is fitted into a cabinet or some other out-of-the-way place. It is filled with about 8 kg of bran, into which a small starting colony of mealworms is introduced. Periodically a banana peel or a pineapple slice may be added for a change of diet or to conjugate the mealworms for easy collecting. Every six months or so the material should be strained and the finer material discarded; the larger can be returned to the drawer along with fresh bran.

Size of the drawer can be altered to fit one's storage space, but the depth of 15 cm seems to be required. For most elementary and secondary schools a single drawer should be adequate; if not, add another drawer.

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The Subversive Science

In recent months there has been much in the news and in science circles pertaining to the environment and the many problems mankind has created. A great deal of news about ecology has been widespread throughout colleges and school systems, and many students have been motivated to become action-minded individuals and do something about our environment.

It must be remembered, however, that ecology is not a new science; it has been around for many centuries, disguised under such titles as physical geography, natural science, or field biology. But today ecology has come to mean something slightly different from the original connotations. Today, ecology is not only interested in the delicate balance of ecosystems and the inter- and intraspecific relationships that exist between various populations and the communities, but is interested in man's role in the environment, his technology, his wars, and his thinking. In other words, many biologists feel that such a course in human ecology is quite controversial and subversive, and many shy away from giving students the political, economic, and scientific overtones needed to pave the way to a complete understanding of our biotechnosphere.

This semester, City College of New York is offering a newly created course in human ecology through the School of Education, which is given to graduate students teaching in the greater New York area. This course is an attempt to integrate the "subversive qualities" of our society with that of science. The course meets once a week for two hours over a 15-week period. Students from all disciplines, including the sciences and social sciences, are enrolled, and they show an enthusiastic interest as they work together and secure more of an understanding of man and his total environment. For the first time there are students of English, social studies, elementary education, engineering, sociology, and all the physical and natural sciences. The course has been warmly received and may be expanded upon for the coming semesters.

The main purpose of the course is to inform students of issues. By using an interdisciplinary approach, mainly the resources from all academic fields, we hope to solve or come up with controls to many of the "human" problems facing the world today. The course is divided into three basic sections. The first section involves the issues. Here is where we analyze and discuss some of the main issues of the environment. They include the political, economic, biologic, sociologic, and psychologic factors of man's relationship to his biosphere. The concepts, facts, and various case studies are given in order to keep the issues clear, and students readily grasp this information from various sources. Some sources used include the Scientists' Institute for Public Information; the various environmental committees of New York City; the journals *Environment* and *Environmental Education;* and various assigned books that include biologic, political, and economic overtones to the issues. Some of these books are Kenneth Boulding's *The Meaning of the Twentieth Century,* Peter Farb's *The Living Earth,* Barry Commoner's *Science and Survival,* and Harrison Brown's *The Challenge of Man's Future* and *The Next Hundred Years.* The basic reader for the course is Jack Bresler's *Environments of Man,* and this acts as a supplement to the discussion of issues and gives the students some insights into the various environmental problems from a biosociologic point of view. All of the readings have been well received by the students to date, and they find them interesting, informative, and challenging in terms of the urgency of the problems and crisis at hand.

The second section of the course is devoted to problem research. Here is where students attack a subversive problem, such as population control, pollution, radioactive wastes, or space ecology, to mention a few, and research the pros and cons of each issue and present them to the group. A detailed account of the history of the problems is undertaken and solutions are thought out on the issues and various suggestions are offered as to methods of approach to each of the problems facing mankind today. Students this semester have been involved in researching the facts and developing solutions in such areas as solid-waste disposal, noise pollution, venereal disease, and overcrowding. Methods for developmental research are beginning to emerge, and we hope this can be carried through in the research courses needed for the attainment of the master's degree.

The third section is devoted to action projects. Here students become involved in a particular project and take the necessary action steps, involving political, scientific, and sociologic power-structures, in order to change an existing problem or reshape it so it is less harmful to the environment. Many students have been involved in looking at garbage

dumps and taking political action to clean them up. In addition, many have been looking into the state and federal laws about pollution and have been involved in contacting legislators and informing them of these "old" laws and requesting action on their behalf. Some students have been taking surveys from people about their feelings on family size and population control. As one can readily see, the class is actively involved in the entire environmental "scene." They are not only learning about ecologic principles as they affect man but they are living and working with this "new" ecology and are emotionally involved in the course.

The greatest aspect of the entire course is the breaking down of the academic barriers and having students from all fields of study work together in an endeavor to learn and find out more about their environment, and how each can contribute. This so-called interdisciplinary approach is working, and it can work if we use a model in which students can participate and give their insights into the problems and are willing to scratch heads together in order to develop a program that might work. We no longer can divorce ourselves from the other disciplines, but we must work, each of us, to bring together these vast fields of knowledge in order that mankind and the environment can benefit.

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A Study of the Needs of High School Biology Teachers

The knowledge explosion and the impact of the new curricula developed for high school biology instruction by national study groups, such as BSCS, have caused a scientific subject-matter content and competency lag for present-day high school teachers of biology.

In an effort to assist in updating the content background of biology teachers in the high schools, the departments of education and biology of Wagner College, with the aid of a faculty research grant, conducted a questionnaire survey of New York City biology teachers. The purpose of this teacher survey was to ascertain deficiency areas in biology background; to discover major interest areas within the biologic sciences; and to create a program for secondary school biology teachers to alleviate deficiencies and to update and expand the major interest areas.

The survey was accomplished by use of a questionnaire consisting of 245 content items organized into seven units. The content items closely paralleled the material covered in the New York State biology syllabus. The teachers were asked to judge each item on a three-scale rating: "high," "medium," "low." "High" indicated a desire for more in-depth information; "medium," for more general information; and "low," if no further information was sought.

The science department chairman of every New York City high school was contacted to determine the number of questionnaires that should be sent to each school. A total of 85 high schools participated, including local Staten Island private and parochial schools. 56 high schools responded—over 300 individual replies, for a return of 66%.

The results indicated that there were 95 items that had a cumulative "high" rating of 100 or more. ("100" out of approximately 300 possible "more in-depth information" ratings was an arbitrarily chosen number selected for inclusion of this item in the proposed program.) The areas of primary concern for the teachers as reflected by the questionnaire were within the realms of ecology, genetics, and evolution. In addition, recent information on certain aspects of human physiology and of cellular processes in both plants and animals was requested.

The survey reflects a concern shared by a large segment of our society for the great environmental crises that have recently come to light. Ecology, evolution, genetics, and certain aspects of physiology were rated "high," since they are intimately related to many of the problems created by our modern technology.

A program was devised to meet the needs as ascertained by the questionnaire. This proposal emphasizes selected aspects of biology content with an orientation towards current ecologic problems. For example, this program includes a study of the world population explosion, with an orientation based on reproductive physiology; and an analysis of the effects of air and water pollution on ecosystems, on organisms, and on cells, with respect to such processes as respiration and photosynthesis.

The program will provide a means for sustaining and intensifying interest from both an academic and a practical point of view. With this exposure, high school biology teachers should be better prepared to cope with the demands of today's biology courses and to keep abreast of the current knowledge explosion.

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Guarding Your Thermometers

As part of an effort to develop a program in environmental education, an outdoor biology program for children in grades 4 to 6 was initiated at the University of California Botanical Garden, at Berkeley, during the past summer. A lesson on determination of thermal gradients was developed as part of that program. The purpose of this particular lesson was to show quantitatively the temperature dif-