

broached, along with the physical and chemical principles of prop, turbo, and pure jet engines. The possibilities go on ad infinitum, and I found that even the flightiest coeds were occasionally able to apply solid science to their subsequent everyday living.

Since it was necessary to use three lecture periods per week, plus a 2-hour discussion-demonstration period under a competent instructor, this parallel with Reif's findings may indicate that any philosophical differences might lie in the fact that Berkeley students have possibly changed!

CHARLES G. DANFORTH  
3612 Angelus Avenue,  
Glendale, California 91208

### Science at Small Colleges

In an attempt to determine the optimum size of the science faculty at a small liberal arts college, I recently obtained data from the academic deans of 20 small, private colleges (1), all carefully selected for their widely accepted excellence in the liberal arts. A summary of my findings follows, presented in the form of an "ideal" college, and based on arithmetic means.

The composite small liberal arts college enrolls 1150 students and has a total faculty (full-time equivalents) of 120, and thus 9.6 students per faculty member. Of the total faculty, 30 (or 25 percent) are scientists (2). The scientific disciplines are divided as follows: mathematics 7.6, biology 7.5, chemistry 6.8, physics (plus astronomy) 6.3, and geology (plus geography) 1.8 (3).

It is my fervent hope that liberal arts colleges continue to maintain vigorous science divisions, particularly so that science offerings for nonmajors can be strengthened and made more attractive. This is particularly urgent for we are not only in a period of diminishing college-wide science course requirements but also in an era in which so many of man's most fundamental problems require scientific literacy in order to be coped with intelligently.

ARTHUR H. WESTING  
Department of Biology, Windham  
College, Putney, Vermont 05346

### References and Notes

1. Percentage of total faculty in science: Amherst, 26; Bowdoin, 26; Carleton, 23; Davidson, 27; Earlham, 30; Hamilton, 23; Haverford, 29; Kenyon, 20; Middlebury, 21; Mt. Holyoke, 20; Pomona, 27; Reed, 27; Swarthmore, 26; Trinity, 25; Union, 35; Wabash, 33; Washing-

ton and Jefferson 30; Wesleyan (Connecticut), 20; Wheaton, 20; and Williams, 22. These colleges are scattered among 12 states; their average age is 170 years; 12 are male, 6 coed, and 2 female.

2. It is interesting that this 25 percent proportion appears to be independent of student enrollment, of student-to-faculty ratio, or of whether the school is coed or all male.
3. There is no geology offered in 8 of the schools; the average for the 12 that do is 2.8.

### Campus Signs and Times

Nelson's excellent article on desegregation in state universities (6 June, p. 1155) seems to reveal greater significance in what it leaves unsaid than in what it says. Is the university the place to correct the inequalities of the past, or is remedial action needed in those primary and secondary schools which produce disadvantaged applicants? It just does not make sense to lower the standards to accommodate a very few. This amounts to the debasing of the intellectual currency upon which the excellence of this country is founded.

It is a hard fact to accept but the truth is that there are a large number of blacks and other minorities for whom it is just too late. It's deplorable but it is nevertheless true. Bestowing instant Ph.D.'s will not in any way alter the situation. The place to begin is to take immediate steps to insure that by the time a student reaches university level he or she either is qualified for admission or clearly is not. Starting at the end and working back toward the beginning is a pretty irrational approach.

KENNETH R. COBURN  
11110 Luxmanor Road,  
Rockville, Maryland 20582

I certainly agree with Wheeler's letter (30 May) when he states: "Personally, I favor the California proposal of fencing off and allowing on campus only faculty and students with identification, except I would enforce a shave, haircut, and louse inspection at the gate."

A standardized uniform should also be required for those allowed on campus. This would permit easy recognition by the guards in their observation towers. Faculty and students would then be free to devote their full time to academic matters and would not be bothered by such annoyances as thinking.

PHILLIP PLATO  
School of Public Health, University  
of Michigan, Ann Arbor 48104

### Pliny's Pheromonic Abortifacients

Montagu (Letters, 21 Mar.) quotes Pliny the Elder (1) and asks what was burned in Roman lamps that caused abortion. I believe the answer is in Pliny. He describes 15 materials reputed to make a pregnant woman abort. All of them work at a little distance or could be prepared as powders or fumes. The following comments on the pheromones are Pliny's (somewhat shortened), given with his book and chapter references:

*Sight alone causes the abortion.*

1) Female sea-hare. This can be prevented if the woman wears a bracelet containing any part of a male sea-hare, 32:1.

*Passing near or stepping over causes abortion.*

2) Cyclamen, or sow-bread, 25:9.

3) *Onosma*, 27:12.

4) Menstrual secretions of other women. This also works when smeared on the vulva. Pliny refuses to believe the courtesans, Lais and Elephantis, because they contradict each other about the virtues of colewort, myrtle, or tamarisk quenched (dipped) in menstrual blood, 28:7.

5) A viper, 30:14.

6) A raven's egg, 30:14.

7) The serpent, *Amphisbaena*, if dead—a live one carried by the woman protects her from abortion. However, a dead one preserved in salt insures a safe and easy delivery, 30:14.

8) Castoreum, or stepping over the beaver that bore it. It was enough if the castoreum or beaver was carried over her, 32:10.

*Odor or fumes of the substance cause abortion.*

9) Galbanum in suffumigation (after onset of premature labor). Or as a cataplasm, or smeared on a pessary of hellebore. Drunk in wine it relieves prolonged labor—drunk in wine with myrrh it causes the extrusion of a dead fetus. Holland notes that according to Dioscorides the galbanum was taken with vinegar rather than wine, 24:5.

10) Dragon. The seeds of this plant induce abortion by their smell. Anointing the vulva with dragon induces abortion according to Diodotus, the physician, 24:16.

11) Fumes, from an "asses house" (donkey's stable?), passing up into a woman's body, 28:19.

*Taken in drink or an unspecified manner causes abortion.*

12) Cypirus, petie-glader, or sword-grass, 21:18.