

Digest of Conference on

RECONSTRUCTING THE GENERAL COURSE IN BIOLOGY

Discussion leaders:

Professor Carl J. Potthoff, University of Minnesota; Dr. Joseph Schwab, University of Chicago; Professor Wayne Wantland, Stephens College.

Digest prepared by Ray J. Nichols, graduate student, University of Chicago.

Dr. Potthoff opened the conference by pointing out some of the points on which opinions differ with reference to a survey course. (1) In treating such broad categories of information, there must be some degree of superficiality. Is the time spent by the student in the course justified by the small amount of information gleaned from such a course? (2) Is it better to give over separate and independent quarters to Botany, Zoology and Physiology? Or should the course avoid such "cleavage planes?" (3) Shall there be a survey course?

The question for the present, however, is not whether there should be a survey course, but what the course shall be. It was suggested by the speaker that an exchange of viewpoints on different experiences might serve as a source of material to aid in solving some of the problems.

Dr. Potthoff continued by outlining the questions with which he and his staff at the University of Minnesota had been confronted during the eight years of the survey course there. The questions have concerned the following problems. (1) Core content - shall perspective knowledge be the goal? If so, what is perspective knowledge? (2) Technical terminology - out of the thousands of terms that constitute a biologist's vocabulary, which ones shall the students be expected to learn? The "rule of thumb" applied is to employ a term when the efficiency of time utilization is improved by so doing. Two groups, the scientific and non-scientific, between whose later training there will be such differences, merit consideration when this question is considered for a particular course. (3) How much detail shall there be? (e.g., Shall the plant and animal groups, phyla, etc. be considered? If so, to what extent?) The tedious details of structure, classification, function, etc. are to be avoided; but, if the presentation is in too broad categories and is without some detailed support, the realm of philosophy is likely to be invaded to too great an extent. (4) Should the course, although general, have a "central theme?" Due to personalities of the various staffs, there perhaps is a central theme, e.g., at Minnesota - Health, at Colgate - Psychology, at Chicago - Physiology. Mr. Schwab suggested that Mr. Potthoff's impression that the emphasis at Chicago is on physiology may be due to his encountering the course at the physiology period of the year.

Dr. Potthoff suggested the following outline for group discussion.

- (1) Core content
- (2) Relation to science requirements
- (3) Techniques

Increased enrollments in survey courses, as well as the courses themselves, add to the problems of teaching.

Colleges generally have been getting the better high school graduates, and an increase must lower the mean level of the students.

Situation calls for "mass teaching."

- (4) Teacher training

This applies to the training of teachers for the course. A "generalist" is the type of teacher necessary. It may take years to train a capable staff; the patience of administrative officers is necessary. Should the course be in charge of one man?

Dr. Wantland took over leadership of the discussion at this point, for consideration of (1) core content. As a point of departure he discussed General Biology as an "integrated science," leading to the two alternatives, a zoology-botany course for the pre-professional student or a general course for the general student. The question was then raised as to the number of persons whose attained objectives are the same as the objectives of those persons when they are college freshmen. Consensus of opinion of the group, as well as actual studies mentioned, was that perhaps 80 per cent of college freshmen either do not know what vocation they want to follow or change their choice of vocation subsequently. Suggestions from the group were along the following lines. (a) The foregoing being true, there is no need of being disturbed over content of the course. (b) The course should be a "blend" so that a student who may be, pro tem, a general student, may switch to pre-professional courses without a handicap. (c) It is very well for "med" school deans to demand more "cultural" training, but students so trained face an uncertain fate. (d) Several voluntarily commented on their own courses, one point coming out that courses are sometimes limited in scope because of the vested interests of departmentalization.

Dr. Wantland then suggested that it might improve a course to offer it in terms of needs, e.g., body requirements for food. The question of looseness then arose. The leader continued, to point out that a knowledge of structure (some microscopic) and function of the digestive tract, etc., would be necessary for the student to understand the body requirements. The question of the student who says that he "doesn't care" arose; Dr. Schwab pointed out that he may take this attitude to get attention; others suggested that he will follow the crowd, if ignored. Dr. Wantland continued, stating that, in an attempt to get away from a topical course at Stephens College, they are building up a course from selected "problem areas", determined in part from analyses of studies of the activities of alumnae and students of Stephens. Then there was given a breakdown of a sample problem field, "Securing Adequate Proper Food", showing the more basic problems of (1) soil and agriculture, (2) conservation and (3) nutrition, including the anatomy and physiology of digestion. Dr. Potthoff questioned the coherence of such a course, and wondered if the student really has anything or feels that he has, when the course is ended. Dr. Wantland answered by stating that even pre-medical students should have the general course! Dr. Hunt mentioned the pressure brought to bear for such a course at Michigan State; but he believes that there is a more real problem in getting the masses of students to look beyond their obvious immediate needs. Dr. Schwab pointed out that we cannot "cramp it down" but that we can begin where the students think they are interested and teach them what they should want. He observed further that our failure to do this is due as much to an adolescent educational system as to adolescent students the main problem being to improve the mores of both!

