

Exxon: The Challenge to Innovate

Drew Faust and Robert Kohler wanted to learn more about war. Iraj Zandi and Ian Harker were looking for a way to introduce future engineers and geologists to the perspectives of the economist, the sociologist and the regional planner so that these future energy planners could make informed decisions on our energy policy. Frank Bowman and Michele Richman were anxious to develop a program on French culture that would make use of audio-visual materials, native speakers and primary sources.

Each of these faculty members—and many others—are drawing on the Exxon Academic Development Fund to achieve their goals. The Exxon agenda is broad and usually risky for a foundation. The purpose of the fund, according to the language of its proposers, is "to enable the University to accelerate the establishment of integrative educational programs that span disciplines and schools and allow advanced undergraduate students to conclude their major programs with an experience which would add a broader perspective to their discipline-oriented studies."

Faculty members who had been seeking to do just that responded with dozens of proposals.

"It was an invitation to do something novel. It offered the occasion and the resources. It would have taken years to get around to doing this!" said Robert E. Kohler of the department of History and Sociology of Science who has developed an Exxon program on War and the American Experience with Drew Faust and Janice Radway of American Civilization and Thomas P. Hughes, also of the department of History and Sociology of Science.

"Cooperation takes time," explained Professor Faust. "And it would have been easier in some ways just to teach a course on war and say, oh yes, Rob Kohler's probably going to do that someday. Instead we sat down and talked about it. And that's been valuable to us both as scholars and as teachers, and I think it will be valuable to students as well."

The idea of integrating disciplines, crossing school and departmental boundaries and offering undergraduates alternatives to the progression of increasingly specialized advanced

courses that are the hallmark of a research university has long been of concern. The 1973 Development Commission Report called for greater links between undergraduate schools and undergraduate and graduate education: the Faculty of Arts and Sciences was created in part to integrate programs of study. The \$600,000 provided by the Exxon Foundation will enable the University to move further toward this goal.

Iraj Zandi, professor of civil engineering, a leader of the Exxon program on Energy and Mineral Resources, explains the importance of the programs being developed through support from the Exxon fund.

"This fragmentation that exists in education does not allow students or faculty to sit down and think about a subject at leisure and in detail. The Exxon fund enables us to study a subject over and over from different angles so that finally consciousness can be developed. That, I think, is very significant in helping students develop a synthetic point of view for dealing with a problem."

Or as Peter Conn, associate dean for undergraduate studies, puts it, "The



Exxon proposal said we want our students to achieve simultaneously that increased sophistication we associate with majoring in a subject with a continuing sensitivity to the breadth of issues that are implicated by any given question."

For undergraduates in French, this has translated into "French 27: Modern France 1789-1944," a program on French culture, history and politics developed by Professor Frank Bowman. Using funds from the Exxon Academic Development Fund, Professor Bowman has created a videotape for each week of his semester-long course, which deals with subjects from philosophy to art nouveau, from religion to French cuisine.

Professor Bowman enlisted native French speakers to narrate hour-long videotapes containing 120 slides each week ranging from historically significant art to maps and battle photographs. His course materials are part of a departmental resource center that has been developed with Exxon funds and includes primary sources and documents as well as slides and videotapes.

"... our goal is to help produce the future business person, diplomat, lawyer or scientist who can disprove the widespread and perhaps all too justified French conviction that Americans cannot speak French, know nothing about France, and are generally ignorant of other cultures," reads the French program's Exxon proposal.

For University faculty who are interested in ethnohistory, Exxon funds were critical in moving the program from a faculty seminar through a series of intermediary steps to undergraduate courses. Since the early 1970s faculty from history, anthropology, folklore and other departments have been meeting as a faculty seminar to share common interests. They had expanded the seminar to include graduate students and used it as a forum for introducing them to the field. When the Exxon guidelines were distributed, it provided these faculty members with the impetus to see whether an undergraduate course could be developed. Using a small grant from Exxon, Nancy Farris, Sandra Barnes and others in the faculty seminar worked with a research assistant to develop a bibliography, which they have since computerized. Based on the wealth of material they found, they are now teaching a course entitled "Sacred in Society," the first ethnohistory course for under-

graduates. They are proposing a course in oral traditions and their development and have received encouragement to establish a major track within the History department.

