

Application for an ACS Curriculum Development Grant for the Development of an International Comparative Watershed Studies Course

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Introduction

I am applying for support in the amount of \$3000 to enable me to live in Germany for three months during my sabbatical leave in the spring of 2007. During this time I will create a new, field-based environmental studies course in comparative watershed studies. The lecture component will be taught at the University of the South campus during the spring semester, followed by a multi-week field course to be taught in Germany. The course will employ an interdisciplinary approach to comparing small watersheds in the Kraichgau region of Germany to those on the Cumberland Plateau of southern Tennessee.

Presently there is only one environmental studies course at the University of the South that is taught abroad (Costa Rica Program). This course would thus provide an important international dimension to our environmental studies program.

Background

The Kraichgau region of southwestern Germany is an approximately 10,000 square km area that is bordered on the west by the Rhine Valley, on the south by the Black Forest, on the north by the Odenwald, and on the east by the Swabian Plateau.

The area is characterized by gently rolling hills formed by Mesozoic sedimentary rocks which include sandstones and limestones. A relatively thick, although discontinuous, layer of loess (wind-blown silt deposited during the last ice age) blankets many portions of the Kraichgau. The area has a rich natural and human history. Several quarries in the region expose world famous fossil-bearing strata (e.g. Tertiary Messel Quarry, Triassic Weisser Steinbruch at Pfaffenhofen, and numerous quarries in the Jurassic slates of the area). Some of the earliest human remains in Europe are found here, including the jaw of the 500,000 year old *Homo heidelbergensis*. Other archaeological remains include those of Celtic sites and numerous Roman villages, roads, and mines. Medieval history is most readily observed from ubiquitous hill-top fortresses and walled cities and towns. Cloister Maulbronn is the best preserved medieval cloister north of the Alps and has been a UNESCO world heritage site since 1993. Today the Kraichgau remains a largely

agricultural region that is dotted with numerous towns. The landscape is composed of a mosaic of forests, orchards, vineyards, and high intensity agricultural fields.

The Kraichgau and Cumberland Plateau are ideally suited for a comparative watershed studies course. Both regions have similar geologic foundations, being composed of limestones overlain by a capping sandstone sequence. Furthermore, watersheds are of similar size in both areas (60 to 200 acres). Beyond this, however, the watersheds are quite different and therefore provide numerous opportunities for studying the diverse factors that define watersheds in general.

I am quite familiar with small watersheds on the Cumberland Plateau, having spent a good deal of my career at Sewanee studying them. Therefore I plan to spend my sabbatical time constructing the Kraichgau portion of the course and becoming familiar with the watersheds there.

Proposed Work

I propose to spend the spring semester of 2007 living in the Kraichgau area of Germany. This will permit me to traverse the land on foot and by car so that I may carry out my watershed studies of the area and plan the logistics for the field component of the new course. The new course will take a watershed approach to understanding the landscape of the Kraichgau. Discrete watersheds will be studied in terms of their surface and ground water drainage patterns, geologic makeup, forest cover type, and history of human use of the land. Such an approach is by nature highly interdisciplinary and permits a greater understanding of those factors that shape watersheds. Thus my time in the region will be spent searching for and studying field sites that highlight the interrelationships between watershed-defining features and processes. For example, the Kraichgau has numerous watersheds containing "Hohlwege", or ancient roads that are deeply entrenched into the loess deposits of the region.

These sunken roads originated as surface roads during the early middle ages, but because of frequent use and their establishment on easily eroded loess were highly eroded over time. These roads are wonderful geologic windows into the ancient deposits that they cut. The loess walls of the roads also create a unique ecosystem that harbors rare plants and animals. The Hohlwege thus act as a vehicle for studying and understanding the interrelationships between the geology, hydrology, human history, and biology of a watershed. On the Cumberland Plateau there are similar, although much smaller and younger, features carved into the landscape. Here wagon roads established in the 19th Century are still visible as linear depressions in the landscape that have resulted from soil compaction and erosion. The lack of loess here has prevented the establishment of the deep Hohlwege seen in the Kraichgau.

Another specific area of study will include the approach to flood control on individual watersheds and for the Neckar River, a large tributary of the Rhine into which most

streams of the Kraichgau feed. Flood control is accomplished largely through a network of small dams placed high on smaller tributaries, as opposed to fewer, large dams on the Neckar River. Flood control is an ancient endeavor in this region, with early attempts manifested by old levees, retaining walls, etc. Flooding here is caused not just by climate, but also by the underlying geology and long history of human manipulation of watershed surfaces.

I plan to identify and prepare 15 field sites in Germany that best illustrate an interdisciplinary approach to watershed studies. In addition, I plan to contact and meet with scientists at the University of Heidelberg, at the Baden Wurttemberg Department of Forestry, NABU (equivalent to our Audubon Society), and the Baden Wurttemberg Division of Watershed Management to learn more about the watersheds and to arrange guest lectures in the field for our students. These watersheds will then be compared to those found on the Cumberland Plateau in the vicinity of Sewanee, Tennessee.

Budget

I am requesting \$3000 for the rental of a modest, furnished apartment in the Kraichgau region of Germany for a three-month period. Rental housing (furnished) is relatively expensive in southwest Germany. I have thoroughly researched rental possibilities in this region (I even had German relatives scout possible rentals) and have identified an apartment that has good access to potential field sites in the area. The cost of this apartment is over 2,500 Euros (more than \$3000) for the three-month time span.