Letters

Martian Predictions

Two Mars Mariner spacecraft, designated as Mariner VI and VII, were launched from Cape Kennedy, Florida, on 24 February 1969 and 27 March 1969, respectively. Current estimates of the time of closest encounter with Mars are 0518 GMT 31 July for Mariner VI, and 0500 GMT 5 August for Mariner VII. These Mariner missions will provide a wealth of information concerning the surface and atmosphere of Mars, but the surface temperature measurements and polar cap photographs are of particular interest here.

Predictions of the Martian surface temperature, which were generated by a computer program entitled "MSFC Planetary Atmosphere Prediction Routine," indicate that the temperature measurements will range from 190°K to 300°K for Mariner VI and from 200°K to 290°K for Mariner VII. More specifically, the prediction indicates an equatorial temperature of 194°K at 245° longitude and 212°K at 315° longitude during the Mariner VI mission and a temperature of 210°K at 35°S latitude and 255° longitude during the Mariner VII mission. The MSFC predictions also indicate that the northern polar cap will extend from the pole to 84° latitude and the southern cap to 70°S latitude.

Martian atmospheric circulation is not considered in these predictions, but its effect is believed to be insignificant because the Martian atmosphere is very thin and the ground-atmosphere system acts as an effective radiator.

These predictions are not meant to reflect upon the scientific value of the Mariner program in any way; they were made to verify the "MSFC Planetary Atmosphere Prediction Routine" only.

Y. S. Lou
Northrop Corporation, Box 1484, Huntsville, Alabama 35807
Don K. Weidner
Otha H. Vaughan, Jr.
George S. West, Jr.
National Aeronautics and Space Administration, S&E-AERO-Y, Marshall Space Flight Center, Alabama 35812

Stanford's Classified Research

John Walsh's cogent summary of the "Confrontation at Stanford: Exit classified research" (2 May, p. 534) is an excellent account of a complex situation, but a few points deserve clarification. The references to "military research" on the campus should read "classified research." Only the classified research will be phased out by Stanford, while other unclassified research funded by military agencies will not be affected. A substantial portion of the work carried out under the classified contracts was in fact unclassified.

The article also refers to a "well-equipped print shop used to turn out classified research papers" in the basement of the Applied Electronics Laboratory (AEL), which the militant students occupied for 9 days. Actually the shop, equipped with several small offset presses, prints research reports for the entire school of engineering. Classified reports were a very small part of its total output. In all, the university carried about a dozen classified research contracts, the major portion of them directed by AEL investigators at an annual expenditure of around $2 million. Of the published research reports emanating from these classified projects, only about 15 percent were classified.

Robert Lamar
Stanford News Service, Stanford University, Stanford, California 94305

Gifts and Grants: Who Benefits?

Letters on the subject of costs seem to imply that universities derive financial benefit from gifts, grants, contracts, and the like. Colás (16 May), referring to equipment purchased with project funds, wrote "I submit that such equipment may certainly be regarded as an indirect subsidy, since accountability is usually waived and title is customarily vested in the original grantee institution. This is not the only or the most important of the indirect benefits that accrue to grantee institutions because of the federally supported research and training activities of their principal investigators. . . ."

This is representative of a widespread attitude and is rarely true. Program decisions are made on the basis of *academic* benefit: the financial component of these decisions is, at best, an attempt to minimize the loss. Even the gift of a building requires future budget appropriations for its operation and maintenance. The only real sources of *financial* benefit would be an unrestricted gift (cash or cashable) or the donation of an asset whose purchase had already been budgeted.

Howard P. Wile
National Association of Colleges and University Business Officers, 1785 Massachusetts Avenue, NW, Washington, D.C. 20036

Practical Courses for Nonscience Students

As a student (late Pleistocene) and later a professor at the University of California, I can hardly believe that nonscience students really appreciate learning about standing waves, which slit a photon uses, and synchronizing clocks for light velocity measurements, as described by Reif ("Science education for nonscience students," 30 May, p. 1032). These and other aspects of physics are not unimportant to a nonphysicist, but the course actually appears to be an expansion of a few topics taken from the usual course for scientists. Why not give the nonscientist something practical?

Over a decade ago I developed a year-long, integrated science course for nonscience college students, and this became quite popular, as did Reif's. It was based upon the student as the referent. Only the interests of the class and the abilities of the lecturers were the limits. When the beep-frequency of Sputnik increased as it approached, the class was led through the Doppler effect, the physics of sound, the chemistry of nerve transmission, and the biology of the ear structure. When an earthquake occurred (this could be counted on regularly), the whole gamut of geological principles could become involved, plus the socioeconomic aspects of real estate salesmanship. As more and more students rode in jet planes, the physiology of balance, respiration, time zone transition (geography!), fear, and "man was never made to fly" religion, were

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; Washington 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.