The Biological Basis of Behavior became a major four years ago and is now one of the largest majors in the College. Its students take courses in such departments as biology, psychology, anthropology and anatomy. Exxon funds have enabled faculty to create a core course, "Neurobiology," that provides a rigorous introduction to the structure, function, biochemistry and pharmacology of the central nervous system. The course, which includes a laboratory section, helps students pull together all of the many pieces of this interdisciplinary program. Exxon funds were used to bring in people from three different schools within the University for the course. Faculty from five different departments are now teaching "neurobiology" to about 43 students.

One unexpected aspect of the innovations that have come out of the Exxon programs relates to teaching methods, observed Kris Nicholls, assistant dean for administration in the College. Several programs have developed sequences rather than a single course. Generally senior faculty from more than one department are involved in teaching the programs. The professors also draw on much more than reading, lectures and discussion to present their materials. In Energy and Mineral Resources, the two faculty members take students on field trips to power plants, a steel mill and a coal mine. Experts from outside the University have also been a key part of the teaching approach in several courses. For example, the director of the humanities division of the Rockefeller Foundation joined the seminar on The Philosophy of Education program, and a member of the Research Division of Exxon spoke with students in the Energy and Mineral Resources program.

The Exxon Fund has been valuable to all those who are advocates of curriculum change and innovation.

"What Exxon has helped us learn is what we already knew, which is that faculties are immensely creative," said Peter Conn, "but that the emphasis of recent years on sound fiscal management provides at least as much of an obstacle as an incentive to significant change."

The budget process makes it particularly hard for the smaller departments to change. Who is going to teach Drew Faust's graduate courses or her popular southern history course while she prepares for and teaches an untested course on war? How can the History and Sociology of Science Department afford to have two senior faculty members team-teach a course for 17 undergraduates?

