

that only time will tell whether or not such-and-such a figure or event will be a landmark in history demonstrates this fact – the history of the future is unknown. The history of the present can be guaranteed to be confused and biased, and confusion and bias have no place in education. Indeed, historians devote time to eliminating these difficulties in past history with imperfect success.

Science can be pure; that is, the laws of centrifugal force can be understood as to what they are and how they got that way, or they can be applied. The latter is relevance, pertinent to training for various tasks, but not pertinent to the basic education which precedes it.

Philosophy was once a profound inquiry into man's reasoning, studied relative to such classics as have come to be regarded as examples of man at his most profound. Now, seeking relevance, it gives way to the relatively recent stress on linguistics, or takes advantage of the great breadth of its field to proclaim on current sociologic matters.

Mark Twain once remarked: "We all do no end of feeling and we mistake it for thinking." Relevance comes from feeling; the campus is dedicated to thinking. Colleges and universities are trying to make their bulletins so attractive that their main messages are lost. Their current messages cater to urges, feelings, and whims in such colors that attention goes to the colors. The advertisement gets wide attention; but no one recalls what was advertised.

Because of the obvious need for answers to current problems,

there is a strong inner urge to seek them. Unfortunately, the feelings of need and urge do not produce answers, no matter how high the pitch. Answers will come from men and women who combine a sound background with a direct aptitude for, and interest in, the specific problems, rather than in the abstractions of the background. Professors and students deal in laws and formulae; citizens, who are often alumni, but need not be, deal in automobiles and answers. The newspaper, telephone, television, and radio make of current events portentous interruptions to the pursuit of foundational knowledge and wisdom to which students and faculties, when they accept the responsibilities which are assigned to them and which they claim, will devote themselves.

When that master of music, Duke Ellington, was giving a concert in Carnegie Hall, news came to him of the assassination of Martin Luther King, Jr. Ellington went to his room and closed the door for about 20 minutes. Then he returned, asked someone he knew for a brief prayer, and continued – *with his music*. Though at times relevance can intrude painfully, education should stick to its duties. Education, when not seduced by the relevant, properly deals with the past. That is not a sin; it is a realistic acceptance of the fact that the way that we can go next week is determined best by study of the way we went last week, a way that is now there to study.

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## AGRICULTURE FOR NON-AGRICULTURAL STUDENTS

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An elective course designed to give non-agricultural students an appreciation of the role of crops in man's welfare was given for the first time at the Ontario Agricultural College, University of Guelph in 1972.<sup>(1)</sup> The course title, "Harvesting the Sun," was taken from the book with the same name and proved to be effective in attracting student interest in the course by arousing their imagination. The course was offered through the Department of Crop Science. The 41 students who enrolled submitted a very favorable course assessment and aroused faculty interest as to the possible value of this and similar courses not only for non-agriculture students but to the non-agricultural segment of the community at large. This paper is therefore an attempt to outline the reasons for introducing such a course, to present briefly the course content and to discuss possible reasons for the success of the course.

### Expanding Role for Colleges of Agriculture

In the past, colleges of agriculture have fulfilled their obligations by providing well-trained and highly qualified graduates in agricultural science, by providing research information pertinent to their geographic area and the scientific community at large, and by extending new and applicable research findings to the agricultural community.

Agriculturists have failed, however, to seek wider audiences for their subject matter on their own. Indeed while most agriculture curriculums have included more and more humanities and social sciences, little effort has been made to design agriculture courses for the students in the general sciences, humanities or social sciences. Since all people are consumers and since many of the issues of agriculture are directly or indirectly related to man's everyday activities, it seems imperative that more people have a broader knowledge of some of the fundamental issues of agriculture. Certainly the calibre and scope of some agronomic courses suggest that wider audiences should be sought.

