Hawaiian Islands

Guam · Northern Mariana Islands

Marshall Islands

Caroline Islands

Line Islands

Bismarck Archipelago
New Ireland

Baker Island

Papua New Guinea

New Britain

Phoenix Is    lands

Solomon Islands

Marquesas

Tuvalu    Tokelau

Cook Islands

Vanuatu

Samoa

Tuamotus

Fiji

Society Islands

New Caledonia

Tonga

Raivavae

Gambier Islands    Pitcairn Islands

Rapa Iti

Rapa Nui

Australia

Norfolk Island

Lord Howe Island

N

W    E

S

New Zealand    · Chatham Islands

0    500    1,000    2,000    3,000 Miles

Figure 3.3. Distribution of circular stone enclosures (*manavai*) across Rapa Nui as identified on satellite images.



Figure 4.1. A view of one of the *moai* roads leading from the quarry at Rano Raraku to *ahu* located along the south coast of the island. This position is probably close to where Katherine Routledge made her initial observations of the roads in 1914. The dotted line traces the path of an ancient road and the arrows point to locations where there are fallen *moai*.
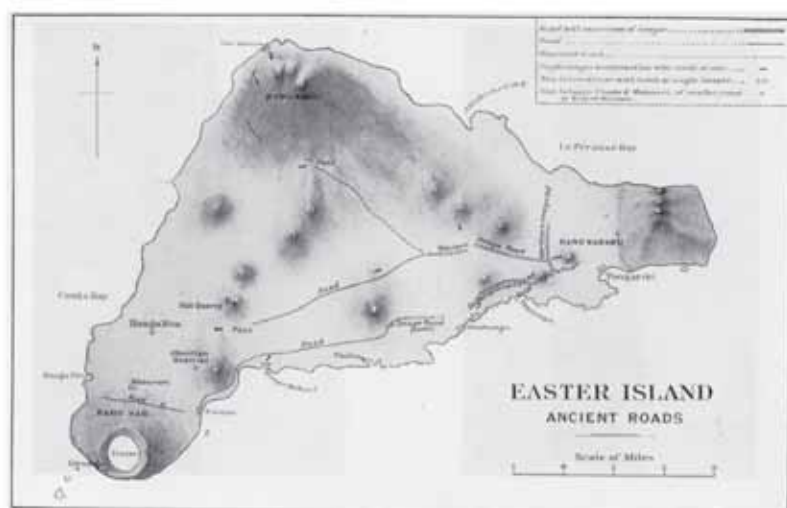
Figure 4.2. Map of ancient roads documented by Katherine Routledge during her fieldwork on the island in 1914–15.
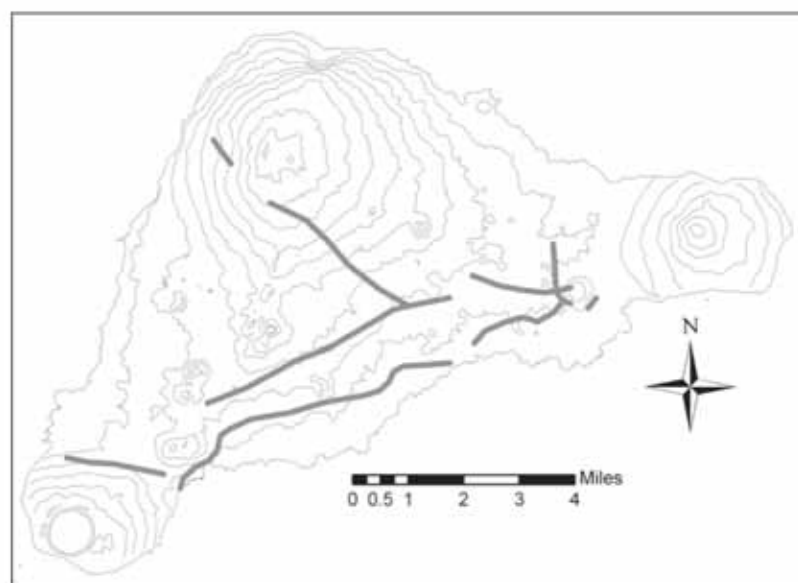


