students who are, on the average, superior to those who major in traditionally "easier" subjects (*e.g.*, business and commerce or education)" (*2*). The results presented here lend credence to the implication of Wolfle and Oxtoby that fields of study enjoy differential reputations that are generalized beyond the individual campus.

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References and Notes

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3. Sarah Gertrude Malone contributed significantly to this study. She administered the questionnaire, took responsibility for contacting the subjects, and coded some of the data in order that I would not learn the reputations of my colleagues.
4. Only one respondent claimed to be ignorant of the reputations in question. Fifty-seven percent admitted that they had been influenced by reputations in selecting their courses at least as often as one course per year. Approximately 7 percent of the teaching staff had reputations pertaining to difficulty and/or competence. These results do not indicate a relationship between competence and difficulty reputations.

2 August 1956

Blocking Effect of Ethyl Alcohol on Inhibitory Synapses in the Eye of Limulus

The lateral eyes of the horseshoe crab, *Limulus polyphemus,* appear to have a synaptic system in which only inhibitory effects are produced. Hartline (*1*) has found that the discharge of impulses from single receptor units in these eyes can be inhibited by shining light upon adjacent units. He and his coworkers have studied the inhibitory effect under a variety of experimental conditions and have found that the changes in frequency of the inhibited unit obey quantitatively simple relations to the areas, intensities, and positions of the spots of light that activate the inhibiting units (*2*).

Several years ago Ragnar Granit suggested to one of us (E.F.M.) that the inhibitory synapses might be blocked selectively by ethyl alcohol, since this substance appeared to block inhibition in the vertebrate eye: Bernhard and Skoglund (*3*) had found that both the "off" response and the PIII process, which is supposed to be associated with inhibition, were abolished by this alcohol.

The experiment was tried, and ethyl alcohol was indeed found to abolish the inhibitory effect reversibly (*4*). In fact, after the application of alcohol, the frequency of discharge was actually increased when the eye was illuminated in a manner that formerly caused inhibition. The increase in frequency was suspected to be due to the effects of scattered light rather than to a reversal of inhibition. These results were not published because neither a method of controlling scattered light nor facilities for making good oscillographic recordings was then available.

We have recently repeated the experiment a number of times and confirmed the earlier results under more suitable conditions (*5*). The excised eye was mounted vertically in a moist chamber, and the chitin and connective tissue were removed from the back to permit easy penetration of the bathing fluid into the nervous structures. The cornea was covered with a mixture of paraffin and lamp black to eliminate scattered light (the wax was pierced by small holes to permit light to fall on the desired areas) (*6*). The optic nerve was combed into bundles until one was found which showed unitary activity. Wick electrodes inserted into chlorided silver tubes were used for recording. Artificial sea water with or without alcohol was caused to flow down the back surface of the eye at a rate of about 1 cm^3/min throughout the experiment. Two sources of light of constant intensity and controllable duration were used to focus small spots of light on the excitatory and inhibitory regions. Electronic timers were used to time the illumination according to a fixed program repeated every 10 sec throughout each experiment. During each interval the excitatory illumination was turned on for 6 sec. The inhibitory illumination was turned on for about 1½ sec after a delay of 1½ sec from the start of the excitatory illumination.

Sets of three oscillographic records were taken at appropriate intervals. In the first record in each set, both the excitatory and the inhibitory illuminations were presented. In the second record, only the excitatory illumination was presented. The difference between the number of impulses discharged during the final second of inhibition and the number discharged in the same interval of the control record provided an index of the degree of inhibition. A third record in which the inhibitory illumination alone was presented served to indicate whether sufficient light was scattered into the excitatory area to cause the discharge of impulses. The results of experiments in which such an effect developed were discarded.

