
BOOK REVIEW FORUM

David E. Stannard, *Before the Horror: The Population of Hawai'i on the Eve of Western Contact*. Pp. xvii, 149, index. Honolulu: Social Science Research Institute, University of Hawai'i, 1989. US\$10.95 paper.

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David Stannard's book *Before the Horror* is a critical look at the important historical issue of the size of Hawai'i's population at the time of European contact. Stannard raises serious doubts concerning the validity of conventional population estimates and builds a plausible account for a substantially larger Hawaiian population that suffered catastrophic collapse brought on by diseases that came with European contact. This work follows research elsewhere (for example, Crosby 1972; Dobyns 1983; Ramenofsky 1987) that has revealed early underestimations of population and the realization that catastrophic demographic collapse occurred in many cases.

In my review I will first summarize the main points of Stannard's work and then turn to a critical discussion of some of the theoretical and substantive archaeological issues central to his argument. I will conclude by outlining the role of archaeological research in Hawai'i to resolve population questions on empirical grounds, rather than by speculation and debate.

Summary

Stannard begins by pointing out that all estimates and attempts to make reestimates of Hawai'i's precontact population are based on the obser-

vations of Lieutenant James King. King made an original population estimate of 500,000, but later revised it to 400,000. King's estimate was based on visits to Kealakekua, Kona (Hawai'i island), and Waimea, Kaua'i, together with some assumptions about the distribution of population that he used to extrapolate archipelago-wide numbers. Other early writers were not as systematic or explicit as King in their attempts at estimation.

Robert Schmitt has reviewed the early sources and attempted his own precensal estimates. Schmitt lowered King's numbers by 150,000 to 200,000 to estimate a Hawaiian population of 200,000 minimum to 250,000 maximum. Stannard argues that the early accounts, which Schmitt cites in revising King's archipelago-wide estimate, are unreliable and lacking in evidence. Indeed, Schmitt concedes that "none of these precensal estimates is very convincing" as methodology "remains unstated, and even where described it is questionable" (quoted in Stannard, p. 4). Stannard concludes that all efforts to *reduce* King's early estimate are sorely lacking in evidentiary or even logical support (p. 14), and that King's estimate of 400,000 appears to be too low.

Stannard critically evaluates four assumptions King used to extrapolate from his observations to an archipelago-wide population estimate. From time ashore at Kealakekua Bay, King's assumptions include: (1) that there were approximately 800 persons per coastal mile; (2) that this density pertained to all inhabited coastlines of the islands; (3) that about a quarter of all coasts were uninhabited; and (4) only coasts were occupied, there were no inland settlements. Examining each of these assumptions in turn, Stannard uses multiple lines of argument and any available evidence to show that King's 400,000 was a serious underestimation of the actual figure.

First, Stannard questions the validity of house counts (ranging from 370 to 1,300 at Kealakekua according to different individuals) and the number of persons (six, eight, or more?) per house used to arrive at local or regional population figures. Second, Stannard points out that Kealakekua and Waimea (Kaua'i) are leeward areas with less rainfall and consequently lower population densities than windward zones, which held greater agricultural potential. Third, the notion that a quarter of all island coastlines were uninhabited is disputed with historical evidence for settlements in the most marginal conditions, as well as the fact that Hawai'i island, with vast zones of barren lava flows, is in marked contrast to the lands available for settlement on the remaining islands of the chain. Fourth, Stannard points to historical and archaeological sources to counter King's claim that interior areas were entirely unoccupied.

Following his critique, Stannard alters King's all-island population projections by correcting coastline mileage; using Samwell's slightly higher house count for Kealakekua; and assuming eight, instead of six, persons per house to come up with a range from 478,000 to 658,000 (p. 29). When only one-tenth of the coasts, rather than a quarter, are assumed to have been uninhabited, the all-island figures rise to a range of 574,000 to 789,000. Finally, if inland populations are added to comprise 10 percent of the total, the all-island projection is as high as 635,000 to 875,000 (p. 30). Stannard argues that these are extremely conservative adjustments, making an overall estimate of not less than 800,000 a likely figure for Hawaiian population in 1778. Importantly, Stannard points out that "while it is true that any estimate of the entire archipelago's population based on extrapolation from a first-hand count of a single small area is fraught with risk, it is in fact the procedure that has undergirded every previous estimate from King to Schmitt" (p. 31). Stannard attempts to take the population issue further than previous analyses by proposing to test these larger estimates against prehistoric growth rates, the Hawaiian Islands' carrying capacity, and the degree of catastrophic population collapse.

