

# Botany in the Graduate Record Examination<sup>1</sup>

*Lloyd H. Shinnors*

In the spring of 1953, a group of American colleges received grants from The Fund for the Advancement of Education (Ford Foundation) to make a study of their undergraduate teaching in liberal arts. As part of the study, many gave the Graduate Record Examination to the entire graduating class, believing that this would give an indication of their success in liberal arts training. Results of the examination in some cases led to curriculum changes. It is these last points which occasion the present remarks.

Faculty members were permitted to read the questions after the examination was given, but not to make any transcripts. I made a mental count of those questions in the general section and in the special section for biology majors which were distinctly either botanical or zoological, and those which could properly be termed biological. Time was brief, and only one perusal was possible. The totals given below may therefore not be precisely correct, but they are close enough for the purposes of this discussion.

GENERAL SECTION (total, 65 questions on biology)	
Botany	8
Biology	19
Zoology	38
SPECIAL SECTION (total, 279 questions on biology)	
Botany	60
Biology	52
Zoology	167

In both groups, the number of zoological questions greatly exceeds the number of botanical and general biological questions combined. In the general section, there are nearly five times as many zoological questions as botanical; in the special section, nearly three times as many.

Why this one-sided ratio? It can hardly be justified in terms of importance of subject matter to the general public, or that portion of it supposed to be liberally educated. The fields of agriculture, horticulture, conservation, and economic botany are of enormous significance in everyone's daily life. They are very inadequately treated or are ignored in standard freshman botany courses, but can scarcely be claimed to be overshadowed in significance by zoological

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subjects, even including medicine (which itself involves botanical material in the fields of pathology and pharmacy), in a ratio of five to one. Neither can it be claimed that a discrepancy in numbers of students in professional training justifies the discrepancy in content of questions. In the May 20, 1949 issue of *Science* (not the latest figures, but the publication is widely accessible, and later data do not differ sufficiently to vitiate the statements which follow) appeared an article on science graduate students and their support by M. H. Trytten (*Science* 109: 505-508). It is there stated that the total number of graduate appointments in schools of the United States was 637 in botany (excluding agriculture, forestry, horticulture, pharmacology); the total in zoology (excluding anatomy and entomology) was 734. The total number of B.S. majors in all plant sciences in 1947-48 was 8,790; in all animal sciences it was 2,182.

Why then the distorted representation of the two phases of biology in the Graduate Record Examination? Many can testify from personal experience that it reflects the actual teaching personnel and course offerings in a large number of American colleges. The personnel of the committee which prepared the special section for biology is illuminating. The five members included one each from a state college, a medical school, a teachers college, a state university, and a private university. Their professional interests are given in *American Men of Science* as follows: testing, educational psychology; physiological chemistry; zoology — cellular physiology, biophysics; economic biology — mammalogy, entomology; botany, radiology — biological effects of radiation. Can it be claimed that the plant sciences are fairly represented by this group, or that its questions will fairly measure what students from an undergraduate liberal arts college should be acquainted with? Can it be claimed even that field natural history, whether botanical or zoological, is represented in proper balance with laboratory biology? These suppositions have been made; and curriculum changes adopted because of the Graduate Record Examination, which will lead not to the betterment of liberal arts training, but to precisely the opposite. Surely distortion of a formerly more balanced undergraduate program to fit the distortions of the Graduate Record Examination cannot be regarded as betterment.

The real roots lie deeper than the committee personnel, or prevalence of unbalanced biology curriculums in present day colleges. These represent the consequences of developments which began in the last century. One influence has been the increase in population, the rise of great urban centers, and the shift of the United States from a predominately agricultural to a predominately industrial nation. These changes undoubtedly have encouraged de-emphasis on the plant sciences in college teaching, which in turn sets pace for teaching in secondary schools.

A second influence has probably been more decisive. The Morrill Act of 1862 established the land grant colleges, and subsequent congressional acts have greatly aided the growth and development of agricultural colleges. Of those college students who are interested in plant sciences, the great bulk will take degrees in a college of agriculture or forestry school. But there is not an equivalent selection of the largest group of zoology students who take college work: those planning to go into medicine. Consequently the so-called liberal arts colleges do not have a random sampling of students, but a very unbalanced one. The pre-medical students become a major pressure group, for whose benefit the curriculum has been increasingly modified. So far as biology is concerned, we now have colleges of pre-medicine, quite equivalent to colleges of agriculture, forestry schools, or teachers' colleges. Liberal arts in any proper sense, too many of them have ceased to be. Botany has not suffered alone from the change; large segments of pure zoology have suffered equally.

As a measure and symptom of our time, the Graduate Record Examination is a faithful witness. As a gauge of the broad and impartial training which a liberal arts education is intended to be, nothing could be falser. It is fervently to be hoped that those colleges which desire to make their undergraduate training truly in the liberal arts tradition will disregard the testimony of the Graduate Record Examination, especially as it concerns the botanical side of biology. If the trends which it reveals continue indefinitely, botany as a pure science will cease to exist in the United States.