Figure 4.3. Approximate location of ancient roads identified by Katherine Routledge in 1914 shown on a modern map.
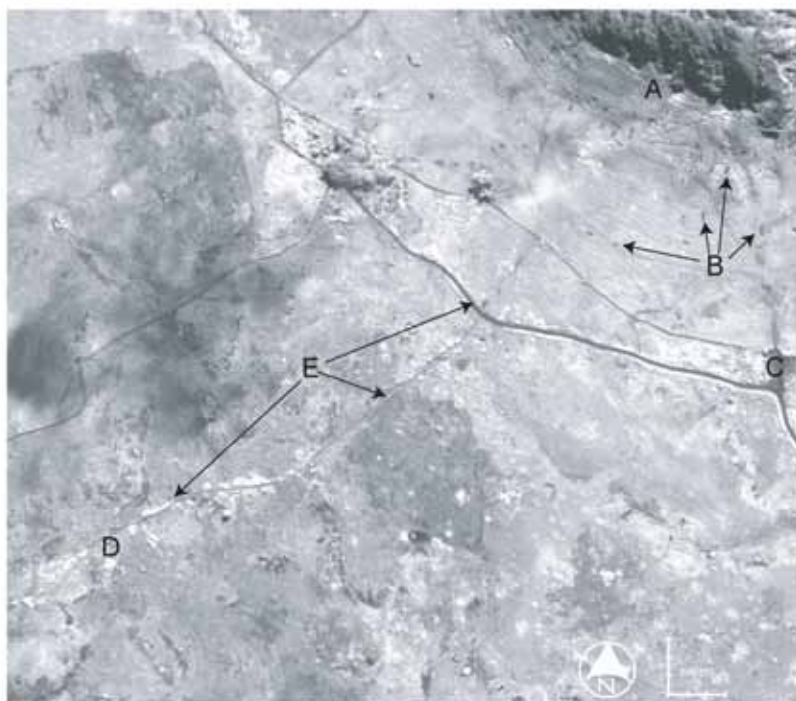
Figure 4.6. Path of a *moai* road leading from the quarry at Rano Raraku in the upper-right-hand corner to the lower left corner of the image. This portion of the road was visible to Katherine Routledge as she observed the area in the afternoon light from the slopes of Rano Raraku. In this satellite image, a number of key features can be identified. (A) Statues that surrount the quarry are easily visible in this image (B), as is the modern parking lot (C). The ancient road (D) is visible primarily as a horse trail and as a line of vegetation that runs from the northeast to the southwest corner of the image. This feature likely reflects sediment compaction with greater water retention and subsequent vegetation growth. Multiple large statues (*moai*) line this road near the quarry (E). The satellite image was provided by RADARSAT, Inc., and DigitalGlobe, Inc.
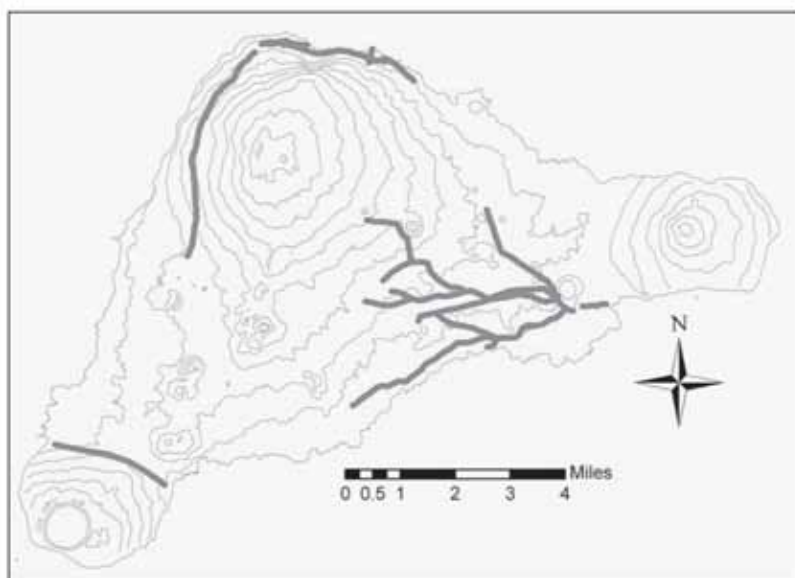
Figure 4.8. Location of *moai* roads mapped in our study
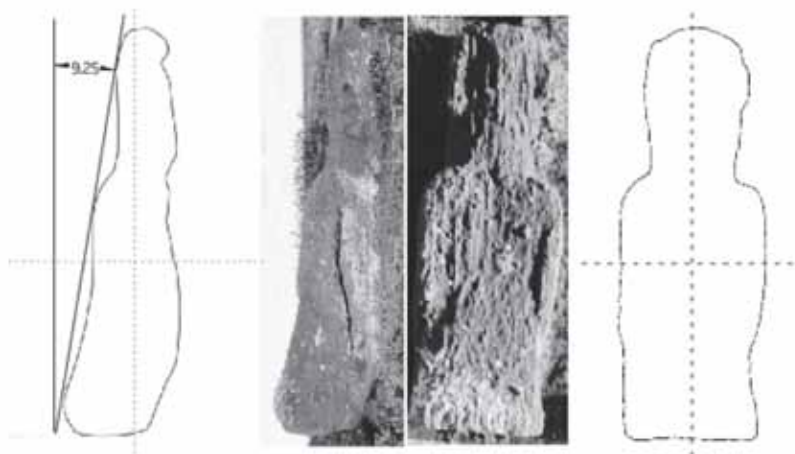of satellite images and ground survey.