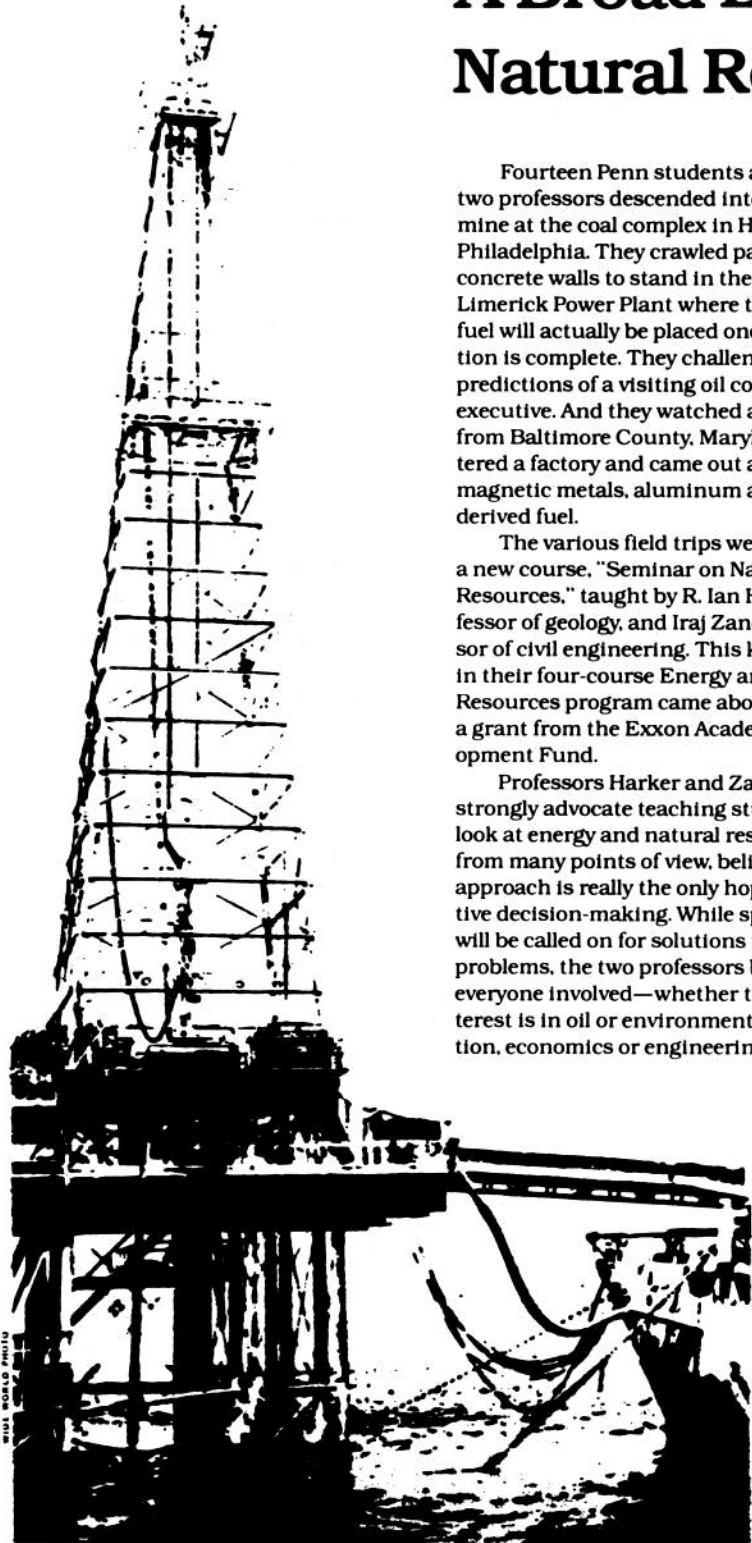
As Professor Conn observed in a recent memo to undergraduate deans, "It is rational to expect that the decade of the 80s will see the contest over resources within the University becoming even sharper. Under such circumstances, the preemptive claims of traditional departments and their pedagogies will become ever more compelling. It is, therefore, also rational to expect that innovation will become more difficult just when it's most needed."

To Peter Conn, the most important outcome of the Exxon program is the way it has stimulated faculty creativity. And it is this, rather than any specific curriculum change, that he feels will be the Exxon Fund's greatest legacy.

Earlier in the fall Professor Conn proposed that the University create a long-term Undergraduate Academic Development Fund. The Provost has just approved this proposal and will use the remaining Exxon funds as seed money to begin the fund, which will support faculty who are anxious to develop new programs.

"In spite of the dispiriting battles they have to fight to promote even modest curricular reform, many of our faculty willingly take up the challenge each year," Professor Conn noted. "Typically, the help they need is shockingly small: release from one course or a summer grant for planning; a bit of secretarial help; a few phone calls; money for inexpensive equipment or field trips. In return for such marginal investment, the University and its students almost always realize a handsome return. An undergraduate development fund would make such investments possible and would help to make innovative activity more visible and consequential. Indeed, such a fund would not only facilitate innovation, it would predictably increase it. The very presence of the mechanism would encourage its use."

A Broad Look at Energy and Natural Resources



Fourteen Penn students and their two professors descended into the deep mine at the coal complex in Homer City, Philadelphia. They crawled past 15-foot concrete walls to stand in the core of the Limerick Power Plant where the nuclear fuel will actually be placed once construction is complete. They challenged the predictions of a visiting oil company executive. And they watched as trash from Baltimore County, Maryland entered a factory and came out as glass, magnetic metals, aluminum and refuse-derived fuel.

The various field trips were all part of a new course, "Seminar on Natural Resources," taught by R. Ian Harker, professor of geology, and Iraj Zandi, professor of civil engineering. This key course in their four-course Energy and Mineral Resources program came about through a grant from the Exxon Academic Development Fund.

Professors Harker and Zandi strongly advocate teaching students to look at energy and natural resources from many points of view, believing this approach is really the only hope for effective decision-making. While specialists will be called on for solutions to specific problems, the two professors believe that everyone involved—whether their interest is in oil or environmental pollution, economics or engineering—must

learn the basic language and life cycle of energy and minerals to make informed decisions about these resources.

