

15. Economic investigations (including visits to Point Judith Fisherman's Cooperative, a wholesale packing and fillet concern, and visits to the state's hatchery).

16. Familiarization with local educational institutions, principally the University of Rhode Island's School of Oceanography.

17. Familiarization with state agencies including labs of the Rhode Island Department of Health and the Rhode Island Department of Natural Resources).

18. Marine geology.

19. Study of the spring herring run.

20. Visit to the New England Aquarium in Boston.

21. Seining.

It is evident from the topics of investigation that the physical boundaries of the classroom have been extended to include the resources of the community and the state.

All through the second semester, students work on a project of their choosing. This project does not culminate in a term paper; rather it is designed to involve the students physically as well as mentally. Typical topics are an amateur's photographic guide to tide pools, the effects of sulfide on mummichog, potential oyster farming sites in Rhode Island, the learning ability of the green crab in a maze, and a slide presentation on the shellfishing industry in Rhode Island. All program equipment is made available to the students; much program time is devoted to the projects, as, for example, when a student requires access to shore and bay sites or needs to interview a politician.

Program personnel have conducted two workshops on marine science to date; more are planned for the future. The first, held in the fall of 1973, was aimed at introducing the program and its concepts to nonscience high school faculty. Because students in our program must miss classes in other disciplines, we wanted to stress the importance of what the students were doing with the time spent in the field. The involvement and advice of teachers in the social sciences is also of great help in promoting the interdisciplinary aspects of the project. Funds are presently available to provide substitute teachers for those members of the faculty who wish to accompany us on a particular field trip for which their specialty would mesh with program objectives. The second workshop, held in the spring of 1974, was designed to provide training in marine studies to those science teachers in the state who wished to adapt all or some of our activities to their own science programs. This highly successful workshop will be offered again this spring. We are also receiving requests to travel to other areas in the state and actually provide field instruction for students from other communities. This is being handled by using students currently in the program who have already mastered particular field techniques as instructors, with program teachers acting as "consultants." Whenever possible, the requesting communities' own marine resources (for example, a marsh) are studied. On several occasions, we have received requests from out-of-state teachers for advice on how to establish similar programs in their communities, and for curriculum, supply, equip-

ment, and textbook recommendations. In addition to being available for consultation with other communities, we have for distribution a 150-page lab manual and a brochure, and we are currently building a library of half-inch videotapes on field techniques that we will either loan or copy on request.

The interest shown in the project by Rhode Island communities as well as those communities outside the state demonstrates the awareness on the part of educators of the need to protect our valuable ocean and shore environments before it is too late. We believe our program is a positive step in that direction.

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## A SCIENCE-SOCIAL STUDIES CAMPING COURSE

Students couldn't wait for the course to begin! When it was over they wished it weren't. A teacher's dream? Yes, but the dream became reality last summer when the Rock Island (Ill.) school system combined science and social studies to provide an unusual three-week camping course for students in grades 9-12. In "River Communities—Past and Present" students were involved in geological history, natural history, and the history of man. Traveling in two rented station-wagons with a junior high school social studies teacher and a high school biology teacher, students learned as they traveled and camped in some of the significant areas of the state.

The three-week program was set up in four-day time blocks, with each week's program running Monday through Thursday. With a three-day weekend, both students and instructors had sufficient time to replenish supplies and prepare for the week ahead. During the first week, in the local area, studies were carried on from 8:00 A.M. until 5:00 P.M., and students carried sack lunches. Monday, Tuesday, and Wednesday nights of the following two weeks the group slept in tents at private and state camping areas. Students were responsible for all the cooking, dishwashing, pitching tents, campground cleanup, and so on. Included in the last week's menu were roasted cattails and boiled milkweed flower buds covered with butter.

An effective field program should make use of resource people. During the first week when students were studying the geology, natural history, and history of Indians and early white settlers, a local expert took the class through an original prairie that will be destroyed in a few years for commercial use. The prairie expert also took the class to a transplant prairie where plugs of the original prairie grass have begun to take hold. The effects of the prairie on man and man's effects on the prairie became a very real thing to the students as they walked through it and learned about it first-hand.