In view of the diverse responsibilities of agricultural colleges, perhaps they cannot be blamed for not providing broad agricultural courses to the non-agricultural segment of the student

body. Such courses have not been requested by non-agricultural students, perhaps because the amenities of life and the future food supply have come to be taken for granted, at least in North America. Interest, however, has peaked recently by the growing concern about the quality of life, environmental pollution, feeding the expanding world population and fossil fuel energy depletion. Agriculture can contribute positively to the alleviation of these problems and although the high-pitched enthusiasm of environmental issues may diminish as the fad passes, the problem will not go away. Just as the agriculturists came to realize the importance of the humanities in their curriculums, so too the arts and social scientists have come to realize the enduring essentiality of applied biology in their curriculums. The desire for an awareness of these problems, to know if agriculture can feed future generations, to appreciate the factors associated with continued soil productivity, and the extent to which agriculture with its arsenal of chemicals has contributed to the destruction of the environment, has produced a desire for a series of courses to provide appropriate answers.

Waiting for requests for such course may not be enough. Aggressive action is needed. Student agitators have demonstrated their ability to arouse the uninformed, who, through mass action, have demonstrated their growing power and ability to regulate agricultural practices by limiting the use or even eliminating some agriculturally useful chemicals. In the course, "Harvesting the Sun," students have expressed surprise that agriculture has remained so silent on such issues as the importance of pesticides to crop production, the limits to organic farming without the use of chemical fertilizers, and the farmer's share of the weekly grocery bill. Not only is it imperative that agriculture reach students, but the average man on the street must also be informed. If agriculture is to continue to receive public funds and moral support, more people must be informed clearly and honestly of the contribution of agriculture. What better place to start, than with the contribution of the primary converters of energy – plants – have to make towards solving the food, fibre

and fuel problems? As well as the contribution of plants in concrete terms. students must be made aware also of the aesthetic contribution plants can make towards today's problems.

A positive approach must be taken. As well as an awareness of the issues facing man, an essential objective must be to try and indicate solutions or alternatives that agriculture can offer. Most articles, editorials and books clearly portray the problems, but few offer any solutions or alternatives to the dilemmas facing man. Indeed, many writers portray the situation as hopeless. This attitude may lead to feelings of dismay, despair and gloom amongst people in relation to the biological issues facing man. Feelings of futility, gloom and despair will add to the problems, rather than solve them. Despair is associated with the idea that man is on an irreversible path. While agriculture is not a panacea to the world's problems, the intelligent use of plants has helped bring about the Green Revolution in Asia<sup>1</sup> and the intelligent use of land resources and plants can still feed many more people. In addition, plants contribute significantly to the quality of life. A positive attitude is not generally the approach of the ecologist, geographer or zoologist who often believes that action can only be precipitated by fear or despair.

Since plants are universal and since all men must eat, "Harvesting the Sun" offers an excellent opportunity to introduce an international viewpoint. Perhaps it is through the plant sciences that progress towards the idealistic dream of greater unity among men can be made.

Unless rapid action is taken, agriculture may lose the opportunity to provide such courses as geographers and ecologists will seize the opportunity. In an era of formula financing whereby student numbers in each course are used to justify academic positions, course offerings are jealously sought and once established are closely guarded. Administrators are hard pressed to prevent unnecessary course duplication even though interpretations may vary widely.

#### Course Content

Since "Harvesting the Sun" is presented by a crop scientist, it is only natural that emphasis is placed on crops. The relationship and dependence of man on field crops and on the factors affecting world crop production are stressed.

The course is given over a 13 week period with three, 50 minute lectures per week. The following areas are covered:

- I. The first four lectures deal with the problems facing man, and the historic struggle of man to obtain the necessities of life. Modern aid programs, their history and development and future are discussed. Since "living space" is a top priority of society, the environmental benefits of intensive crop production through the release of land by increased yields in spite of increasing population is illustrated.
- II. A total of 15 lectures is devoted to actual and theoretical efficiencies in harvesting the sun's energy. Soil productivity and loss of productivity, past, present and future are compared and discussed. Food production is viewed under the topics of irrigation, potential of roughlands and marginal land use, minimum tillage, the potential of the Canadian North, Siberia and deserts, glass houses and food factories, harvesting the sun's energy through the sea, the application of science and technology to crop production and the concept of the yield-per acre take off. The programs of CIMMYT, IRRI and other international bodies are described, the Green Revolution and the associated problems in the developing and overdeveloped nations portrayed. Included are overproduction problems and the possibilities of converting surplus and/or waste materials to other energy forms such as ethanol, methane or oil to alleviate the energy crises.
- III. The image of agriculture, farm incomes, food production costs compared to North American consumer costs in relation to other nations and other commodities, and world trade are discussed in five lectures.
- IV. Five lectures are devoted to crop production and pollution and placing pesticides in perspective. Fertilizers and manures as pollutants and as production necessities are described. Alternatives to pesticides are discussed and the total approach towards control of plant pests through chemical, biological, cultural and genetic factors are discussed.
- V. The remaining lectures deal with a variety of subjects, some at student request, on organic food production, non-conventional food and fibre production and its impact on crop production, crop hybrids, crops and wildlife, wildrice production, wheat and associated products and various natural plant products such as latex, poisons, drugs and stimulants.

