Letter from the Desk of David Challinor
January 2008

Where did the first human beings to inhabit the New World come from, and how did they get here? This question has long been the focus of international paleoarcheological investigation, but as old hypotheses are being challenged, new theories continue to emerge. This month's letter will consider routes and methods by which our early ancestors may have traveled to people our continent.

We know that 15 to 20 kya (thousand years ago)—the period of glacial maximum—so much of the world's water was ice that ocean levels were 100 meters shallower than today, and much of the Bering Sea was then dry land. Scientists have long assumed that Paleolithic people simply trudged across the tundra of the Bering Bridge. They surmise that the bridge was wide enough to accommodate not only these hunter/explorers, but also for the migrating megafauna of the time, providing an abundance of game as sustenance during the long trek. Recent paleoarchaeological discoveries are, however, beginning to paint a more confusing picture.

No hard evidence survives in North America of settlement earlier than about 10 kya, and it is now accepted that the New World's oldest settlement was in Monte Verde, Chile. This site, about 50 kilometers east of the coast, shows physical evidence of having been occupied 12.5 kya, and the logical assumption is that these early people arrived in Patagonia by sea. Rafts and dugouts, unless deeply buried in oxygen-free sediment, soon disintegrate, and skin boats are even more fragile. Yet, despite the fact that no boat relicts have survived, there is rapidly accumulating evidence that Paleolithic men migrated not as long-distance walkers but as seafarers.

The most striking evidence for this theory is the arrival in Australia of its aboriginal people at least 40 kya, about the same time *Homo sapiens* reached Europe. Even though seas were considerably shallower, and many of the island chains were dry land, aboriginal settlers still had to cross scores of kilometers of open, albeit tropical, seas in their travel from southeast Asia. Farther north in chilly Japan, humans arrived from the Asian mainland about 20 kya. Food is the crucial component of human survival on any outpost, and it is a reasonable assumption that they survived their ocean voyage by fishing or harvesting shellfish. Then, as now, just offshore Japan were endless kelp forests, nurtured by rich nutrient coastal upwelling and harboring a bounteous trove of fin and shellfish. This bank of kelp stretches from Japan's northern islands, past the Kuriles, Kamchatka and the Aleutians all the way to southern California, where it culminates in the 40 meter-long giant kelp that thrives on the ocean floor off Santa Barbara and its Channel Islands.

An increasingly popular current theory is that these kelp forests formed a kind of marine highway used by early man to travel north and east from one fishing camp to

another along the coast. Fishing techniques needed no adjustment in this familiar kelp belt, and once past the stormy Aleutians these pioneers must have had an easy boat ride south along our west coast. This theory gains additional credence from the fact that land passage before 13 kya may have been blocked by converging ice sheets throughout today's British Columbia.

As further evidence of ancient sea travel, Japanese paleoanthropologists discovered the remains of a child in an Okinawan cave that dates back to 36 kya. An extraordinary discovery of a piece of obsidian was made in a bed dated 20 kya in Honshu. The obsidian was traced to the volcanic offshore island of Kozushima, 50 km away. Were the early migrants to the New World hunters or fishermen? We now understand that there had long been a seafaring tradition on both the mainland and islands of the northwest Pacific, and we surmise that the later arrivals in the New World must have retained these skills.

We know now, for example, that California's Channel Islands were early occupied. Three human bones that have been reliably dated to about 13 kya were found eroding from a canyon wall on Santa Rosa Island. On the mainland, the almost complete remains of Kennewick man were found in 1996 on the banks of the Columbia River, and after a drawn out court struggle, in which Smithsonian scientists played an important role, physical anthropologists were able to analyze the 9,300-year-old skeleton and surmised that his skeletal characteristics seemed more akin to the Ainu of Hokkaido or even of people from the Tibetan plateau than from the stock of the later arriving Amerindians.

Just when the first people came to North America is still unknown, because no coastal camp sites have been excavated. Many experts now lean towards 16 kya as the migration start, when the glaciers had melted back from our coastal northwest. With their withdrawal, vegetation would soon have appeared making coastal camping feasible, but sadly for us today, such sites are 80-90 m below sea level. There is hope that we will be able to explore them, but it is expensive and will have to start slowly.

About a decade ago, Canadian scientists digitally created a map of a submerged delta at Werner Bay in the Queen Charlotte Islands of British Columbia. Using it as a guide, they dredged the accumulated silt over what seemed to be likely camp sites. For two seasons the effort was truly like looking for a needle in a haystack, until they were rewarded by finding a small basalt tool about 10,000 years old. Another nearby site of great promise appears to be near the outlet of a stream that must have thronged with migrating salmon. It is 90 m down, near the depth-limit of conventional scuba, but so promising as to be worth the effort and risks. Research submarines, albeit expensive, are already available, and remotely controlled robots can scurry along the seabed and send detailed images to the surface of what they "see." A whole new era of archeological exploration has started, and exciting discoveries are eagerly anticipated.

Meanwhile, at the Smithsonian my friend the paleontologist Dennis Stanford is rattling the cages of the traditional new world immigration theorists by proposing that our

first settlers may have come from Europe rather than from Asia. Stanford, as readers of these letters may recall, is an expert flintknapper, a maker of stone tools. I told the extraordinary story (November 2004 Letter) of how Stanford and his colleagues—in an attempt to understand how early people prepared their game—butchered, with a variety of handmade stone blades, the carcass of Ginsberg the elephant, who had died at the Boston Zoo. Stanford's hypothesis is based on his knapping expertise, and it was further developed when he studied the elegant Clovis blades, first found in Clovis, New Mexico. Clovis points, which are characteristically bifacial—meaning that the knapper has finished both sides of the blade—have since turned up across the continent.

Stanford and his colleagues were struck by how closely Clovis points match the sophisticated Solutrean blades from the Old World Upper Paleolithic culture. To put it in perspective, the Solutrean culture followed the Aurignacian, which is usually associated with Cro-Magnon man, and Solutrean blades represented a significant step forward from the former's stone and bone implements. The theory is that these late Solutrean people might have navigated along the edge of the ice pack in skin boats about 18 kya with some reaching North American. Then some 6,000 years later (about 11 kya) there was a warm spell, and the ancestors of the Clovis people might reasonably have trekked west to merge with the migrations from Asia. Stanford and colleagues are increasingly convinced that the Solutrean and Clovis knapping techniques are too close to each other to be coincidental.

What all scientists learn is that a crucial challenge in conducting research is to stick your neck out, to think out of the box. You have to keep looking past accepted wisdom, no matter how radical your hypothesis is. Often, when the search is for something extremely complicated, the simple and obvious answer may be staring you in the face. I greatly admired the physicist Richard Feynman, who isolated the cause of the first shuttle disaster with a simple experiment on how low temperature affects rubber gasket rings. Using common sense, he ran the straightforward experiment himself, and he even wrote a short book about his approach to scientific problems entitled *Surely Your Joking, Mr. Feynman!* His hypothesis on the cause of failure of the gasket rings was sound. Lucky him! It is not the end of the world to have your theory sunk—but the message is that while your theory is still floating, keep boosting it from every angle you can think of. Persistence can pay off. Stanford and his ilk are excellent role models for us all, particularly for those who love and practice a scientific discipline—and paleoanthropology is an excellent example—where every hypothesis is challengeable.

David Challinor
Phone: 202-633-4187
Fax: 202-673-4686
E-mail: ChallinorD@aol.com

P.S. Much of the material about the kelp highway came from a fascinating piece, "Follow the Kelp," by Heather Pringle in *New Scientist*, 11 August 2007, p. 40-43.