phasing the priorities among the developmental alternatives that are presented. It is to be hoped that, under circumstances such as those of the hill peoples of Thailand, preservation of options for cultural adaptation is as practical an aim as agricultural improvement.

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Drought

Proceedings of the Symposium on Drought in Botswana. Gaborone, Botswana, June 1978. MADALON T. HINCHEY, Ed. The Botswana Society, Gaborone, and Clark University Press, Worcester, Mass., 1979 (distributor, University Press of New England, Hanover, N.H.). xii, 306 pp., illus. Paper, $15.

It is probably true that no year passes without a serious drought somewhere in the world. Recent droughts—in the Sahel from 1969 to 1974, in the Soviet Union in 1972, in the United States in 1976 and '77, in western Europe in 1976, and in much of the Indian subcontinent at this writing—have been the subject of headlines and television reports. Although this attention may have led some to think that something is happening to the world's climate that makes drought more frequent, documents of governmental agencies and colonial bureaucracies, the literature and the oral traditions of many peoples, and even the relatively short record of instrumented climate observations (100 to 200 years, for most of the globe) indicate that there really is nothing new about these situations. It is true, though, that, with surging world population and wildly inflating costs of the energy that is needed for such amelioration tactics as irrigation and emergency tillage, the impact of drought may become far more serious in the developed as well as the less developed countries than it has been in even the recent past.

The proceedings of the symposium on drought in Botswana are welcome, since they offer information from a wide range of viewpoints to help us understand the impact of drought in a sensitive region. The proceedings are, on the whole, interesting for the number and integration of the disciplines considered relevant to the problem of drought in southern Africa. The book is scholarly and carefully edited.

In the first three sections (Background Papers, Towards a Definition of Drought, Physical Aspects of Drought) we gain some understanding of the physical setting of Botswana, a nation imposed on the Kalahari desert. In the next section, Social Aspects of Drought, the culture of the peoples of Botswana and their traditional techniques for coping with drought—migration, reduction of herd size, and sharing of food supplies, for example—are described by a number of social scientists. This section contains a paper by Campbell on the 1960's drought in Botswana, the primary concern of the symposium. I would have preferred to see this paper at the beginning of the book, since it provides a clear explanation of the chronology and impact of the drought and a systematic description of attempts made to mitigate its effects.

All of the problems and impacts associated with drought in the less developed countries were manifested during the Botswana drought. Human and animal populations had increased from precolonial times and again following recovery from prior 20th-century droughts. Stress on the available forage supplies became great. The tendency of animals to concentrate near available water resulted in overgrazing in certain areas. The level of human nutrition fell seriously below acceptable standards in many areas.

This story has clear parallels in the far better publicized events in Sahelian Africa, as papers by Wetherell, Holt, and Richards and by Rijks make clear. Another parallel to the Sahelian experience is the almost total lack of governmental preparedness to cope with drought. It was not until the fourth or fifth year of the drought that any effective measures were taken to ameliorate the condition of the affected herdsmen and farmers.

Apparently, the government of Botswana does not intend for such a situation to occur again (nor do the nations of the Sahel, which have established a seven-nation intergovernmental agency to develop drought preparedness measures). Thus the book concludes with a consideration of networks and information systems to provide early warnings of drought. The importance of information collected in the districts as well as from meteorological and satellite networks is stressed. Nutritional surveillance as a method of planning the prevention of hunger is also examined.

This volume is one of a number of new reports dealing with recent droughts in the semiarid regions of the world. The lessons to be learned from these reports seem clear: drought is a normal, recurrent phenomenon of the semiarid regions and one for which preparation and advance planning are necessary; whether or not nonreversible desertification is occurring on the margins of the semiarid zones today, overpopulation by humans and animals and overgrazing seriously exacerbate the impact of periodic droughts; if drought preparedness and amelioration efforts are to be effective, an understanding of the workings of tribal and village societies and their traditional modes of coping is essential—though one must not assume that they always cope well.

The book constitutes one of the best and most useful recent reports I have seen on the subject of drought in the developing countries. I also recommend *The Aftermath of the 1972–74 Drought in Nigeria* (G. J. van Apeldoorn, Ed., Federal Department of Water Resources and Center for Social and Economic Research, Ahmadu Bello University, Nigeria, 1978). It, too, contains a wealth of material on local agronomic, pastural, and water resource problems that occur in times of drought. In neither report does the wealth of biological and physical detail obscure equally important information on and analysis of the social and economic impacts of drought.

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Volcanism in Human History

Volcanic Activity and Human Ecology. PAYSON D. SHEETS and DONALD K. GRAYSON, Eds. Academic Press, New York, 1979. xviii, 644 pp., illus. $49.50.

Through the course of earth and human history volcanoes have been of great significance both as a biological and human hazard and as a resource. As specific features, volcanoes only occupy a limited part of the earth, but landscapes of volcanic origin occupy some 2 percent of the total continental surfaces and 4 percent of North America, Africa, and Asia. These surfaces range in age from Mesozoic to Holocene and are pri-