Figure 5.5. Profile and plan view of a statue found along
a *moai* road. The dotted lines indicate the approximate location
of the center of gravity.

Table 6.1. A Series of Encounters Between You and Some Neighbors

| You ... | Encounter ... | and Receive |
|---|---|---|
| Dove | Hawk | 0 |
| Dove | Dove | 5 |
| Dove | Hawk | 0 |
| Dove | Dove | 5 |
| Dove | Dove | 5 |
| Dove | Dove | 5 |
| Dove | Hawk | 0 |
| Dove | Hawk | 0 |
| Dove | Hawk | 0 |
| | Total | 20 |

Table 6.2. Summary of Results After Your Set of Encounters

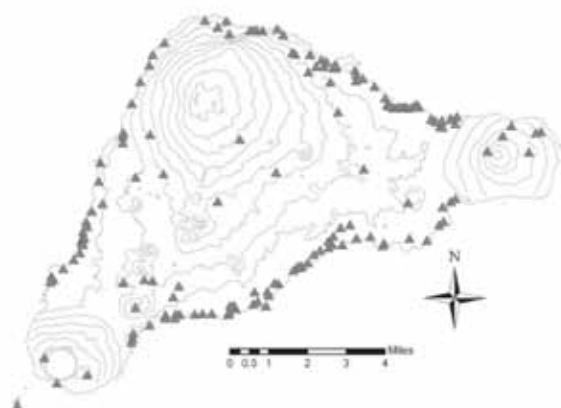| Your friend ... | Encounter ... | | and Receive |
|---|---|---|---|
| Hawk | Hawk | (Friend wins the contest) | 10 |
| Hawk | Dove | | 10 |
| Hawk | Hawk | (Friend loses the contest) | −30 |
| Hawk | Dove | | 10 |
| Hawk | Dove | | 10 |
| Hawk | Dove | | 10 |
| Hawk | Hawk | (Friend wins the contest) | 10 |
| Hawk | Hawk | (Friend loses the contest) | −30 |
| Hawk | Hawk | (Friend loses the contest) | −30 |
| | | Total | −30 |