A typical experiment is shown in Fig. 1. The top record shows that a strong inhibitory effect was present after the preparation was equilibrated in artificial sea water. Four percent by volume of 95-percent ethyl alcohol was then added to the bathing fluid, and records were taken as the effect of the alcohol developed (second record) and after it had exerted its full effect (third record). It is evident that the inhibitory effect was almost completely abolished. Alcohol-free bathing solution was next applied, and records were taken during partial recovery (fourth record) and after complete recovery (fifth record). The inhibi-

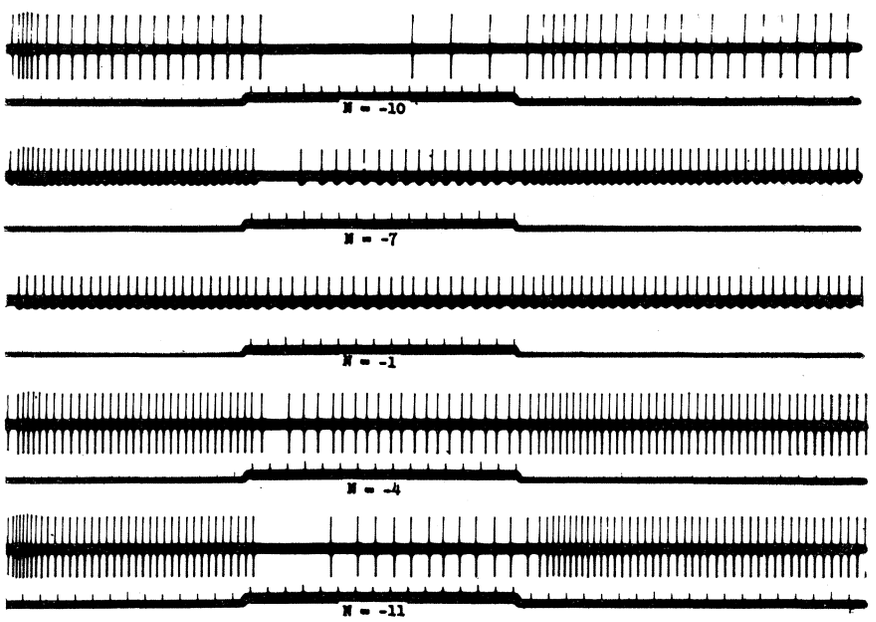

Fig. 1. Disinhibitory effect of 4-percent ethanol. Top record taken 1 min before application of alcohol; second and third records, 18 and 50 min after application. Fourth and fifth records taken 26 and 100 min after return to alcohol-free solution. N = inhibited frequency minus uninhibited frequency during last second of inhibitory illumination. Time marks in tenths of a second. Elevation of time trace indicates duration of inhibitory illumination. Time constant of amplifier, 0.01 sec. The decrease in spike height during application of alcohol is regularly observed and is presumed to be due to the effect of the alcohol vapor on the portion of the nerve bundle between the recording electrodes.

tory effect caused a deficit of 10 impulses before the application of alcohol; of 1 impulse when the alcohol had exerted its effect; and of 11 impulses after recovery. The initial frequency in the last record was higher than in the first, presumably owing to further dark adaptation during the experiment, yet the number of impulses lost during inhibition was approximately the same. This is in accordance with Hartline's finding (*2*) that the number of impulses lost during inhibition is independent of the initial frequency over a wide range.

A single preliminary experiment has been made to determine whether three other substances have a selective effect on inhibition. Acetyl choline (100 mg/100 cm^3) and curare (5 mg/100 cm^3) had no effect whatever. Nicotine (0.16 percent) caused spontaneous activity and then blocked conduction in the nerve fibers but had no selective effect on inhibition.

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5. This work was supported by a grant from the National Science Foundation.
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Fat Changes during Weight Loss

In the course of nutritional studies, 13 clinically healthy and active young white males were placed upon a low-calory diet yielding approximately 1000 cal/day for a period of 24 days (*1*). Soft-tissue teleoroentgenograms were taken at six anatomical sites during the preliminary control period and again at the end of the period of caloric restriction. These x-rays, made and measured under standard conditions (*2*), provided an accurate measure of changes in the subcutaneous fat-plus-skin layer on nine parts of the body.

All of the subjects lost weight, while incurring a deficit of the order of 40,000 cal: the median weight loss was 8.3 kg, or 12 percent of the original value. Subcutaneous fat decreased with median losses of 4 to 5 mm for "central" fat (deltoid pocket, iliac, and trochanteric) and 1 to 2 mm for "peripheral" (lower arm and lower leg), as is shown in Table 1. Decreases in subcutaneous fat ranged from 16 percent to 47 percent of the initial values. The rate of fat lost per kilogram of weight loss ranged from 0.1 to 0.6 mm, depending on the part considered.

