

### Crop Formation: Laguna Canyon, California, USA

**Laboratory Code:** KS-03-91

**Material:** Plantain - intact plants, *Plantago lancolata*.

**Formed:** First noticed on March 9, 1996

**Sampled:** April 6-7, 1996, by Kris and Ed Sherwood, Santa Monica, CA

#### Results and Discussion:

This complex of formations and the surrounding hillside terrain is shown in the Fig. 1 diagram prepared by the Sherwoods. This sampling team also reported that "numerous species of weed covered the hillside, but only the Plantain was found to be bent". These plants displayed a sharp, 90° bend in the stems at around ground level. Three control groups taken outside the formation did not show the sharp, stem bending. These bending differences are neatly documented in Fig. 2, taken from the Sherwood field-report of April, 1996. The seed heads were immature, therefore it was not possible to conduct germination tests.

Plantain is a dicot and does not have stem nodes. To obtain quantitative information concerning internal alterations in the plant cells, a microscopic examination was conducted within stem tissue taken about 5 cm above ground level. The cell wall pit diameters were measured in thin sections prepared from the outer epidermal stem tissue. In Table I the controls are given as the mean diameter from three sampling sites as far away as "hundreds of feet from the formation". Since there is no available sampling map showing the exact sample locations, the information in Table I was taken from the labels on the test samples.

**Table I**

Cell wall pit diameters in *Plantago lancolata* tissue, sampled from a crop formation at Laguna Canyon, CA, in April, 1996 (30 randomly selected pits per sample).

Site Location	Pit dia. (microns)		N-measurements	Change (%)
	ave.	s.d.		
Controls (3)	3.31	0.73	90	-----
Spoke-site	4.58	1.34	30	+38.4*
9-ring-site	4.63	1.17	30	+39.9*
5-ring-site	3.29	0.77	30	-0.6
Flattened Ring - within 9-ring-site	4.34	0.87	30	+31.1*

\*-P<0.05

The changes in cell wall pit lengths in Table I were calculated as percent alteration relative to the mean of the controls. The (\*) indicates that these changes are statistically significant at the 95% level of confidence. As we have seen in the past, this degree of change in the cell wall pit diameters indicates the plants were exposed to a very rapid, high heat input. This energy, probably microwave in nature, was very transient; otherwise, had the heating been prolonged the pits would have decreased in size (see reference [1]). It is also important to point out here, that of the approximately 200 crop formations examined in this laboratory, this is the first one involving

Plantain. Consequently we do not have a data base indicating the normal, phenologically-related variations of cell wall pit diameters in this species.

In addition to plant material, soil samples were collected at four locations in the formation and at one location outside the formation area. All of these samples were examined for magnetic material and none was found.

**Reference:**

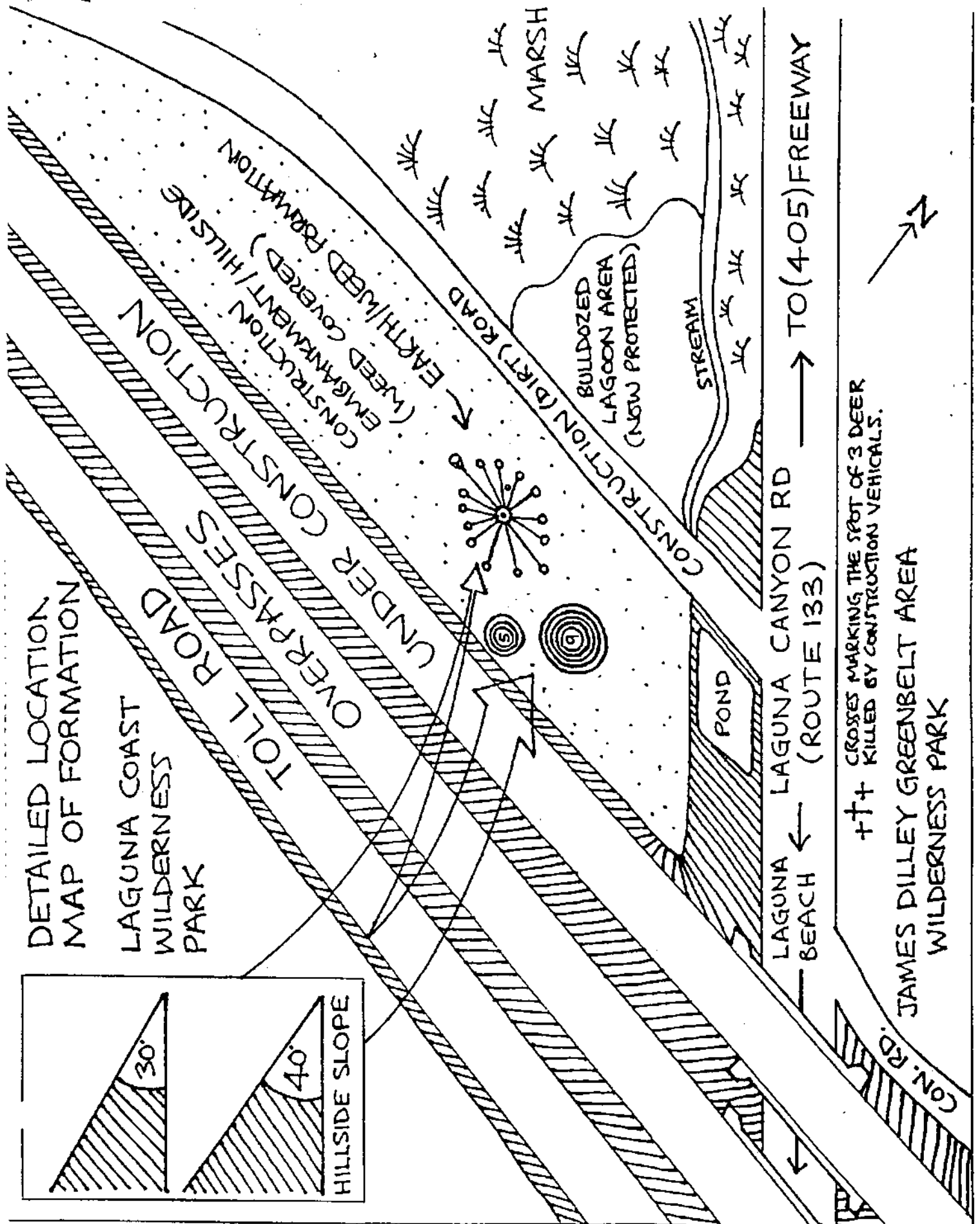
[1] Levengood, W.C., *Anatomical anomalies in crop formation plants*, *Physiologia Plantarum* 92: 356-363 (1994).