In terms of the potential for prehistoric growth rates, Stannard suggests that initial colonization of the Hawaiian Islands occurred by the first century A.D. This colonizing group, by conjecture, could have been about one hundred, with approximately equal numbers of men and women. Drawing on the demographic models of Norma McArthur and her colleagues, Stannard proposes a conservative 0.9 percent growth rate for the first three hundred years of Hawaiian settlement, and then a rate of 0.52 percent per annum for the remainder of prehistory. Such a demographic model would result in well over 800,000 people by 1778. In short, Stannard shows that conservative demographic models can account for figures much greater than he is claiming for Hawai'i at the time of European contact.

Since demographic models alone provide numbers well in excess of those expected on other grounds, Stannard turns to what he recognizes as the messy problems of carrying capacity. Instead of an unreasonable attempt to establish a carrying-capacity estimate for Hawai'i, Stannard uses empirical-inductive population densities (based on several comparative cases) as a kind of surrogate (in place of an empirical-deductive estimate). Stannard suggests an overall population density of 130 to 150 per square mile for the islands. Such a density would have meant that on the basis of agriculture alone, "Hawai'i easily could have fed over a million people with less than two percent of the land being put into combined dry-land and wet-land taro production" (p. 41).

A third approach to reconstructing possible population numbers is to work backward from census data (postcollapse numbers) to precontact values using comparative cases of depopulation that resulted from European contact. Stannard draws on numerous cases worldwide (which indicate population collapse commonly on the order of 90 percent or more within the early periods of European contact) and establishes an empirical population decline trajectory based on the low average of the cases surveyed. He compares the low average from surveyed cases to trajectories based on King's and Schmitt's estimates (p. 51, fig. 4), revealing that at least Schmitt's values for Hawai'i would be quite unusual in light of comparative cases, that is, yielding a remarkably low population decline. Stannard proposes a population collapse trajectory for Hawai'i based on 800,000 people in 1778. His proposed trajectory for Hawai'i is identical to the low average (from his comparative data) for cases known worldwide, with depopulation as high as 50 percent in first twenty-five years of contact.

Stannard anticipates some likely objections to the argument put forth. He first addresses the notion that natural population growth was limited (controlled) by warfare, infanticide, abortion, sacrificial killings, and limited health measures (p. 60). Stannard argues that none of these factors effectively reduced the population projections proposed. Furthermore, he cites physical anthropological (osteological) and ethnohistorical sources as evidence in support of his claims. Second, he also disputes suggestions made by archaeologists Hommon and Kirch that resource depletion led to a decline in Hawaiian population prior to European contact. Third, Stannard argues that there exists no credible evidence for the pre-European presence of diseases such as syphilis, tuberculosis, and other serious infections.

The last portion of the book is critical commentary by two well-known historical demographers in Hawai'i, Eleanor Nordyke and Robert Schmitt. Stannard replies to their comments as well.

Discussion

From an archaeologist's perspective, the substantive problems I see in Stannard's work are minor. First, some will object to a Polynesian settlement date early in the Christian era, pointing instead to colonization of the islands around A.D. 500 or 600. Stannard is correct in looking to earlier settlement, as several radiocarbon dates earlier than A.D. 500 are known from Hawai'i and O'ahu islands. Furthermore, there are at least fifty radiocarbon dates from seven islands (corresponding to where most

research has been done) that are earlier than A.D. 1000 in median age (Hunt and Holsen n.d.). The widespread distribution of sites dating to the first millennium A.D. suggests not only early settlement but also the population expansion that Stannard postulates.

Second, while inland settlements are known ethnohistorically and archaeologically, it remains unclear whether all settlements--inland and coastal--were occupied permanently and simultaneously. In some cases, inland settlement was associated with intensive dryland cultivation but appears to have been only temporary in nature (for example, Lapakahi and Waimea [Kohala]). In other cases, inland settlements may have been permanent while coastal areas were used on a temporary (seasonal?) basis (such as southern **Ka'ū**). Census-taking approaches in archaeology that count sites interpreted as dwellings risk an overestimation in settings where a dispersed settlement pattern was based on movement of individuals for specialized activities. This problem, however, has little bearing on Stannard's argument, as he keeps to a conservative 10 percent in his extrapolations.