"The scientific method of inquiry has enabled engineers and scientists to examine large and complex problems in the physical world..." they asserted in their Exxon proposal. "This method has proven extremely successful in dealing with the world of matter and energy, but rather ineffective in the world of man. It has enabled man to reach the moon, to harness the energy of the atom, to master global communications, to invent the computer and beget tens of thousands of useful and not-so-useful things.

"In the midst of all of these technological triumphs, and partially as their direct result, human societies face problems that are by and large, proving more subtle and difficult to handle. The fact that man can travel to the moon, but is unable to devise a better transportation system in earth, is not because the professionals involved are less imaginative and intelligent than those in the space program, but rather that transportation has an added element that was absent in space endeavors... Transportation is a socio-technical problem, not merely a technical problem as the moon journey was..."

Thus the geologist and the engineer are turning to regional scientists, sociologists, economists and others to bring these perspectives to the 15 or so students who are enrolled in each course. They are anxious for their students, whose fields include engineering, anthropology, international relations, geology and business, to learn to move beyond the narrow focus of a single discipline.

"You come to me and say we are running out of electricity," explained Professor Zandi. "Very likely as an engineer, I would answer, 'Build a new power plant.' You ask the same question of a sociologist, maybe he or she would say, 'Can we manipulate the demand?' or an economist would say, 'Well, we need more capital,' or 'Raise the prices.' We're trying in these courses to teach the students from

different fields to think in this interdisciplinary fashion."

The first two courses are largely taught as lectures and are titled "International Mineral Resources" and "Resource Utilization and Impact Assessment."

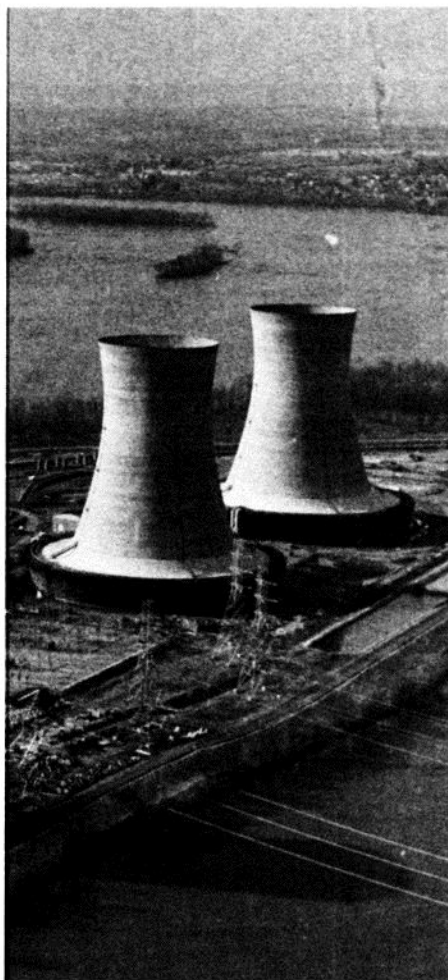
"In the first course we are saying where the material is and in what form it occurs, how it got there and who has it, and the second course goes on to tell you how you will utilize it and what is the impact of its utilization," summarized Professor Harker.

Both of these courses introduce the students to the energy life cycle and provide them with the information that they later draw on in the seminar. Professors Harker and Zandi have offered these two courses before, but they have now coordinated the material for the Exxon program. This year Professor Harker has added a new course on Mineral Economics.

Most of the Exxon funds were used for the Seminar on Natural Resources, which Professors Zandi and Harker teach together. Here they help students learn to see the impact of any one issue on the many other facets involved with energy and natural resources and to begin to weight and balance competing alternatives. Each week the class either takes a field trip or brings in an expert in one of the areas of natural resources along with a third Penn professor for a campus seminar. In eight field trips the class has visited energy facilities ranging from the Eddystone Power Plant to Bethlehem Steel's works to the Plasma Physics Lab at Princeton.