Figure 7.1. The locations of "image" *ahu* based on studies by Helene Martinsson-Wallin.
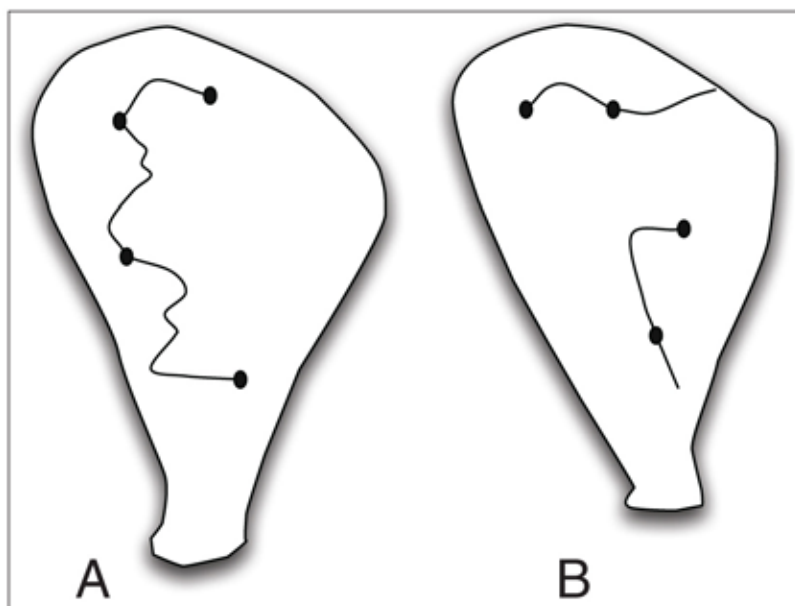


Figure 8.1. Caribou scapulimancy. Scapula are cleaned and placed over a fire. The patterns of burning and cracks provide a divination of future hunting conditions. On the left (A), the pattern of cracks and spots shows the location of caribou and successful hunts. On the right (B), the patterns of cracks show an unsuccessful hunt since the hunter's trail does not join that of the caribou.

Table A1.1. Major Polynesian Cultigens and Their Range of Optimal Growth in Latitude

| Plant (taxon) | Range of growth (latitude)[a] | Grows/Fruits on Rapa Nui? |
|---|---|---|
| Coconut (*Cocos nucifera*) | N26 to S10 degrees | No[b] |
| Kava (*Piper methysticum*) | N25 to S20 degrees | No |
| Breadfruit (*Artocarpus altilis*) | N23 to S17 degrees | No |

| Plant (taxon) | Range of growth (latitude) | Grows/Fruits on Rapa Nui? |
|---|---|---|
| Taro (*Colocasia esulenta*) | N35 to S18 degrees | Yes |
| Yam (*Dioscorea alata*) | N23 to S20 degrees | Yes |
| Sweet Potato (*Ipomoea batatas*) | N40 to S32 degrees | Yes |
| Banana (*Musa sapientum*) | N31 to S31 degrees | Yes |
| Sugarcane (*Saccharum officinarum*) | N35 to S35 degrees | Yes |

[a] Modern estimates for optimal agricultural potential.
[b] Some important food crops, such as coconut and breadfruit, would not have survived on Rapa Nui if they had been introduced. With recent climate change, Rapa Nui is now becoming warm enough for coconuts to fruit. In prehistoric times, however, this was not the case, and the coconut was absent.

*Source:* Data from the Food and Agriculture Organization (FAO) of the United Nations.

Table A1.2. Rainfall, Temperature, and Evapotranspiration Statistics for Rapa Nui, 1958–97

| Month | Evapo-transpi-ration (in.) | High Temp (F) | Mean Temp (F) | Low Temp (F) | Rainfall Average (in.) | Rainfall Standard Devia-tion (in.) |
|---|---|---|---|---|---|---|
| *January* | 6.7 | 79.8 | 73.4 | 67.1 | 2.9 | 2.6 |
| *February* | 5.4 | 81.0 | 74.1 | 67.1 | 2.9 | 2.6 |