#### Student Reaction:

A course assessment revealed excellent student acceptance of the course. Students generally described the course as effective

in making them aware of the potentials and problems of plant production and that it offered a new look at the farmer of today, who was viewed in a new image.

Students indicated strongly their preference for first hand experience and personal observations to illustrate particular points, thereby making it imperative that an experienced lecturer, actively engaged in research in agriculture, present the lectures. Many students were initially concerned that complex scientific formulas would be introduced to show them the complexity of science and expressed relief that such was not the case.

Assignments were designed to introduce problems that allowed students to use and appreciate their own area of interest in an agricultural context. One problem dealt with government promotion or restriction of agriculture production in various regions. Evaluation of the students was composed of assignments and prepared papers; there was no final examination.

Discussions with students in the course revealed that many had an agricultural interest because of previous agricultural associations in jobs or through a parent who had graduated in agriculture. They had deliberately chosen a college on an agricultural campus so that they could benefit from both colleges. Approximately 30% of the Arts students at the University of Guelph have been raised on farms or in rural communities; the corresponding figure at other universities in the province is 5%.

#### Faculty Reaction:

Although the lecturer has had over 10 years of classroom experience, mainly with classes of 300 or more students, there was a feeling of anxiety about "reaching" non-agriculture students and about their reaction to the everyday issues of the agronomist. These fears proved to be ungrounded as response to the course was excellent.

Several factors may have contributed to the success of this course. Perhaps the fact that one lecturer was responsible for the entire content and presentation resulted in an integrated viewpoint being achieved. Broad agricultural courses without any prerequisites must adopt an integrated approach and can be done most effectively by one person. One must recognize, however, that this demands considerable effort to become knowledgeable in a wide variety of areas. An integrated approach must be taken, even at the risk of duplication with other courses because one aspect of agriculture cannot be presented as an isolated subject divorced from other considerations. Restricting areas of presentation because they do not fall under the umbrella of crop science, can result in the emasculation of that course. A series of lecturers wishing to get into the act, and presenting views representing various disciplines, destroy the continuity of a course designed to integrate the many areas of agriculture.

A second reason for success was perhaps the determined effort to be up-to-date; books tend to become quickly out-of-date and by themselves are not sufficient without supplementation from periodical trade news releases or even from the daily newspaper.

#### Conclusions:

Colleges of agriculture today have a greater responsibility than ever to extend their knowledge to a broader spectrum of people. Teachers within the colleges of agriculture must be prepared to devote more effort to comprehensive courses to be taken by non-agricultural students as well as the non-agricultural segment of society. This may mean that teachers will have less time for their own research. The course, "Harvesting the Sun", for non-agricultural students was developed and was well received by students and proved to be a rewarding experience to the lecturer.

Similar courses should be developed in other areas of agriculture. Students in general arts and science have an interest in various aspects of environmental horticulture, soil and land resource science, animal production and in ecology and environmental quality. Faculty members of colleges of agriculture have an excellent opportunity to educate the non-agricultural segments of society - we should endeavour to make the best of this opportunity!

#### References

- (1) Borlaug, N.E., Norvaev, I., Aresvik, O., and Anderson, R.G. A green revolution yields a golden harvest. *Columbia Journal of World Business Report*. September-October, pp. 9 to 19; 1969.

#### Footnotes

- <sup>1</sup> The University of Guelph (7500 undergraduates, 600 graduate students) is one of 15 universities in the province of Ontario. It is the only university with a faculty of agriculture. The population of the province is approximately 8 million people.