"It's a whole different thing to talk about a nuclear power plant and then to suddenly realize you're standing at the core, where all that nuclear activity occurs," asserted Professor Zandi. "When you talk in class about the conversion process, you put the power plant on the blackboard, and you say, 'This is a power plant. It produces so many thousands of megawatts!' It's a whole different world when you go into this power plant—this huge 20-story building—and you go down in the basement and see a million pipes going in every direction. The students are faced with the reality and the implications of the black boxes they see on the board."

The field trips give students and faculty alike a chance to see not only the complex processes that have been devel-



oped, but sometimes the process that has yet to be achieved.

Professor Harker observed, "I think the interesting thing about the Plasma Physics Lab was to get the feeling of how far away we are from having a viable fusion reactor to really provide us with any meaningful amount of electricity. You read the kind of blurbs that come out of the news, which usually describe things that have been said in an effort to conjure up more support from Congress, and the statements that come out from the newspapers in this context certainly gave me a very different impression from the one I had by actually going to see the operation. We got a better feel for some of the enormous technological barriers that have to be overcome."

Another important outcome of the field trips, which have clearly been exciting for both students and faculty, is what Professor Zandi calls sympathy. "You go

into a coal mine, and the first thing they do is put in front of you a disclaimer that the company's not responsible for your safety or your life. And that's the first shock that comes. You can see it in the students' faces.

"Understanding the coal miner and the kind of working conditions he's dealing with is I think of great value for anyone who might become a manager or a decision-maker in a company someday."

Students enrolled in the Energy and Mineral Resources program have heard economists lecture on commodity stabilization and monopoly trade. They have heard geologists outline the location of minerals, and engineers describe the way nature assimilates pollutants. They have met with researchers and managers from the U.S. Geological Survey, Consolidated Coal, Philadelphia Electric, Exxon, and Homer Research Labs of Bethlehem Steel Corporation.

Through these differing perspectives students are challenged to look at the life cycle of energy, as Professor Zandi calls it, to see, for example, how recycling paper, which is good for the environment, reduces paper production. A drop in paper production in turn reduces the need for trees, which in states like Oregon has a significant impact on the regional economy.

While they are committed to developing broadly informed decision-makers, the two professors stress that the solutions themselves will come from people who are well trained in the appropriate disciplines. For example, once decision-makers have defined the need for more energy as the need for more oil, geologists will find the oil, and engineers will create better drilling tools.

Professor Harker, who was in industry for many years, believes that well-informed energy or resource managers are rare:

"Even with the speakers we get, we find that the coal man who understands all about coal mining doesn't know beans about a nuclear power station. And you get somebody from a power station, and you can tell that they really haven't much idea about what goes on in a coal mine—how coal is formed, how it has to be extracted. But I think that our students will go out with a much broader background and a greater appreciation of these other very important parts of the whole energy system."

War: Casting Society's Values Into Relief

A British soldier in the trenches on the Continent sighted a German soldier through his telescope—but decided not to shoot because he could see that the German was taking a bath.

Fritz Haber, an intensely moral man, created the synthetic ammonia that enabled Germany to make explosives prior to World War II and supervised the first use of poison gas.

While their husbands were off fighting the Civil War, many ladies of Richmond preferred to starve, rather than take a white collar position with the Confederate government, a position they feared would diminish their femininity.

These contradictory, bewildering and terribly human reactions to war point up some of the reasons why four faculty members from American Civilization and the History and Sociology of Science decided to develop a series of courses on War and the American Experience.

"In times of war a society's values are cast into relief, and people have to make ultimate decisions about what's important to them and what they want to preserve," asserted Drew Faust, associate professor of American Civilization. The issues of war are under consideration in three interrelated courses: "The Culture of War," "War and American Literature," and "Science, Technology and War." They touch on subjects ranging from the effects of war on blacks to the arms race, subjects that have traditionally been given little attention outside of R.O.T.C. courses.

