

LANDSCAPES AND BIOGEOGRAPHY

Group Contract, Fall-Winter 1991-92

Faculty: James M. Stroh (geology) and Peter B. Taylor (biology)

This group contract was about topics in geology and biology concerning the distributions and interrelationships of landforms, plants, and animals. The primary subjects were geomorphology and biogeography. The geographic scope was worldwide, including terrestrial and aquatic organisms, and polar, temperate, and tropical regions. The modes of study were lectures, reading, seminars, labs, field studies, and literature-based research projects.

Fall Quarter 1991

The texts for assigned reading, written exercises, and discussion were: Process Geomorphology (D.F. Ritter, 1986) [this quarter: Introduction; Climate and Internal Forces; Chemical Weathering and Soils; Physical Weathering; Mass Movement; Slopes; Drainage Basin Development; Morphometry and Hydrology; Fluvial Processes and Landforms; Glaciers and Glacier Mechanics; Glacial Erosion; Deposition; and Landforms], Biogeography (J.H. Brown & A.C. Gibson, 1983) [this quarter: concepts of ecology and evolutionary biology, historical biogeography of aquatic, terrestrial, and flying animals, and of plants; and Quaternary events]; and After the Ice Age (E.C. Pielou, 1991) [first half]. Lectures were presented on topics of geomorphology and biogeography by the instructors and two invited speakers.

Seminars featured discussion of Rising from the Plains (John McPhee, 1986) and three current issues of High Country News to examine geological, biological, and human aspects of western landscapes.

As an individual-study assignment, each student was expected to research and present in written and oral reports a topic involving the biogeography (ecological and historical) of a species or taxonomic group of plant or animal.

Field trips were undertaken to the Olympic National Park (two days), Mount Rainier National Park (one day), and the Columbia River basin of central Washington (four days), to view landforms, other geological features, vegetation, animal-life, and ecological patterns. On-campus field studies involved vegetation identification, description, and mapping. Laboratory studies included interpretation of topographic maps, compass (Brunton) and tape mapping technique for geology and biology, and introduction to the scanning electron microscope. The students were expected to write field notes, a field journal, an essay on the field trips, write laboratory summaries, and to produce a map resulting from a vegetation-mapping exercise. Students completed introductory workshops on the use of a computer spreadsheet (Quattro Pro), and, optionally, workshops on logarithms and trigonometry.

Winter Quarter 1992

The texts used this quarter were Process Geomorphology (remaining chapters, related to wind, coast, periglacial, and karst environments), Mima Mounds by A. L. Washburn with Pocket Gophers and Mima Terrain in North America by Cox and Scheffer, and Plant Ecology of the Death Valley, Calif., Biogeography (remaining chapters, about island biogeography and species richness), After

the Ice Age: the Return of Life to Glaciated North America (second half), Little Islands of the Pacific: An Essay on Pacific Basin Biogeography (E.A. Kay, 1980), Landscape Linkages and Biodiversity (W.E. Hudson, Ed., 1991), and The Fragmented Forest: Island Biogeography Theory and the Preservation of Biotic Diversity. Review-questions were assigned for written responses about the reading in these. Lectures by the faculty variously addressed or augmented the topics covered in the reading. Three invited speakers from local state agencies talked about programs in conservation biology in Washington State.

In addition to the core studies in biogeography and conservation biology, each student was expected to find and read articles from which to write an organized report about a particular topic, or an annotated bibliography of articles about one or more topics.

The "basin study" consisted of detailed map interpretation of a drainage basin, measurement of area, stream orders, stream lengths, and calculation of several morphometric measures (stream orders, bifurcation ratios etc.). Reports covered techniques, findings (measures), hydrology, geology, land use, and other pertinent factors of the basin.

Geological/geomorphological laboratory and field studies included beginning mineral and rock analysis, how to make a topographic profile, and discharge and load measurements of streams (using a Swiffer current meter). Ecological field studies included a survey of vegetation and other ecological features along a profile also surveyed topographically, and a quantitative survey of waterbirds at a South Puget Sound site. The results were to be presented and the distributional patterns discussed in a brief report.

Quantitative (data and statistics) workshops consisted of types of measures, significant figures, error analysis, central tendency, and beginning probability and hypothesis testing.

Seminars were conducted on The Control of Nature (John McPhee, 1989) and three issues of High Country News, to discuss environmental matters and related topics of geomorphology and biogeography.

Field Trip - Death Valley, CA (2 weeks). This was an intensive look at geomorphology (forms and processes), geology, desert plants and animals and their distribution in Eureka Valley and Death Valley California. The approach was ecological. Use of field guides, written documentation (journal or letter format), field lectures, and evening discussion and seminars were important elements of the trip. Ten full days were spent on field work and writing.

Alternative to the Death Valley trip, a four-day field trip was conducted to the Willapa Bay - Long Beach Peninsula area (Pacific County) of southwestern Washington. The area was viewed as a landscape unit, to see the interrelationships of geomorphic landforms and processes, ecological conditions, biotic distributions, human activities and influences, and their respective histories. Initiatives to conserve biota and natural systems in the area were also featured. Expected products were a field journal, and a written synthesis with discussion. Also, the students of this group presented articles about conservation biology in a final seminar.