PREHISTORIC COLONIZATION AND CATASTROPHE

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In radiocarbon time, the last 40,000 years, new breeding populations of anatomically modern *Homo* emigrated from the Afro-Asian megacontinent to colonize new lands. Given the cultural, social and anatomical skills of the species, the huntable native animals not buffered biologically or behaviorally against the new human predators were suddenly at risk, at least until the invaders relaxed their hunting intensity along new intertribal boundaries. Whether or not surplus killing was involved, waste of prey would be economically inevitable and without ownership (Vernon Smith) there would be no steady harvesting. Thus, each colonization event is certain to yield abnormally high extinction rates for more vulnerable prey. Extinction pulses may be expected to accompany colonizations.

The first continent to be colonized was Australasia, including adjoining oceanic islands of New Britain and New Ireland. These were peripheral to the expected island hopping pathway across Wallace's Line (Jones) and their early colonization supports the view that tens of thousands of years ago the first Australians were at home on coastal waters at low latitudes. Emigration out of southeast Asia across a water gap was not fortuitous.

Australasian colonization around 30-35 ka is supported by radiocarbon dates from sites recently reported from all major environments, tropical and temperate, dry and wet. The early artifact types include ground stone axes, thumbnail scrapers, etc., and the fossil record features human skeletal material as old as 27 ka at Lake Mongo.

Recently less well defined older artifact assemblages have been dated by the thermoluminescence (TL) techniques to 47 ka. Whether or not these older claims can be verified, the record of material culture in Australia predating the Holocene (last 10,000 years) is impressive. It was brought to light mainly over the last 25 years.

As an environment for prehistoric human foraging, America would appear to be better endowed than Australasia. The New world is larger, its unproductive arid interior (where historic human populations were relatively low) is smaller, its species of vascular plants with palatable fruits, seeds or tissues suitable for foragers is greater and its native fauna, before extinction between 10 and 12 ka included species of larger size than those in Australasia. The potential resource base appears even more ideal for the first hunter-gatherers to invade the New World.

Since World War II, American outcrops, dune deposits, gravel quarries, caves and sediments of all sorts have been extensively exposed by excavations with salvage archaeologists employed to recover antiquities. The New World supports a larger population on the land, including more sportsmen, farmers, and ranchers (many important new archaeological finds are made by amateurs) as well as a larger number of professional archaeologists and paleontologists.

Whatever their past practice, vertebrate paleontologists studying Quaternary deposits in the New World have during the last 25 years been increasingly alert to the premium placed on the possible discovery of pre-Clovis (pre-12,000 years old) artifacts or (especially) human bones. Vertebrate paleontologists often excavate sites whose local environments are highly likely because of water, mineral salts, riparian vegetation with palatable fruits or forage, to attract large mammals not excluding *Homo sapiens*. No definitive evidence of human activity has emerged, despite the regular appearance of new claims by archaeologists.

We find powerful theoretical and practical reasons for viewing New Wold claims with suspicion, especially given the intense hunt with indefinite results to date in America compared with the relative ease with which early sites were unearthed in Australasia.

In both continents, large animals, those that appear to be desirable food packages, disappear around the time of colonization. This can be demonstrated by ^{14}C dating with more confidence in America than in Australasia (Stuart 1991, Martin 1984, 1990). In Australia there is at least one suite of geochemically defensible radiocarbon dates available for *Genyornis*, a large flightless bird whose eggshell yields secure carbon samples for ^{14}C dating (Williams). The

youngest of _____ dates on *Genyornis* is coeval with our proposed date for Australian colonization at 35 ka.

In America roughly two dozen early (Clovis) archaeological sites include remains of mammoth (Haynes). Presence of such kill sites has led some Australian archaeologists (Bowdler) to impuge the idea of culturally driven extinctions in Australasia where no kill sites have been found. In fact, in North America very few Clovis points, a diagnostic artifact type, are associated with mammoth bones. There are large numbers of mammoth bones and mastodon bones (with the possible exception of the Kimswick, Missouri, site) not associated with archaeological material. While some 14 of the 33 extinct North American genera of large mammals can be radiocarbon dated to within about one thousand years of Clovis, and while some are incorporated in Clovis sites, none are clearly seen to be processed. Even in those Clovis sites with processed remains of mammoth, the evidence of butchering or processing is minimal (Gary Haynes).

This may be viewed by some as strengthening Bowdler's point. Alternatively, it suggests very rapid and wasteful depletion of early obtained resources destroyed in the first centuries of contact. Models of maximum rate of harvest can diminish the time of overlap to roughly ten years in any one region (Mosimann and Martin 1975). The challenge of finding a kill or processing site following Australasian colonization over 30 ka would, under such a scenario, be extremely fortunate and may never occur.

With the exception of mammoth in a few Clovis sites, all of the food remains of large animals in American archaeological sites are of species still extant or, in the case of bison, extinct taxa with close living relatives. The same is true in Australasia where Tasmanian caves in the Franklin River drainage, country inhospitable to prehistoric settlement during the Holocene, yielded older evidence of *Maonepus nifogarseus*, a sedentary wallaby apparently being hunted during glacial times since roughly 30 ka (Cosgrove, Allen). [Frog "kill site" of Jeanette Hope also.]