The program also fits in well with the purposes of the Exxon fund. As Drew Faust sees it: "I think the courses are a very good teaching device because it allows undergraduates to bring together knowledge of a vast variety and to try to integrate it within a narrow framework. We're very excited about using science and scientific knowledge together with humanities and social science in this course."

What is war? Faust will ask her class. How does it differ from random violence such as mugging? How have people defined what is acceptable in war—as did the British soldier—and how have the values changed in recent wars?

"We have to explore how conventions have fallen away over time until today it's much harder to tell the difference between war and terrorism," she noted.

The structure of war will also occupy the class. "It's like a little society in itself,"

Professor Faust explained. "It has a place where it goes on. It has an army, which is the social order that organizes it—and the soldier has a certain social role."

In her course, which she will offer next fall to introduce the series of three courses, she will also deal with the social impact of war—how war changes the world surrounding it.

The ladies of Richmond refused to permit their place in society and the definition of womanhood to be one of the changes that was wrought by war. But blacks have capitalized on wars to change their role. During the Civil War the debate over whether blacks could serve as soldiers was finally resolved by the acute manpower shortage, and blacks moved to use the war as an opportunity to show that they were as brave, as manly and as worthy as whites, according to Professor Faust. It was an opportunity to make a place for themselves in the national consciousness as equals; their role in the war became a source of black pride.

World War I and World War II helped to raise the consciousness of blacks. In World War I many blacks saw Europe for the first time and realized that the role of blacks was significantly different in countries outside the United States. During World War II A. Philip Randolph threatened a giant March on Washington which would have been very embarrassing for the nation. His message was, according to Professor Faust, "If you're going to risk our lives in this war, then we have to be treated as if our lives are worth something."

Professor Faust will also raise the complicated issue of war's impact on the economy. She and her students will consider the extent to which war provides a way of recovering from economic depression and to what extent this dictated pol-

icy prior to World War II. She will also touch on the importance of the armament industry to the economy.

These issues lead directly into the History and Sociology of Science course on Science, Technology and War.

"We want to look at how technology out of control, through its momentum, carried people to war—the way in which the destructive power of technology has caught society by surprise," explained Thomas P. Hughes, professor of history and sociology of science. "Wars have been much more terrible than diplomats and military strategists believed they would be."



Major Martin R. Delany was the first Negro officer to hold a field command in the Civil War.

"Scientists and engineers get involved because of the highest moral and patriotic feelings," explained Robert E. Kohler, associate professor of history and sociology of science, who cites synthetic ammonia inventor Fritz Haber as an example. "Often the nation is under attack. They have the skill to help the country and they plunge in. They just get started and are in it before they know it."

The two professors, who will teach the course together, will begin by looking at the biographies of some key scientists and engineers. "We will discuss them without making the facile assumptions that they should have known better," Professor Kohler continues.

"We also want to relate the immediacy of the battlefield to the austere environments of the laboratories and workshops in which the means of war were developing," said Professor Hughes. "There is a dramatic juxtaposition of the laboratory researcher who was inventing and developing arms and the foot soldier who was experiencing the horrors of the battlefield. The austere environment of the laboratory kept those in it from realizing the realities of war itself."

Professors Hughes and Kohler will then look at the dynamics of the arms race and will consider the difficulty of distinguishing politics and technology. One example they will use is the great naval arms race between England and Germany during the late 19th and early 20th centuries.

"This race produced a state of mind that led many to see armaments as a solution to national problems," said Professor Hughes. "Many industrialists and workers had their economic and professional well-being deeply imbedded in armaments."

"The existence of atomic weapons predisposes civilization to rest their defense on them," Professor Kohler pointed out as another example. In their course they will consider the decision to use the atomic bomb and the way politics and technology were completely intertwined in that decision.

Professor Kohler, who became interested in teaching on war both through his course in "Science Since World War I" and through the events of our times, will urge "students to use history to undertake an intelligent search for alternatives to war."

"War and American Literature," another course in the sequence, will



address such questions as how writers have changed the role of communication and language during war. Janice Radway, assistant professor of American Civilization, will take up such issues as the effect of literature on war with a discussion of Harriet Beecher Stowe's *Uncle Tom's Cabin*. She will discuss World War I as the crucible of literary modernism with such works as John Dos Passos' *1919* and e.e. cummings' *the enormous room*.

