

Bergmann, Allen and Birdsell:

**Patterns of Ecogeographic
Adaptation in Aboriginal
Australians.**

Patricia Lindsell

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ABSTRACT

The major focus of this thesis is an assessment of the degree to which human body form has been shaped by adaptation to climate. In the 19th Century Bergmann (1847) and Allen (1877) observed regularities between ambient temperature and body size and shape. These regularities are thought to relate to thermoregulation and have become known as Bergmann's and Allen's rules. They are also termed "ecogeographic" rules.

The applicability of these ecogeographic rules to humans will be examined using anthropometric data of Aboriginal Australians collected by Joseph Birdsell in the 1930s and 1950s. Birdsell observed that the Australian Aborigines were not an homogeneous people and explained their variation as being due to three morphologically distinct waves of migrants. This thesis represents a reinterpretation of his data within an adaptive paradigm.

The analytical methodology used herein is based primarily on correlation. This course was adopted in order to make the results of this thesis comparable with those of previous research.

The results of this study have found evidence for Bergmann's and Allen's rules in Australian populations. Overall, it was found that Aboriginal people living in warmer climates were more linear, both in terms of body breadth and in the relative length of the distal limb segments, whilst those living in cooler climates were stockier, with shortened distal limb segments. Failures of these "rules" appear to be related to recent population movements within Australia.

Ecogeographic clines were also observed in cranio-facial morphology, however many were related to body size variation. The results support the hypothesis that nasal volume is increased where air temperatures are lower and there is a need for inspired air to be warmed and moistened. This study also supports the theory that a relatively broad nose may facilitate heat loss. The theory that relatively narrow noses are an adaptation to low atmospheric moisture, by itself, is not supported in this study.

There is evidence for consistent ecogeographic clines in body proportions in populations worldwide. This suggests that the identification of differences of body proportions, among and between hominid species, should be an indicator of the climate in which they, or their ancestors, evolved.

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