Table 1. Median values for subcutaneous fat and weight before and after weight reduction and changes in fat per kilogram of weight loss.

Measurement (thickness in mm)	Median (before)	Median (after)	Decrease (median)	Decrease (per kg)
Weight (kg)	69.1	60.7	8.3	
Lateral arm fat	4.4	3.4	1.0	0.1
Medial arm fat	3.8	2.7	0.7	0.1
Deltoid "pocket" fat	12.5	7.7	4.4	0.5
Iliac fat	12.2	7.1	5.7	0.7
Trochanteric fat	13.6	9.5	5.9	0.6
Lateral leg fat	5.6	4.7	0.9	0.1
Anterior leg fat	3.0	2.7	1.1	0.2
Medial leg fat	7.6	5.7	2.3	0.3
Posterior leg fat	5.9	4.3	1.5	0.2

Losses in subcutaneous fat were clearly related to the initial thicknesses. Those parts of the body with the thickest fat deposits sustained the greatest loss during caloric restriction (Fig. 1, top). In like fashion, those *individuals* with greater amounts of fat to start with sustained greater losses in fat (Fig. 1, bottom). Rank-order correlations in each case were found to be highly significant, an exact test for significance (*3*) being used.

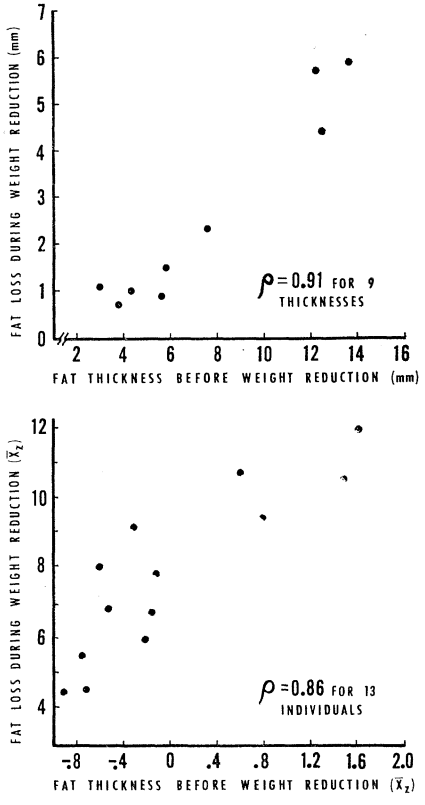

Fig. 1. Relationship between initial subcutaneous fat thicknesses and amount of subcutaneous fat lost after 24 days on a 1000-cal diet. (Top) Scattergram showing changes in the nine fat thicknesses measured in this study. (Bottom) Scattergram showing changes in 13 subjects. [Individual mean Z scores for fat are used as an indication of total fatness (*4*).]

Since fat is withdrawn in proportion to the initial amount of fat present, relative fat patterns before and after weight reduction tend to preserve their individual characteristics. This finding has been published elsewhere (*4*).

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References and Notes

1. This paper reports research undertaken in cooperation with the U.S. Quartermaster Food and Container Institute and has been assigned No. 543 in the series of papers approved for publication. The views or conclusions contained in this report are our own. They are not to be construed as necessarily reflecting the views or endorsement of the U. S. Department of Defense.
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Reaction of 8-Quinolinol with Cerium (III)

The reaction between cerium (III) and 8-quinolinol was first studied by Pirtea (*1*), who used it for the gravimetric determination of this ion. The unusual nature of this reaction was indicated when it was found that the formula of the precipitated chelate was $Ce(C_9H_6NO)_4 \cdot 2H_2O$, containing 18.73 percent cerium. The cerium had not been precipitated as the trivalent chelate, but an oxidation had occurred giving a chelate in which the cerium was present in an oxidation state of four. Although 8-quinolinol usually acts as a reducing agent, in this case it was the oxidizing agent.

Berg and Becker (*2*) found that the precipitation of cerium (III) by 8-quino-