Much literature, Professor Radway feels, is about language, and such significant cultural events as war change the meaning and nature of language and people's beliefs in its properties and possibilities.

Each one of the three courses on war will be limited to about 17 students, and those who want to enroll in more than one course will be given preference. At seminars for everyone involved in the three courses, both the professors in each course and professors from other universities will present their research on war.

"I think that to expose the students to that level of interaction will be very instructive for them—seeing the whole process of how one defines a research area and how a scholar presents material in a seminar," said Professor Faust, who hopes to present the work she is beginning on the reactions to William Sherman's march to the sea at the end of the Civil War.

In describing how she got involved in the course, Professor Faust explained, "I found that when I took American history

courses, we would skip the Civil War. The Civil War took place over Christmas vacation, and the teacher never wanted to talk about wars and battles...." a reality that she ascribes to her education in women's schools and to the fact that war was generally the subject of study by military buffs and historians which meant that those with more general interests tended to shy away from it.

"I started teaching a course where I was dealing with the Civil War. I decided I would not skip it. So I sat down and dutifully started studying it, and I was just fascinated by it. The kids were fascinated by it. And I thought, there really is a need for this."

After developing a general honors course on war, she became even more convinced: "I realized that I would never know enough to teach this course the way it should be taught. I was talking to Rob Kohler one day and he was telling me how he thought he wanted to work on war. And when I was teaching *The Red Badge of Courage* I talked to Jan, and she had a lot of things to say about literature and war. And I thought, well, why don't we organize ourselves into some kind of situation that will force us to really talk about this, because we all want to, and where our knowledge can be of benefit to undergraduates."

The Exxon fund, as Professor Hughes put it, "... gives us the chance. It says, if we exert ourselves to innovate in the curriculum, there is moral and material support."

Philosophy of Education: Shaping a New Identity

Three University of Pennsylvania philosophy professors—Elizabeth Flower, Abraham Edel and Zoltan Domotor—are engaging undergraduates in their search for new paths in the philosophy of education, in a series of three courses supported by the Exxon Academic Development Fund.

"We are exploring how the resources and methods of philosophy can play a more constructive role in the problems presented by education," explained Dr. Flower. "The project was stimulated by the present crises in education and the fact that philosophy of education itself is at the crossroads."

For the some thirty upper classmen, it was an exciting journey in open-ended research in which questions had to be designed as well as tentative answers proposed. The class, together with their team-teaching professors, confronted educational concerns from such concrete issues as grading to ideals of equality of educational opportunity and appropriate educational goals in third-world countries.

Conceiving education broadly as the development, transmission and critique of funded knowledge and experience, the course made a main point of enlisting people from different disciplines to see how they would frame and explore the issues. It has brought the students into contact with such scholars as Ernest Nagel, philosopher of science from Columbia; Helen Block Lewis, psychoanalytic theorist from Yale's psychology department; Joel Colton, historian and former director of the Humanities Division of the Rockefeller Foundation; Oscar Schachter, professor of International Law at Columbia and former head of the United Nations legal division.

"The whole character of the philosophy of education has undergone major transformation during the twentieth century," Professor Edel explained. "In the early part of the century, philosophy of education was approached more

through the different philosophical schools, each of which tried to work out its distinctive educational emphases. This meant starting with a whole philosophy—Idealist, Thomist, naturalist, pragmatist, etc. And of course this is still carried on by the newer philosophical movements. After World War II analytic philosophy became a dominant influence, with its emphasis on conceptual analysis. It brought rigor and precision to such ideas as *knowledge* and *teaching and learning*. But too often the analysis was carried out in isolation from the lessons of educational practice. For example, if the philosophers distinguished *knowing-that* from *knowing-how*, then the educational practitioners would develop their corollaries: *teaching-that* (verbal, classroom experience) and *teaching-how* (apprenticeship learning).