Since the discovery of an extinct flightless *Ibis* on Hawaii (Wetmore and Olson 1976), there has been a remarkable proliferation of Holocene deposits on Pacific islands, both natural and

archaeological, revealing that islands in the Pacific once harbored twice to three times as many species of land birds as were known historically (Steadman, Olson, Jones, and associates). Even plants were affected (Easter Island). The Galapagos suffered less severe loss of bird life (Steadman) and only the Galapagos archipelago is unknown to have escaped prehistoric human settlement (possibly it was visited).

Apparently, oceanic island extinctions were driven by prehistoric human colonization, amplified by accompanying alien species. The native fauna may have been especially vulnerable to human intervention, direct or indirect (for example, the tameness of Darwin's finches in the absence of an array of predatory birds or mammals). But islands should help reveal none-cultural extinctions.

Skeptics of the concept of culturally driven extinction on continents seek natural forcing functions. In northern Eurasia, for example, extinction of ten species of large mammals, some still surviving in parts of their Quaternary range, was gradual from about 70 ka to 10 ka and even later in the case of northern Siberian musk ox and mammoth (Stuart 1991, Vertanyan et al. 1993). Extinctions occurred under conditions of both climatic and cultural change and an obvious way to distinguish cultural from non-cultural forcing is apparent (Stuart).

Oceanic islands are widely regarded as brittle. Their species are extinction prone (Williamson), so that the magnitude of losses recently discovered is hardly surprising. By the same reasoning, they may serve as amplifiers of non-culturally driven extinctions. While few oceanic islands have yielded pre-Holocene fossil faunas, there are exceptions such as New Zealand, Eva in the Tongan group, Oahu in Hawaii and Santa Cruz in the Galapagos.

In the case of New Zealand, the modern moa fauna of seven genera can be traced back into the last glaciation 25,000 years ago with no additional loss (Anderson 1989). A cave on Eva on the Tongan archipelago with a basal TL date of _____ ka revealed extinction only at the contact with cultural material some 3000 years old. No extinction of bird species was detected in bone-rich lake sediments of glacial age on Oahu. In Santa Cruz, whose known fossils are largely Holocene, Steadman radiocarbon dated bones of a petrel (_____ _____),

no longer resident on Santa Cruz. The 10,000 year old date may reflect a climatically drive displacement of a breeding colony. Steadman estimates background extinction in the Galapagos at one species in 50,000 years [check].

Undoubtedly more examples will come to light as the pre-cultural record of oceanic islands is examined more thoroughly. According to biogeographic theory (M-W), _____ rate should be high. Nevertheless, the magnitude of prehistoric extinctions beginning in Australasia, then striking America, then the Pacific Islands from west to east with only historic extinctions known in the Galapagos exceeds anything yet found in the pre-cultural record since the Hemphillian, 5 million years ago (Webb, Martin).

If our view of Australasia and America is basically sound, both were colonized rapidly, both suffered heavy concurrent losses of megafauna, and only the reluctance of some archaeologists to place a bottom on the hypothetical age of human colonization or to view it as a gradual and tentative process rather than dynamic and effective, generates the chronic search for yet older invasions.

We do not exclude such a possibility, which cannot be disproved by even the best negative evidence to be wrung from the fossil record. All presumed dates of colonization, from the Galapagos in the 1800s to Australasia at 35 ka, are open to challenge. The Australian record, which swept presumed dates of prehistoric colonization from the Holocene to over 20,000 years further back in time was accomplished by energetic field archaeologists whose spirit at the time overrode the conventional academic "party line."

Nor can we exclude the possibility of major extinction events in Australia before or after our hypothetical colonization date of 35 ka. There are post-35 ka survivals of extinct fauna proposed for Lancefield, Cloggs Cave, Lime Springs, etc., which we have not reviewed.

Given the extreme interest in "new records," that is older records of human colonization than are now known and younger survivals of extinct fauna than are yet recognized, it is essential that claimants not be satisfied with novelty which is inevitable. There must be a major effort at replication, either excavation of existing "record" old archaeological sites by skeptical or neutral

parties, or of discovery by independent teams of similar site patterns that pass stringent tests of dating. The same protocol needs to be applied to superlative claims in the late Quaternary extinction record.

The new "party line" we advocate of colonization and catastrophic extinctions spreading outward from Afro Asia over the last 40,000 years is simple to communicate and easily understood. Its heuristic value includes a very strong case against much chance for any Clovis archaeology in the New World and for a much closer coincidence between Australian colonization and megafaunal extinction than has been acknowledged. Our last finding is that the present view of colonization and faunal catastrophe invites both more exploration of potential new sites beyond the Afro Asian heartland of modern people. It invites the search for extinct faunas close to the moment of colonization. And it invites site verifications, a virtually neglected methodology that is increasingly needed. To neglect verification would reduce archaeology to a branch of cryptozoology where any possibility is heard and protocols for the rejection of claims are largely neglected.