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.

W. C. RUEDIGER,
GEO. N. HENNING,
WM. A. WILBUR,
Committee

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

under the leadership of Dr. Bruce Clark, instructor in paleontology, obtained an interesting collection of remains of land mammals in Tertiary deposits north of Coalinga, on the west side of the Great Valley of California. As the Tertiary section in the Coalinga region is a part of the marginal marine series of Californian formations, and the mammalian remains obtained in these beds represent a land fauna best known in the epicontinental deposits ranging from the Great Basin east to the Great Plains region, this occurrence offers an unusual opportunity for correlation between the marginal marine province and the mammal-bearing deposits of the interior of the continent.

Evidence bearing on the problem of correlation between the Great Basin and the Pacific Coast province is particularly welcome at this time, since there has been reason to believe that the geologic scales used in the two regions have not coincided in the limits of the periods.

The mammalian remains obtained in the North Coalinga region were found at not less than four horizons ranging from beds generally considered to be Lower Miocene or Upper Oligocene, to a horizon of Pleistocene or Pliocene stage. The occurrence of the faunal zones in the sequence of deposits in the North Coalinga region is shown in the table.

The lowest horizon is characterized by abundance of horse teeth representing the genus *Merychippus,* and may be known as the Merychippus zone. At the second horizon from the base comparatively few remains are known. The presence of teeth of *Neohipparion* suggests the tentative designation of this portion of the section as the Neohipparion zone. The third of the principal horizons is characterized by the presence of a new species of horse designated as *Protohippus coalingensis* and may be known as the Protohippus coalingensis zone. The latest fauna is distinguished by the presence of a large specialized horse, probably representing the genus *Equus,* and by remains of a form near *Cervus.* This may be known as the Equus-Cervus fauna.

Occurrence of Mammal Zones in Tertiary Beds of the North Coalinga Region of California

Time Divisions		Local Formations	Mammal Zones
Pleistocene		Terrace deposits	? Equus-Cervus fauna in part
Pliocene		Tulare	
		Etchegoin	Protohippus coalingensis
		Jacalitos	Neohipparion
Miocene	Upper	"Santa Margarita"	
	Middle	"Temblor"	Merychippus
	Lower		

The fauna of the Merychippus zone occurring in the "Temblor" beds commonly recognized as Lower Miocene, includes the following types.

Merychippus, n. sp.
Tetrabelodon ?, sp.
Procamelus ?, sp.
Prosthennops ?, sp.
Desmostylus, near *hesperus* Marsh.
Isurus, sp.

The horses of the Merychippus zone correspond very closely in most respects to *Merychippus isonesus* of the Mascall Middle Miocene of the eastern Oregon region. The stage of evolution of the teeth of this form is not reached by any species of the Lower Miocene in America. The proboscidean, *Tetrabelodon?,* has no certainly known relatives in America earlier than the Middle Miocene of our accepted scale. The camel resembles a late Miocene type. It seems impossible to refer this fauna to a stage older than that of the Mascall Miocene of the mammalian sequence of the Great Basin province.

From the occurrence of the Merychippus

fauna in the "Temblor" beds of the North Coalinga region, it seems clear that these marine beds, commonly referred to Lower Miocene or late Oligocene, are not older than mammal-bearing beds of the interior of the continent referred to Middle Miocene.

The "Temblor" beds of southern California represent a phase of the Monterey series of California, which is one of the best known and most widely spread of the divisions of the Tertiary. There seems good reason to believe that the Monterey series of California is approximately to be correlated with the Mascall Middle Miocene of the Great Basin.

A broad consideration of the lack of adjustment between the time scale of the Pacific Coast province and that of the Great Basin suggests that correlations of marine faunas of the Pacific Coast region, particularly those based on the percentage method, have tended to locate the time divisions relatively too far from the present or Recent. In late years, the refinement of specific characterization has proceeded very rapidly. Splitting the species has resulted in giving us a larger number of forms each of which has a relatively restricted geographic and geologic range. The percentage method, as proposed by Lyell, when used with modern species naturally results in pushing time divisions farther apart.

The lack of adjustment in the time scale also suggests the desirability of testing the relation of Middle Miocene mammal-bearing beds of North America to the formations of Lower Miocene age in the European scale.

The fauna of the second mammal zone of the Coalinga region comes from beds referred for the present to the Jacalitos formation. It includes a form referred to *Protohippus* by Arnold and Anderson, and a *Neohipparion* species of somewhat advanced stage. The *Neohipparion* material from this zone is insufficient for thoroughly satisfactory comparison. It seems in part to be related to a *Neohipparion* from the Rattlesnake Pliocene of the John Day region of eastern Oregon. This species does not appear to be very closely related to the well-known *Hipparion* species in the Ricardo fauna from the Mohave Desert.

The fauna of the third or Protohippus coalingensis zone of the Etchegoin formation in the Coalinga region has as its most characteristic form a new species, *Protohippus coalingensis*,[1] which differs from all the described species found west of the Wasatch Range. It is most nearly related to a species represented in the Ricardo fauna of the Mohave Desert. It does not, however, seem to be identical with the Ricardo form. The stage of this fauna, in very general terms, seems to be Pliocene. Both the Etchegoin of this zone and the Jacalitos below it were referred by Arnold and Anderson[2] to the Upper Miocene.

The fourth fauna of the North Coalinga region includes a number of species of relatively modern aspect. These include forms referable to *Equus* and to *Cervus* or *Odocoileus*. This assemblage may be known for the present as the Equus-Cervus fauna. Its stratigraphic position is not entirely clear. The fauna is in part much like that of the Pleistocene.

JOHN C. MERRIAM

THE CRENATION AND FLAGELLATION OF HUMAN ERYTHROCYTES

I. *Crenation*

THE method of preparing the blood on which the following observations on crenation were made is very simple. A drop of blood obtained by pricking the finger is immediately sucked up into a pipette which contains one to two cubic centimeters of sterile Ringer's solution or 0.85 per cent. sterile sodium chloride or human blood serum. The suspension is then mixed on a sterile glass slide until a homogeneous suspension is obtained. A drop of the suspension is then transferred by means of a pipette to an absolutely clean large coverslip and the drop allowed to spread out into a thin

[1] *Protohippus coalingensis*, n. sp. Type specimen, No. 21,341, Univ. Cal. Col. Vert. Palæ. Distinguished by large size, unusual narrowness of cheek-teeth in transverse diameter, small protocone and narrow, simple fossettes.

[2] Arnold, R., and Anderson, R., U. S. Geol. Surv. Bull. No. 398, p. 78, 1910.