"The question now is how to secure a genuine cooperation of theory and practice, philosophy and education, that neither legislates the philosophy for education nor carries out its analysis in isolation from the detailed impact of practice."

Accordingly, the course began with perspectives on the relation between philosophy and education. They first took a systematic philosophy (Plato's *Republic* as a case study) and saw what educational bearings it had and where educational problems entered. Then, in contrast, they took a practical educational problem to see how quickly philosophical problems emerged. The problem they chose was grading, and they were led on to questions of merit and desert, student accountability, the role of competition and the competitive character of our culture, and whether job certification and career advancement have a place in the grading system.

To bring another perspective Arjun Appadurai of Penn's Anthropology department described how our education and its institutions might look to an observer outside of our culture. This "to

see ourselves as others see us" technique both startled the class and stimulated the effort to distinguish the common human aspects from the variable elements of education.

Michael Katz, professor of educational history at Penn, considered with the class different contemporary ideologies in education and their interpretation of the history of the public school system. This led on to a discussion of values in this and succeeding meetings—problems of elitism, how education is involved in "high" and "low" culture, and what is the relation between education and democratic ideals.

The second part of the course was a kind of "exploratory fishing into science, art, humanities and law," according to the team.

The first expedition was with Ernest Nagel. He reviewed the long history of Columbia's effort to design a core science course for all students. He posed the problem of why core courses have been successful in other fields but not in science. He then explored the problems and difficulties in designing a course that would be suitable for both non-science students and students of different sciences that would convey the sense of scientific method, a specific body of scientific knowledge, and the place of science and technology in our culture—the essentials for a responsible and educated citizen.

Nelson Goodman of Harvard's philosophy department offered a distinctive view of the educational character of art. Instead of looking to aesthetic modes of appreciation and feeling, which are often taken to distinguish the aesthetic from the scientific, he presented art as cognitive, as opening new ways of seeing the world.

In light of the widespread discussions about the report of the Commission on the Humanities, initiated by the Rockefeller Foundation, the class invited Joel Colton, who was director of its Humanities Division when the report was developed, to discuss the role of the humanities in American education. The letter inviting him pointed out that there had been no students on the Commission itself, and would he like to get their point of view. The result was a very lively discussion.

Oscar Schachter, drawing on his experience in the United Nations, discussed the learning necessary in prepar-

ing for membership in a world community, especially where genuine conflicts of interest have to be resolved in the absence of decisive power. It left the class in a somberly realistic but not altogether despairing mood, according to the Penn philosophers.

Teaching and learning, the third part of the course, turned to controversies over the meaning of *teaching* and of *learning*, indoctrination, teacher accountability, rationality and the ideals of teaching, different models of the "pedagogic encounter," along with psychological aspects of teacher-student relations and the educational effects of different views of human capacities.

Helen Block Lewis, combining experimental work in the psychology of individual differences and psychoanalytic depth studies of shame and guilt, discussed the affective aspects of male-female differences and their impact on

the educational process as regards both students and teachers. As she anticipated, class discussion itself illustrated some of the theses presented.

Zoltan Domotor lectured on models of artificial intelligence and the varied assumptions they make about our built-in learning capacities, as well as how such differences are exhibited in styles of teaching.

Finbarr O'Connor of Beaver College's philosophy department and participant in the current Beaver-centered National Endowment for the Humanities project on strategies of reading, writing and problem-solving, discussed the present state of the theory of problem-solving and the classification of intellectual capacities. He showed how the hardened categories of such classification perpetuated curricular divisions into the arts, sciences and humanities.

Next semester will offer a second course called Problems of Moral Education and Moral Philosophy. This will be followed in the year after by Special Problems of Educational Philosophy in a World of Change.

The instructors hope that by the end of that period the materials will have shaken down sufficiently to become a standard offering of the Philosophy department, although they hope it will never lose its experimental character.

For the students, whose participation Elizabeth Flower describes as tremendous, it has been a very unusual opportunity. They have not only had the extraordinary resources of the three senior faculty members and outstanding speakers from outside the University. They have had the chance to be on hand for one of those rare moments when a field of study is actually shaping a new identity.



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