

acids, and of the process of their disintegration. Reading these chapters, one can not help being impressed by the complexity of the mechanism which controls the catabolism of nucleic acids. There have been described in the animal organism at least a dozen agents (enzymes) taking part in the work of the destruction of nucleic acids. Undoubtedly more will be discovered. Each of the known enzymes is capable of inducing only one reaction, of performing only one phase in the general process.

The reading of these chapters is instructive, not only for the information contained in them, but as an illustration of the means employed by the animal organism in order to bring about a very gradual transformation of the complex tissue components into simpler derivatives. How great must be the number of enzymes residing in animal tissues if more than a dozen are required for the catabolism of only one tissue component!

P. A. LEVENE

STANDARDIZATION OF COURSES AND GRADES

THE following regulations were adopted for the guidance of the faculty at a recent meeting of the president's council of the George Washington University:

To the President's Council: The Committee on Standardizing Grades appointed last June begs leave to submit suggestions upon the following two problems:

1. How can the amount of work required for each unit of credit be approximately equalized in the various courses?

2. What common standard of grading can the various members of the faculty observe so that they will all grade approximately on the same standard?

In submitting principles and standards for the solution of these problems the committee wishes first of all to be understood that it does not wish to dictate, or even to suggest, how any member of the faculty should do his work. It not only has no intention of curtailing the legitimate rights and freedom of any teacher, but it desires especially to emphasize that these rights and freedom are sacred; that they are an indispensable condition for the best type of university work.

But in schools, colleges and universities the per-

sonal side is not the only side to teaching. There is present also a social side which grows out of the fact that a school is in some fundamental aspects a social unit. The various members of the faculty are all working to contribute in piecemeal to the same end. They are all contributing to the rounded education of individuals, and to the extent that social relationships are involved in this process to that extent is it necessary to observe similar standards and principles. When this is not done the equilibrium and the efficient working of the whole is disturbed. Students in considerable number will elect those courses in which they can get the largest number of credits or the highest grades, or both, for the least work, and they will shun those courses in which the opposite is true.

But in observing similar standards and principles in those matters that pertain to the school, as a whole, it would seem that no desirable aspect of the personal freedom of the teacher needs to be violated. A common goal only needs to be recognized, the manner of reaching the goal being left to the individual teacher. We have here an example of the type of liberty within law that obtains elsewhere in society.

Equalization of Units

It appears to be true that the amount of work required of students in different courses carrying equal amounts of credit varies greatly. While in some courses little more than attendance upon lectures and the passing of examinations is required, in others from one to three or even four hours of outside preparation for each lesson is required in addition. To minimize this divergence the committee recommends:

(a) That all teachers strive to require about two hours of outside preparation for each lesson.

(b) That courses which are now so weighted that they can not be completed with this amount of study be readjusted so that they can ordinarily be completed with two hours of preparation for each lesson.

(c) That lecture courses in connection with which it is impossible or undesirable to assign any considerable amount of outside work carry one half as many credits as the number of lectures per week.

Distribution of Grades

Considered from the social standpoint, the college, in common with other schools, performs two interrelated, although distinguishable fundamental functions. It (1) educates and it (2) selects.

The educative function is the one commonly recognized and is in outline well understood. It includes the imparting of ideals, knowledge and skill.

The selective function, on the other hand, has been less commonly recognized, but it has always been present and is socially indispensable. The school not only imparts ideals, knowledge and skill, but it also designates those who have acquired these characteristics, and by the assignment of grades it aims to indicate the degree in which they have acquired them.

The giving of grades to students is only one of a number of means that the school uses in discharging the selective function of education, but it is one of the most important. Like other educational functions it must be done carefully, intelligently and uniformly in order to avoid injustice to the student. The desideratum of uniformity requires not only that each teacher always use approximately the same standard with all of his students, but that all teachers use approximately the same standard with all students. When this is not done, the educational equilibrium of the school is disturbed and injustice is done to the earnest and conscientious student. The less serious the students are the more they tend to gravitate toward the teachers that give the higher grades and the injustice that this tends to work upon the conscientious student when it comes to the awarding of honors and the recommending for positions is obvious. The giving of many high grades, furthermore, gives many students a false and exaggerated notion of their ability. The grade of "A" especially should be reserved for very exceptional ability which in the nature of the case is rare.

The principle underlying a uniform standard of grading is found in the distribution of mental ability as revealed by psychological investigations. These investigations have shown, when sufficiently large numbers of people are considered, that ability in general or in any particular line, is distributed in the form of a bell-shaped curve technically known as the probability curve or the normal surface of frequency. Letting the base line represent the degrees of ability from poorest to best and the vertical lines the numbers of persons possessing each degree of ability, it is clear that there is but a small number of students with excellent ability, a larger number with good ability, a relatively large number with medium or average ability, a smaller number with sub-medium but passing ability, and a small number with distinctly unsatisfactory ability.

There are, of course, no sharp dividing lines between these different groups, and any such lines that are drawn are arbitrary. But when the base line is divided into five equal steps, representing therefore five approximately equal steps of ability, the percentages of students that fall into each group are approximately as follows:

	Per Cent.
Excellent (A)	4
Good (B)	24
Medium (C)	44
Sub-medium (D)	24
Failure (E)	4
Total	100

These percentages mean in the present connection that a teacher's grades should in the long run be distributed approximately in the amounts indicated by these percentages. The grade of "A," or excellent, should be assigned to about 4 per cent. of the students; "B," or good, to about 24 per cent.; "C," or medium, to about 44 per cent.; "D," or sub-medium, to about 24 per cent.; and "E," or failure, to about 4 per cent. It is quite likely that the percentage of failures in the lower classes may properly be somewhat higher than that in the upper, with corresponding changes in the other percentages, and failures may perhaps also properly be more frequent in professional schools than in liberal culture schools. Because of its immediate social responsibility, it is the duty of the professional school to apply the principle of selection rigidly.

It should, however, not be inferred that the grades assigned in any particular class, especially in a small class, must approximate closely to the distribution above given. The expression, "in the long run," should be emphasized. The principle can not be applied mechanically, but it devolves upon each teacher to school himself to recognize excellent ability, good ability, and so on.

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SPECIAL ARTICLES

CORRELATION BETWEEN THE TERTIARY OF THE GREAT BASIN AND THAT OF THE MARGINAL MARINE PROVINCE IN CALIFORNIA

IN December, 1913, a party of students from the University of California working