Dr. Wantland continued with an admission of weakness in the laboratory set-up of such a course as the one at Stephens, the optional projects of the students varying from cosmetics to horses, obviously too much for a limited ratio of assistants to students. At this point the question arose as to how the teacher knows what the student wants, when the student doesn't know. Dr. Shumway pointed out that it is a teacher's duty to make a course interesting but that it is not the teacher's duty to apply the course to all the problems of life!

Dr. Potthoff believes that students should not dictate the course,- that they must be made to think they are getting somewhere, the information to be unified and to follow the "interest areas" of the course in particular (meaning particular with reference to the school).

Dr. Hunt suggested that the major problem is the student who is not "reached". Common agreement was that a course is for the "masses." The work habits carried over from high school received their share of the blame for most of the things a course does not achieve. It was suggested that the question, "How has (or can

this course contribute (d) to other courses?" put to students, provokes a favorable reaction, at least more so than the usual one, i.e., "How can this course be improved?"

Dr. Shumway stated that one problem (in core curriculum) is to develop new interests, broaden the horizon of the unknown, and that the teacher is in a much better position than the student to judge needs. He suggested that a person needs a "biological background" for reading, and that a course should teach (1) what biologists have done and who they are or were, (2) what they are doing and (3) what they hope to do and how -- it being futile to build a course on the student's own immediate interests! Dr. Schwab suggested that a course should be built in terms of a general education, the course being a tool, not the finished product, -- stressing the need of "communicative" methods between courses. It was agreed that a person is first a human being and only secondarily a zoologist or botanist!

Dr. Potthoff then commented further on the topics he originally presented, concluding with the idea that perhaps we build a course around the instructors. Another suggestion from the floor was that mature persons other than biologists could give valuable aid in outlining the needs of a course. Although studies of this type have been made, Dr. Schwab pointed out that answers from such persons are biased by present conditions and culture patterns -- when, in addition to recurrent fundamental needs, future conditions need to be anticipated.

Further questions at this point concerned (1) "Principles of biology" and what they are -- as well as the criticism that they are too "creedy", (2) the ability to transfer in transfer of applications. It was agreed that desirable goals are training in (1) recognition of facts and (2) drawing of workable conclusions.

Dr. Potthoff pointed out questions arising concerning (1) the use of the laboratory and the division of opinion on the matter and (2) the use of films. With reference to the latter, certain precautions were suggested: (a) avoid making films the main force of the courses, (b) preview carefully, (c) possibility of substituting one's own comments for sound track.

Dr. Schwab took over leadership of the discussion at this point, making the following summary of "special techniques," stressing that one must evaluate in terms of the ends to be met. Since the ends to be met largely determine core content, which latter also affects the techniques to be used, Dr. Schwab's remarks might be perhaps more appropriately titled, "What and How to Teach - and Why". (Because of limited time, he presented the following without interruption.)

#### I. Basis for content of course:

Students' needs or "wants" and the traditional content of botany, zoology, and physiology are not the only bases for constituting a course.

- A. From the point of view of science alone (ignoring educational ends) the second base is not valid because botany, zoology and physiology are not fundamentally different subject matters, but separations induced largely by different approaches (different research techniques). All three study life phenomena and all three have contributed jointly to our conception of the living organisms, i.e., they all focus separate lights on the nature of the processes of maintenance, growth and reproduction of the individual, the growth and change of populations.

- B. From among the details and generalizations about living organisms, rather than from a survey of the separate details of biology, zoology and physiology, the content of a general course might well be chosen -- chosen on the basis of criteria derived from a rational consideration of the ends to be served by general education.

## II. The ends of general education

Generally: the most adequate and accurate concept of the nature of man and of the living world possible in the time and within the limits of the average intelligence of the students.

- A. Even when man's needs and activities as an animal are interpreted, he is still left in the category of fruit flies and guinea pigs! Man's unique qualities demand consideration! E.g., only humans use words! These unique qualities, since they are of utmost importance, demand a place in any curriculum. Is this the biologist's obligation? -- Treat man as an active creature, not merely as a passive "molecule" acted upon by external forces! Too many courses (i.e., departments) show an increasing tendency to overlook the qualities of man that are of primary importance and interest to man - as man.

- B. Teach the avoidance of

1. superficiality
2. inaccuracy of observation
3. false generalization

- C. Teach the facts that are the bases of principles. The student needs to get knowledge "as it is got," and needs to be able to judge validity.

- III. Course accessories, i.e., movies and laboratory, in any course, should show how data are obtained.

The teacher should keep in mind that science is a tool, and that a teacher is dealing with rational animals, whose recognized needs, i.e., "wants," should be "capitalized" as motivators.