| Month | Evapo-transpi-ration (in.) | High Temp (F) | Mean Temp (F) | Low Temp (F) | Rainfall Average (in.) | Rainfall Standard Devia-tion (in.) |
|---|---|---|---|---|---|---|
| March | 4.6 | 80.2 | 73.7 | 67.2 | 2.9 | 2.6 |
| April | 3.3 | 77.5 | 70.8 | 64.3 | 2.8 | 2.5 |
| May | 2.8 | 75.3 | 69.0 | 62.3 | 2.7 | 2.5 |
| June | 2.3 | 71.4 | 65.9 | 60.0 | 2.6 | 2.4 |
| July | 2.4 | 70.5 | 64.6 | 59.0 | 2.5 | 2.3 |
| August | 2.6 | 70.3 | 64.5 | 58.8 | 2.5 | 2.3 |
| September | 3.4 | 70.9 | 65.0 | 58.5 | 2.6 | 2.3 |
| October | 4.2 | 72.8 | 66.0 | 58.7 | 2.6 | 2.3 |
| November | 4.6 | 74.6 | 68.3 | 61.7 | 2.7 | 2.4 |
| December | 5.6 | 78.0 | 70.9 | 64.4 | 2.8 | 2.5 |
| Total | 47.9 | | | | 32.5 | |
| Average | 4.0 | 75.2 | 68.8 | 62.4 | 2.7 | 2.5 |
| Standard Deviation | 1.4 | 4.0 | 3.7 | 3.5 | 0.1 | 0.1 |
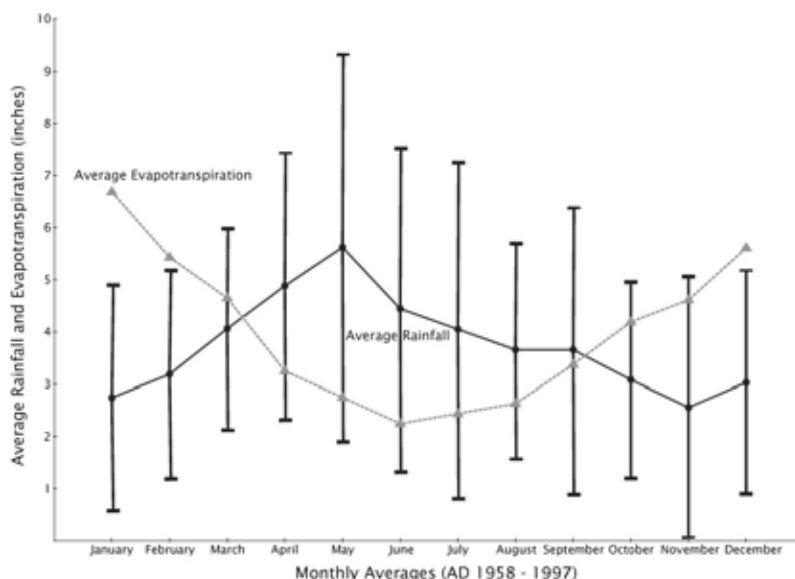