A third substantive problem, albeit minor, is that Stannard argues that Waimea (Kaua'i) and Kealakekua are surrounded by "a huge and notoriously dry landscape" (p. 17) and that production and thus population in windward areas would be much greater. This claim oversimplifies certain facts. Waimea, while receiving relatively low rainfall, is situated along the Waimea River. This abundant water source provided a means for irrigated agriculture using ditches (for example, the famous Menehune Ditch) to feed pondfields of wetland taro. At Kealakekua rainfall increases dramatically within the first few miles inland from the coast, which allowed massive dryland field systems (known archaeologically) with cultivation of not only taro but also breadfruit, banana, and the highly productive sweet potato. The simplified contrast between windward and leeward detracts from Stannard's more generally correct assertion.

Finally, Stannard must rely on undoubtedly poor population estimates from cases surveyed worldwide (most in the Americas and the Pacific) to establish rates of depopulation. Many of these studies are flawed by the same kind of errors Stannard exposes in the Hawaiian case. Nonetheless, a survey of many cases may yield generalized patterns that are valid in spite of errors in individual cases.

In terms of theoretical problems, I see two. One supports Stannard's argument and one perhaps confounds it. First, while Stannard recognizes the complexity of estimating carrying capacity, he overlooks a factor that could prove important to prehistoric Hawai'i. Liebeg's Law of

the Minimum states that population is constrained not by *average* resource availability but by the *lowest* availability of *critical* resources. Thus, the average is simply an abstraction, whereas the lowest point in fluctuations of resources is the reality members of populations were faced with. Consequently, population densities may reflect either an "optimum" or some other point in a continually fluctuating value. The causes of famine in Hawai'i could be further examined as they may reflect resource fluctuations that limited population size (Schmitt 1970). It should be noted, though, that Hawai'i seems less prone to catastrophic losses from hurricanes and droughts than some parts of the Pacific (Currey 1980).

Also in theoretical terms, those critics such as Nordyke who suggest that populations hold their numbers in check through infanticide, warfare, abortion, and sacrifice must accept outdated functionalist notions based on the fallacy of misplaced teleology (Richerson 1977). These arguments assume that the population, not individuals, is the source of goal-directed behavior. People, including those of our society, do not kill their offspring, go to war, or have abortions in response to population pressure. This would be equivalent to arguing that today's urban traffic problems (giving individuals the impression of overpopulation) lead to infanticide or other individual sacrifices to reduce population size. Instead, occurrences of infanticide, abortion, and so forth relate to strategies to *increase*, not decrease, long-term reproductive success (see, for example, Dickemann 1979). Moreover, others have shown that conventional notions of population regulation are nothing more than functionalist myths (Bates and Lees 1979). Thus, Stannard is correct in his assertions that these practices (common or not) in Hawai'i had little effect on population size.

I must add that the commentary that concludes Stannard's book did little to discredit his claims. Nordyke's appeal to authority (reputation) is not how historical or scientific questions are resolved. Rather, this appeal signals the difficulty of evaluating the problem on empirical or even theoretical grounds, Nordyke's comments on archaeology are incorrect, and those on environment (ancient food and water supplies) appear naive. Schmitt's comments serve to reiterate the problems of interpreting the incomplete and error-prone early (precensal) estimates.

Conclusion

Stannard has clearly uncovered the many problems with conventional population estimates and indeed establishes the *plausibility* of substan-

tially greater numbers for the precontact Hawaiian population. He has revealed the inconsistencies and contradictions of the early historical sources that have, it seems, enjoyed undue trust. He shows, in his first chapter, that attempts from King to Schmitt to estimate precensal Hawaiian population are fraught with error and unwarranted assumptions. In his critique, Stannard brings us to the conclusion--disquieting to some--that Hawaiian population at European contact simply cannot be deduced or extrapolated from the limited observations made by early visitors. We will never know prehistoric or precensal population values from the historical sources. In short, Stannard has shown us that the issues of population in Hawai'i can be best resolved by archaeological research.

