Stenocereus aragonii was significantly related to substrate type, soil moisture, canopy cover and the basal area of surrounding trees. Sites where *S. aragonii* was found were rockier, drier, more open and had fewer and/or smaller surrounding trees than control sites along our transect.

The distribution of *S. aragonii*, however, did not seem to be dependent on any individual site characteristic, but rather on a suite of related characteristics. The two models that best predicted cactus presence were those including (1) soil moisture - canopy cover and (2) soil moisture - basal area. Based on this result we might expect that basal area of surrounding trees and canopy cover would be highly correlated, but this is not the case ($r = 0.34$). Also, in the three-parameter model, canopy cover was significant and basal area was marginally significant. It appears that these two parameters are measuring slightly different aspects of a site and are both valuable for predicting cactus presence. Canopy cover is a more direct indicator of sunlight reaching the cactus, which could explain its higher significance level over basal area.

The non-random distribution of *S. aragonii* that we observed supports a theoretical distribution based on the benefits and limitations of the CAM pathway. *S. aragonii*, owing to adaptations that include its specialized metabolism, is able to grow in areas that seem to be relatively uninhabitable by most other plants (pers. obs.). Physiological specializations in plants allow for increased habitat partitioning and help to explain the high diversity of plant species in Neotropical forests.

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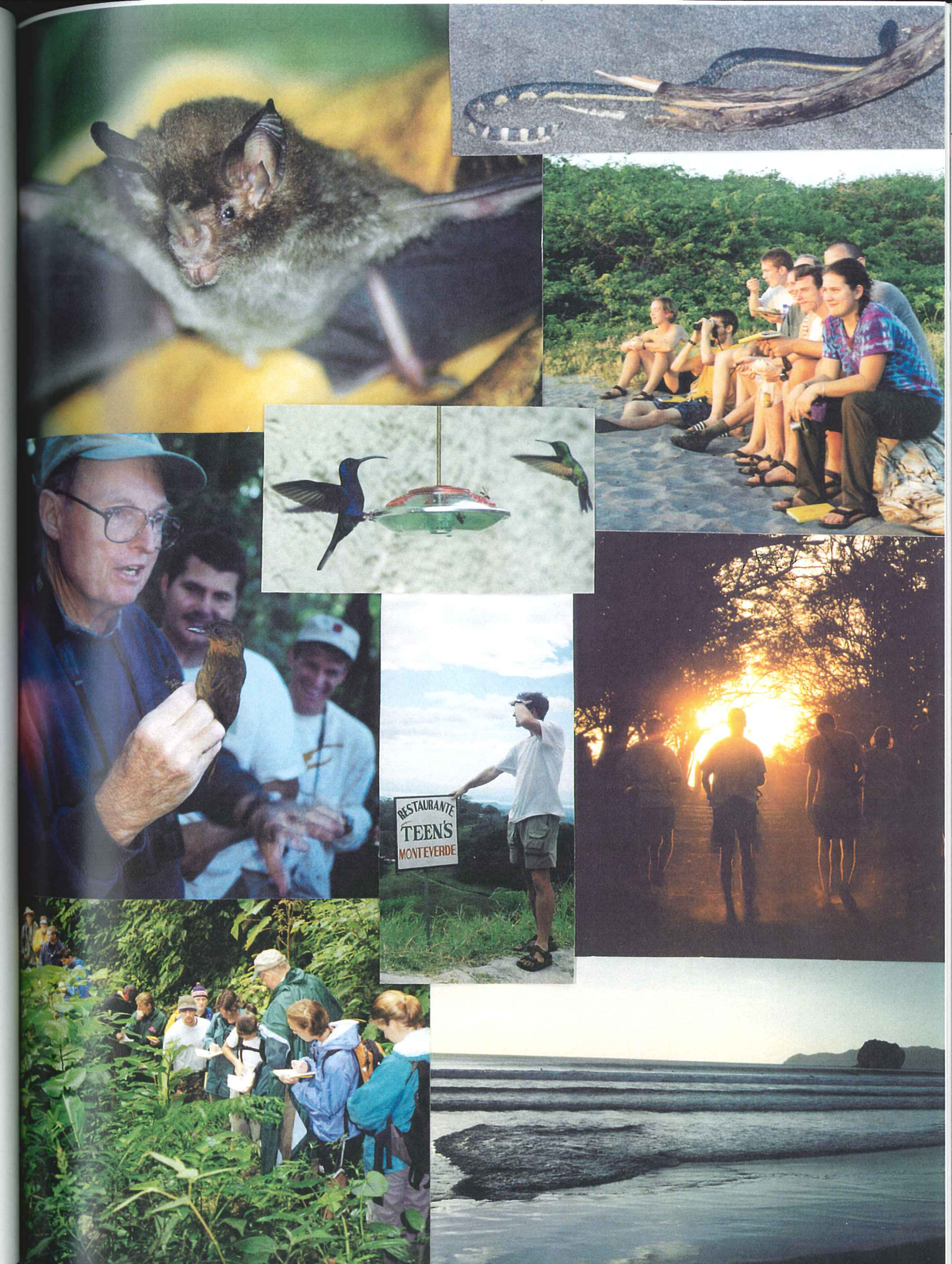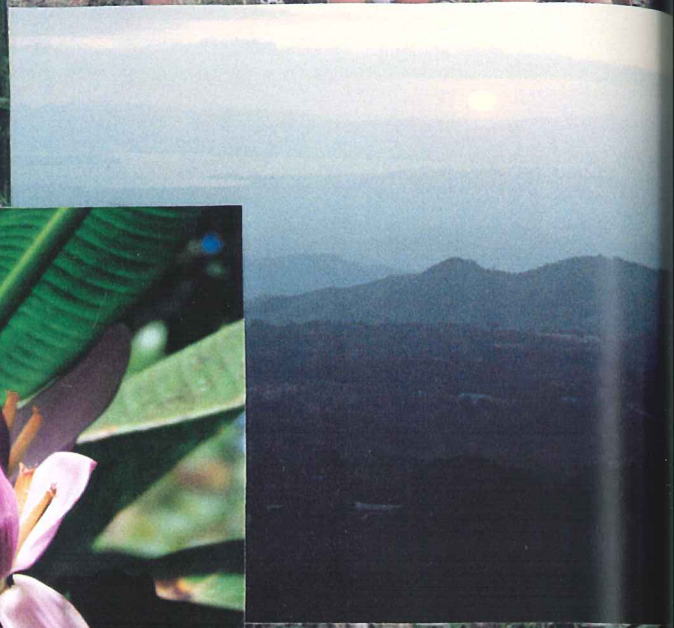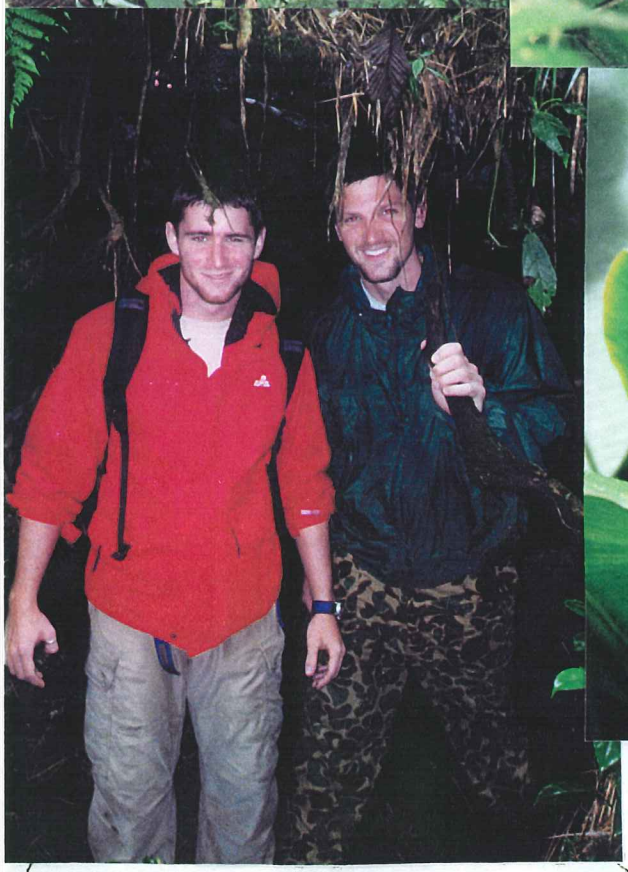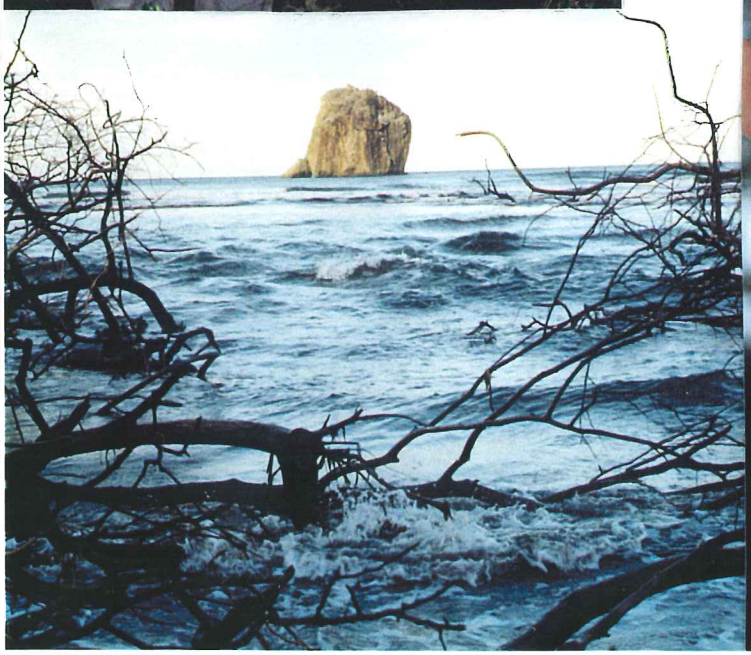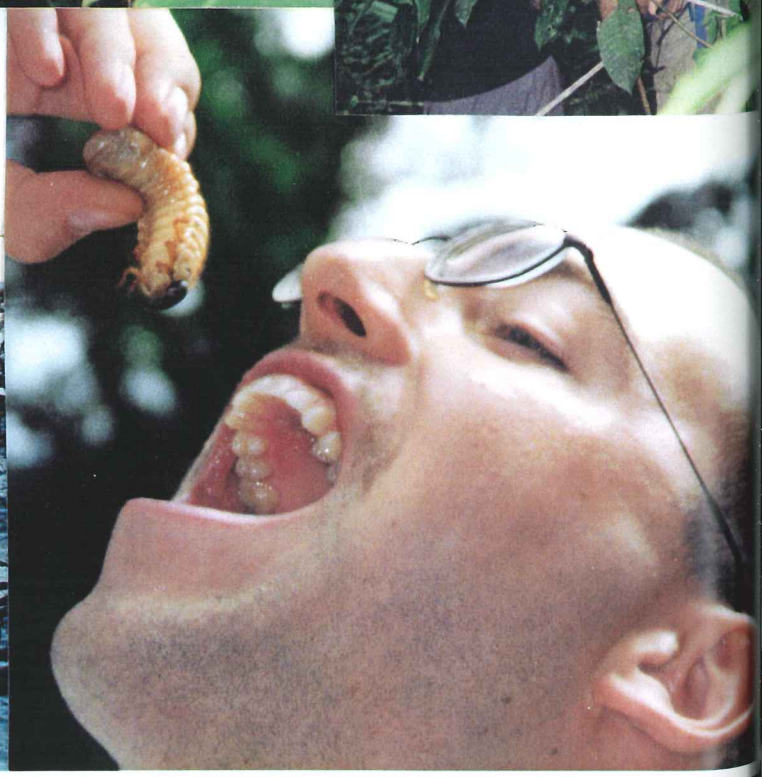
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