Figure A1.1. Average monthly rainfall, its variability (standard deviation), and average evapotranspiration on Rapa Nui from 1958 to 1997. Note that under average conditions, evapotranspiration exceeds rainfall six months of the year.
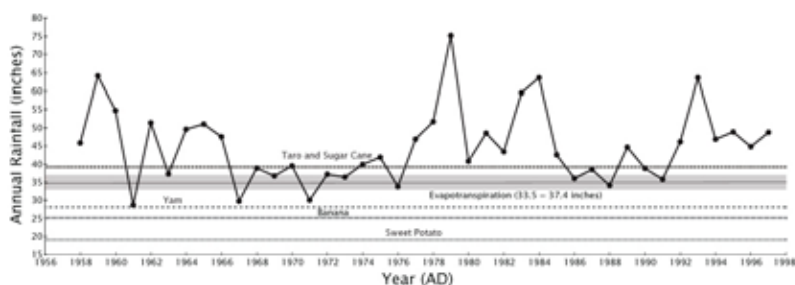
Figure A1.2. Annual rainfall (1958–1997), average evapotranspiration, and minimal moisture requirements for the major Polynesian cultigens on Rapa Nui. Data on plant growth and agricultural potential are from the Food and Agriculture Organization of the United Nations (FAO).
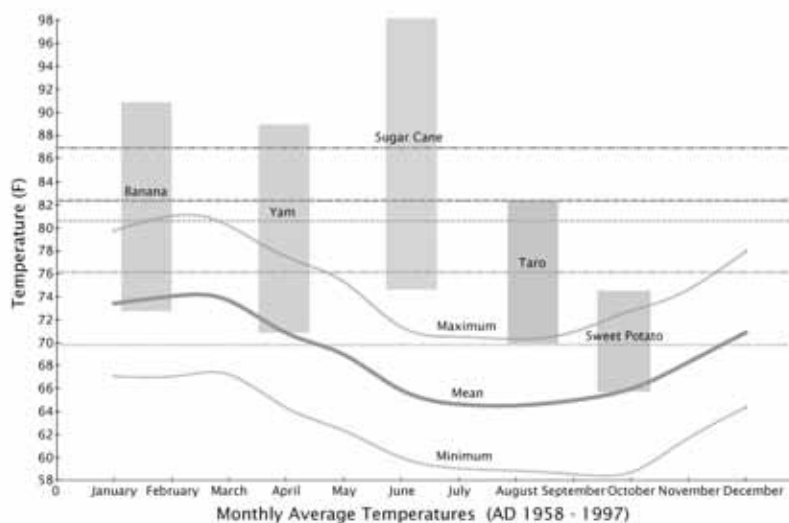


Figure A1.3. Average monthly temperatures (1958–1997) and temperature requirements for the major Polynesian cultigens on Rapa Nui. Data on plant growth and agricultural potential are from the Food and Agriculture Organization of the United Nations (FAO).
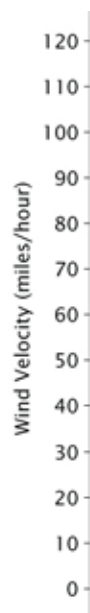
Figure A1.4. Average and stronger sustained winds ("outliers") recorded at the Mataveri Airport on Rapa Nui between 1958 and 2005. Over this 47-year recording period, hurricane-force winds (greater than 74 miles per hour) occurred at least ten times, or roughly once every five years.
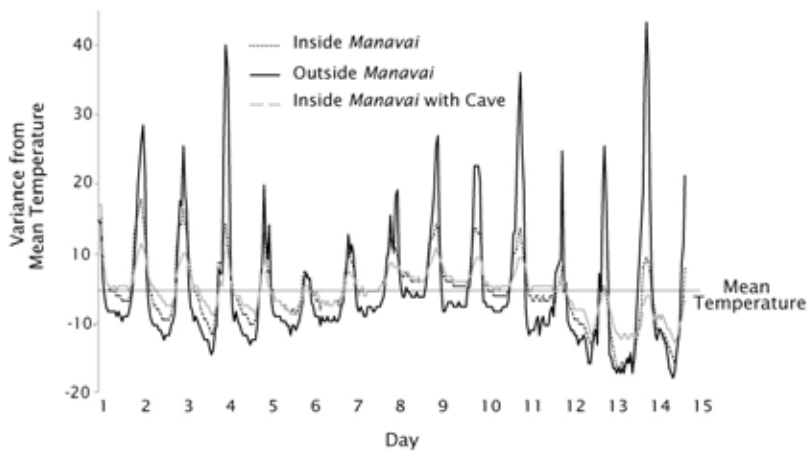
Figure A2.1. Temperature measurements made in three locations over two weeks. Temperature is measured relative to deviations from the overall mean temperature of the period. During the daytime, temperatures rise to a peak, then they fall to lows at night. The lines show temperature change on the outside surface, inside a *manavai* structure, as well as inside a *manavai* with an adjacent cave. Note how the range of ups and downs is smaller for the temperatures inside the *manavai*, particularly for those located adjacent to a cave.
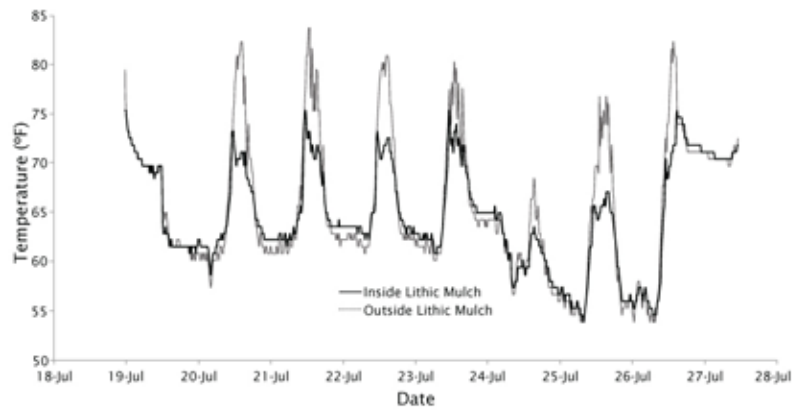


