MOAI MOVING 101
Comments by Vincent Lee

IT IS HARD TO IMAGINE that even the most prescient ancient Rapa Nui could have foreseen that his peoples' beloved *moai* would in time become gifts to the entire world. For those of us obsessed with the mechanics of how *moai* were moved and/or erected, they have been gifts that keep on giving. We may never know "how it was done," but until someone carves a really big *moai* (say 30 tons) from the face of Rano Raraku, lowers it to the foot of the cliffs, moves it to a sea-coast *ahu* and leaves it standing on its pedestal with an appropriately large *pukao* perched atop its head, we won't even know how it "could have been done." Many of us have devised clever solutions to this or that part of the problem, but none of us has yet attempted, let alone solved, the entire puzzle. And so it is with the most recent entrants onto the field, the students of MIT professor Herbert H. Einstein.

The students have proposed two variations on existing themes and two entirely new movement schemes. Before offering a brief critique of each, I would offer them the same advice I give to others who occasionally contact me about this: "Try it out with a really big rock, and see what happens." The transition from paper to desktop to the real world is not just a matter of scale. The real world differs from the first two in some predictable and all sorts of unexpected ways, and it is these differences that usually settle the issue. The classic example is rollers, which to their credit, none of the MIT students propose to use. Making rollers that are perfectly straight, cylindrically true and of precisely equal diameters from tree trunks isn't easy, nor is finding a perfectly flat place to use them. Perhaps things were simpler for the Rapa Nui, unencumbered as they were by paper or desktops, but surrounded instead by crooked trees and rolling terrain.

Methods 1 and 2 are both upright movement ideas, the first on a "rocking foot" made of bent poles and the second rocking the moai directly on its base, "refrigerator style." I think Charlie Love has shown that the latter method works, on flat ground anyhow, but raises hell with the soft base of the *moai* in ways we don't find evidence of in the field. It also leaves begging a bit, the question of the *pukao*. Rocking a refrigerator with a washing machine balanced on its top seems risky business at best, and even if secured somehow, the *pukao* would dramatically raise the center of gravity of the whole, to the serious detriment of stability.

The same problem haunts the "rocking foot" scheme, that nevertheless theoretically protects the *moai* base. I say theoretically since the details of a rocker able to support a thirty ton *moai* and withstand the multiple twisting movements of a cross-island march might be daunting. And what happens if it wears out en route, or worse, breaks? The numerous halts for the repair and restructuring of the sled used in the 1994 NOVA project took much more time than moving the *moai*, which at least lay there unthreateningly in a prone position through it all. Somehow, I think the Rapanui worried about that sort of thing and tried to avoid methods with any likelihood at all of failure in mid-transport.

The third proposal has the distinction of being an island "first," as far as I can tell, and we know with some certainty that it works. Precisely as the ancient Egyptians moved granite blocks and obelisks from the quarries of Aswan downriver to Thebes and Luxor, this team proposes sea transport of *moai* from Rano Raraku to their *ahu*. A canal is imagined from the quarry to the sea and boats posited able to support the loads. The fact that no trace of such a canal exists today amidst the several obvious haul roads that still criss-cross the island is not mentioned. Nor is the difficulty of landing and unloading a huge and heavily laden boat through the near-constant surf that batters the island's uniformly rocky shoreline.

The last idea is one dear to my own heart, utilizing as it does levers to move a "walking platform. "Having personal experience with levers, my first observation is that they only work if they have something bombproof to push against on the ground. Otherwise they simply dig a hole and "kick out" when force is applied. Even assuming a prepared road of some sort, levers only work well in a near-vertical position, with maximum force directed forward, rather than up or down. Finally, even a moderate load requires lots of near-vertical levers, many more than the two presumably very large ones proposed here with as many as 50 people somehow manipulating each.

This proposal, I think, brings us back to where we started, to the interface between the desktop and the field.

REFERENCES

Adam, J. P. 1988. *Le Pasques compose*. Paris: Seuil.

Heyerdahl, T. 1958. *Aku Aku - The Secret of Easter Island.* New York: Rand McNally.

Lee, Vincent R. 1998. Rapa Nui Rocks: Impressions from a Brief Visit. *Rapa Nui Journal*, 12(3)1998:69-72.

Loret, J. H. and R. Hemm, 1997. El Nino's. One of the Earth's most destructive phenomena may have spelled disaster for the inhabitants of Easter Island. *The Explorers Journal.* Spring 1997:22-25.

Love, C. 1990. How to Make and Move an Easter Island Statue. *State and Perspectives of Scientific Research in Easter Island Culture.* Frankfurt: Forschungsinstitut Senckenberg.

Mulloy, W. 1970. A Speculative Reconstruction of Techniques of Carving, Transporting and Erecting Easter Island Statues. *Archeology and Physical Anthropology in Oceana.* 1-23.

Pavel, P. 1990. Reconstructions of the Transport of Moai. *State and Perspectives of Scientific Research in Easter Island Culture.* Frankfurt: Forschungsinstitut Senckenberg.

Van Tilburg, J. A. 1994. *Easter Island Archeology, Ecology and Culture.* London: British Museum Press.

Van Tilburg, J. A. 1996. Mechanics, Logistics and Economics of Transporting Easter Island (Rapa Nui) Statues, Rapa Nui Journal, Vol. 10.