Nancy Talbott  
Cambridge, Mass.

W.C. Levengood  
Pinelandia Biophysical Lab.

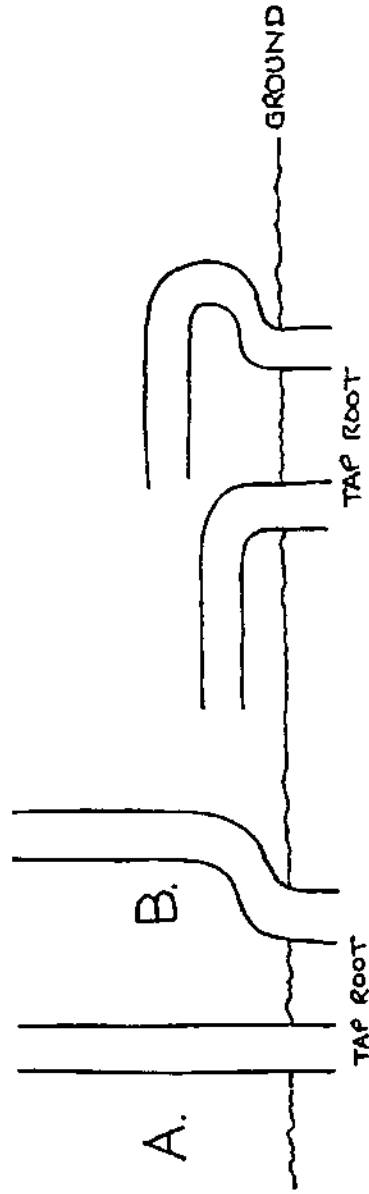
John A. Burke  
Am-Tech Lab.

FIGURE 1: Sherwood diagram showing formations & surrounding terrain.

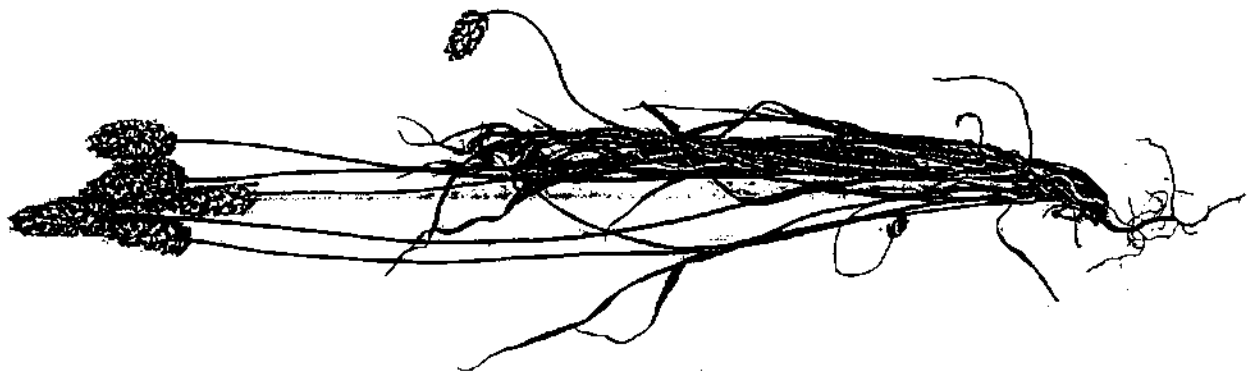


The Laguna Canyon 1996 .rth/Weed Formation

The Laguna Canyon formation was impressive for a number of reasons. One was the abundance of plant stems bent 90 degrees without a break or crease.



It is important to note that we collected control (non formation) samples of English Plantain with no natural bending (A) and natural bending (B). However, the undamaged samples taken from glyph 1, 2 & 3 demonstrated a bend, or additional bend clearly not part of the plants natural growth.



An example of English Plantain (control sample, left). Compare this, with its tap root and natural bend to a plant removed from one of the spokes (glyph 3, above).

FIGURE 2: Sherwood diagram of bending differences observed in Plantain, showing control plant outside formations and bending observed in a plant removed from one of the "spokes".