Figure A2.2. Temperature measurements made inside and outside lithic mulch areas on the south coast of Rapa Nui. Lithic mulch, like the *manavai*, reduces amplitude in diurnal temperatures.

Table A2.1. Summary of Mineral Concentrations
for All Eight Manavai Studied

| Mineral Nutrient | Minimum | Maximum | Mean Inside ($\bar{X}$) | Mean Outside ($\bar{X}$) |
|---|---|---|---|---|
| P ($\mu g/g$) | 46.00 | 6985 | 1030.21 | 313.64 |
| K ($\mu g/g$) | 24.00 | 2374 | 770.11 | 414.43 |
| Ca ($\mu g/g$) | 588.00 | 5672 | 2326.11 | 1713.71 |
| Mg ($\mu g/g$) | 284.00 | 2364 | 1039.16 | 880.29 |



Figure A2.3. Planview and profile of *manavai* feature recorded in 2004.
The dotted line shows the transect along which we collected
soil samples. Each diamond shows a sample location.
The line from *a* to *a'* marks the alignment of the profile
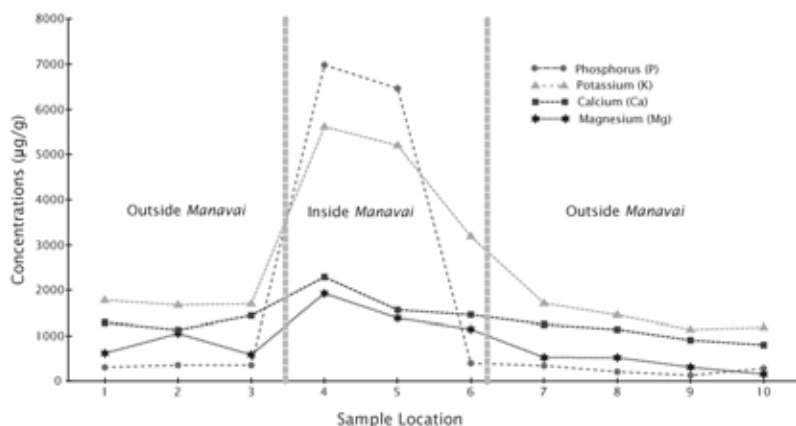in the upper right corner.

Figure A2.4. Graph of concentrations of the extractable nutrients phosphorus, potassium, calcium, and magnesium as measured from samples located along a transect that crosses outside and inside a *manavai* mapped in 2004. Note that inside the *manavai*, nutrient concentrations, particularly phosphorus and potassium, are much higher than in soils measured outside the *manavai*.

9. Counts of *moai* found faceup or facedown relative to the slope along the road heading away from the Rano Raraku quarry.

Direction of Slope Relative to *Moai*

|  | Downhill | Flat | Uphill | Total |
|---|---|---|---|---|
| Facedown | 17 | 3 | 11 | 31 |
| Faceup | 3 | 0 | 16 | 19 |
| *Moai* Position |  |  |  |  |
| Lateral | 0 | 0 | 1 | 1 |
| Total | 20 | 3 | 28 | 51 |

Chi-square = 12.388, p = 0.01476