

uct of involvement with ES materials. We also want to deal more substantially with activities that help a teacher to sustain student involvement in particular subjects, once the involvement is elicited by the broad assignments we begin with. This leads us toward content of a kind that teachers are used to dealing with; however, once the classroom has been "opened up" this conventional activity is conducted in an entirely different context: the students make the decisions and choices rather than being led by teachers.

Environmental Studies materials, if used as we suggest, bring about the integration of science with other human activities. By giving students more freedom to choose the things they wish to work on, we find that large numbers of students who formerly disliked science have discovered that many aspects of science are fascinating. What we are trying to do is to remove labels from things. Once the label "science," with its connotation of the intellectual in his white lab coat, is destroyed, we can get down to business in helping students become self-actualizing learners who are able to put scientific activity into its proper—humane—perspective.

We feel that the job of the "biology" teacher is to encourage exploration of living things; to remember that human beings are animals, too, and thus are valid subjects for investigation in biology classrooms; to sustain and nourish the natural curiosity that young people bring with them wherever they go; and not to worry if students act unconventionally. Biology is everywhere around us, and if we free students to explore widely there is no way they can avoid things that we think of as included in "biology." Students who have developed an intrinsic motivation to learn more biology will, in cooperation with supportive teachers, develop their own more systematic, more "rigorous" ways of exploring the content in depth. Students who choose not to pursue detailed studies will at least go out of their biology courses with a positive attitude toward science and with a spirit of exploration that will enable them to learn more *on their own* or by seeking appropriate help when they wish to do so later in their lives. The purpose of the ES materials is to help teachers feel that they have permission to allow each student to develop along the path that is uniquely relevant to his own life.

Anyone wishing more detailed information about ES materials is invited to write to Environmental Studies, P.O. Box 1559, Boulder, Colo. 80302, for free reprints of pertinent articles and for free subscriptions to the ES/ESTPP newsletter.

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REFERENCES

EARTH SCIENCE TEACHER PREPARATION PROJECT. 1972. *The cut-*

- ting edge . . . or how to innovate and survive.* ESTPP, Boulder, Colo.
- GLINES, D. 1971. *Creating humane schools.* Campus Publishers, Mankato, Minn.
- GRIFFITH, G. 1972. Environmental Studies: a curriculum for people. *Science and Children* 9: 18-21.
- MASLOW, A. 1962. *Toward a psychology of being.* Van Nostrand Co., Princeton, N.J.
- ROGERS, C. 1969. *Freedom to learn.* Charles Merrill Co., Columbus, Ohio.
- ROMEY, W. D. 1970. ESCP: a project in transition. *American Biology Teacher* 32: 343-347.
- _____. 1971. The Earth Science Educational Program. *Journal of Geological Education* 19: 119-123.
- _____. 1972. *Risk-trust-love: learning in a humane environment.* Charles Merrill Co., Columbus, Ohio.
- SAMPLES, R. E. 1971. Environmental studies. *Science Teacher* 38: 36-37.
- _____. 1970. Toward the intrinsic. *American Biology Teacher* 32: 143-147.
- SILBERMAN, C. E. 1970. *Crisis in the classroom.* Random House, New York.
- WEBER, L. 1971. *The English infant school and informal education.* Prentice-Hall, Inc., Englewood Cliffs, N.J.

Trends in Graduate Education

Graduate enrollments and the number of advanced degrees in science and engineering increased substantially between 1960 and 1970 but they lagged behind those in other fields of study, according to the National Science Foundation.

The increase in graduate enrollment in all science and engineering fields combined was 109% during the decade studied. Social sciences showed the greatest increase, 163%. Mathematical sciences increased 159%; life sciences, 135%; and engineering, 77%. Physical sciences showed the smallest increase, 56%.

The figures are contained in *Reviews of Data on Science Resources*, no. 20, "Trends in Graduate Education in Science and Engineering, 1960-70" (NSF publication 71-15).

While the nation's 22- to 27-year-old population increased from 13.0 to 18.8 million—about 45%—during the 1960s, the number of students enrolled for advanced degrees in all fields actually increased 160%. This increase, which was 3.5 times that of the broadly relevant population group, has been attributed largely to the increased availability of graduate education; the pressures of more highly specialized employment requirements; the greater availability of fellowship, traineeship, and scholarship funds; possibly Selective Service policies; and the rise in general affluence.

The net result of differential trends among science and engineering fields and all fields over the past decade is that the total enrollment for advanced degrees in science and engineering fields declined from 38% of total enrollment in 1960 and 31% in 1970.