During that first week the class went to an early Swedish settlement not far from home. A native of that community was with us to aid our study of its his-

tory. The same day we were taken back in time to the working of a 1910 farm by the gentleman who had restored the farm. Rope-making was one of the experiences students took part in there. Learning the operation of an 1850 grist mill and the ecology that influences the people of that area, past and present, was also part of the first-week schedule. In keeping with the basic theme of man's effects on the land and water and the effects of land and water on man, we used the expertise of a fisheries biologist to learn about the operations of a state fish hatchery in the same area. A close look at an old man-made canal was made possible by borrowing canoes to explore the canal and to see its wildlife. Everyone had binoculars to have a better view of herons, kingfishers, ducks, water snakes, turtles, and bullfrogs. We disembarked from the canoes to examine the structure of a cement aquaduct that carries a segment of the canal over a creek. This all-day trip was completed with a canoe race between student canoes and instructors' canoe.

Traveling south the second week, the group made a stop in a river community to sample smoked fish and listen to an explanation of how the fish are caught and prepared. This trip also took us through a cheese factory and winery that were main industries for early settlers in that community. The processes of cheese making and wine making were tied in with the history. Archeology was a focus of study during the second week, as the classes studied early man in the state by visiting a site that is currently being excavated. The Koster Site, one of the biggest finds in North America, is an example of glacial loess from surrounding hills eroding from the hills and down into the site to preserve remains and artifacts of each successive civilization. Seeing high school and college students work this site under direction of Stuart Streuver of Northwestern University motivated a number of students to work at the site last summer. Experts at the site helped the class to understand how pollen analysis, snail shells, clam shells, and so on could be used to help reconstruct a picture of the ecology of the area at the time each civilization inhabited it. Reasons for the people to select this land above the floodplain with access to the waters for fishing and hunting, while protected by the hills above, were obvious.

Our final week took us northward in the state to camp at a state park all three nights. We explored surrounding areas for their geologic, natural, and social history, taking into account environmental factors that led to the rise and fall of communities in the area. Included were studies of an old lead-mining town and trips through a lead mine and cave. The state's historian for the area held a special evening program for the group. An old-timers' demonstration for dowsing for water (all of the students and teachers tried it too!) and a tornado watch one night at the campground were two of the unscheduled events the students liked best.

All students took part in the total program. Tests were given over each week's work, during which students were allowed to use their notes and brochures from each area. Our philosophy was that they need not memorize but should have some unforgettable



An old man-made canal and its wildlife were examined by canoe.

first-hand experiences plus notes to keep and refer to when they visit those parts of the state again. Students were allowed to choose credit in either science or social studies after they completed the course.

One of the main objectives of the course was to see how man through the ages has been influenced by and depends on his environment. In turn man uses and alters his environment for his own needs. We asked the students each day to reflect on what they had seen and to discuss whether they thought each natural or historic area was worth preserving or restoring. A post-course anonymous evaluation proved to the instructors that there were some very effective changes in attitudes and a very positive feeling toward the course. A reunion weiner-roast party in the fall was attended by every one of the class members. Many commented that the course was the best part of their summer and wanted us to plan another for next summer.

This kind of course could be adapted for a summer program in any state. Possibly it could even be worked into a two or three-week program combining subject areas during the school year. Of key importance is getting instructors from science and social studies who know their surrounding area well or are willing to do thorough scouting to develop a well-planned course that will be most meaningful to the students. Student fees can be based on estimated food, transportation, insurance, and campground cost. Station wagons, vans, or buses can be used, depending on the size of the group. A U-Haul can be pulled for equipment and locked at the campground if station wagons or vans are used. If families go along, a family car can be used for the wives and children. Our group thought families were a good addition. Students certainly got to know the instructors as more than just teachers, and the families added to campfire discussions, singing, and marshmallow roasts.

Learning can be exciting! It's a tremendously stimulating experience for instructors to see students really turned on by learning.

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