Addressing questions of population growth, size, and collapse through archaeology in Hawai'i will not be easy or accomplished quickly. Many of the aspects of archaeological research that Stannard mentions will continue to shed light on the issues that pertain to population. I see five aspects of archaeological research contributing to a better understanding of prehistoric Hawaiian population (see Kirch 1985 for a general review):

1. A date for initial colonization of Hawai'i will become better known through continued field research together with efforts to adequately date excavated sites. Too often archaeologists have been satisfied with single radiocarbon determinations for entire sites, even entire regions. These single dates are difficult to evaluate. Field research in Hawai'i will undoubtedly yield more sites dating to the first few centuries A.D. A systematic field study (including geomorphological considerations) would probably dramatically increase our chances of finding such sites, as it has elsewhere in the Pacific Islands.

2. Paleoenvironmental studies of climatic changes, agricultural systems, and human-induced changes that increased or degraded productivity will be important in evaluating questions of population trends over the course of prehistory. Impressive work has already been done examining, for example, plant remains, land snails, and sediments to study patterns of deforestation (historic and prehistoric), agriculture (technology, variability, expansion, and intensification), and geomorphological changes.

3. Continued settlement-pattern studies analyzed at regional scales will help to clarify the nature of prehistoric settlement and the associated population. Unfortunately, contract archaeology has often been confined to isolated parcels of land. Research that includes analysis and synthesis over larger areas will prove informative.

4. Continued osteological (physical anthropological) analysis of prehistoric human skeletal remains is the primary means to address questions of precontact diet and nutrition, health, pathologies and disease, life expectancy, and fertility. These are essential components to understanding (in more than theoretical or speculative terms) the paleodemographic variables critical to Stannard's argument. Ignoring this important source of evidence will leave many questions Stannard raises unanswered, indeed unanswerable.

5. Archaeological research particularly focused on the question of the degree of population collapse--that is, changes detectable in the Hawaiian archaeological record from just prior to 1778 to the late 1800s--following the innovative work by Ramenofsky (1987) in North American archaeological case studies will undoubtedly prove rewarding. Given the problems that Stannard discusses for Hawai'i, the archaeology of population changes with European contact may be the key to putting a plausible argument on more solid ground.

In sum, Stannard has revealed the flaws in early population estimates and has argued the plausibility of a much larger Hawaiian population than conventional estimates allow. Stannard's attempts to use models of growth rates, carrying capacity, and depopulation trajectories are also only plausible arguments (although I see his argument as more plausible than those he criticizes). From an archaeologist's point of view, we should be able to do better than plausible arguments in spite of the shortcomings of the ethnohistorical sources on population counts. Obtaining more certain answers about population in the past is possible given the empirical nature of the archaeological record, even though it will require asking questions about population in different terms.

REFERENCES CITED

Bates, D. G., and S. H. Lees

1979 "The Myth of Population Regulation." In *Evolutionary Biology and Human Social Behavior: An Anthropological Perspective*, ed. N. A. Chagnon and W. Irons, 273-289. North Scituate, Mass.: Duxbury Press.

Crosby, A.

1972 *The Columbian Exchange: Biocultural Consequences of 1492*. Westport, Conn.: Greenwood Press.

Currey, B.

1980 "Famine in the Pacific: Losing the Chances for Change." *GeoJournal* 4 (5): 447-466.

Dickemann, M.

- 1979 "Female Infanticide, Reproductive Strategies, and Social Stratification: A Preliminary Model." In *Evolutionary Biology and Human Social Behavior: An Anthropological Perspective*, ed. N. A. Chagnon and W. Irons, 321-367. North Scituate, Mass. : Duxbury Press.

Dobyns, H.

- 1983 *Their Number Become Thinned*. Knoxville: University of Tennessee Press.

Hunt, T. L., and R. M. Holsen

- n.d. Radiocarbon Dates and the Early Settlement of the Hawaiian Islands. Manuscript in preparation.

Kirch, P. V.

- 1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory*. Honolulu: University of Hawai'i Press.

Ramenofsky, A. F.

- 1987 *Vectors of Death: The Archaeology of European Contact*. Albuquerque: University of New Mexico Press.

Richerson, P. J.

- 1977 "Ecology and Human Ecology: A Comparison of Theories in the Biological and Social Sciences." *American Ethnologist* 4:1-26.

Schmitt, R. C.

- 1970 "Famine Mortality in Hawai'i." *Journal of Pacific History* 5:109-115.