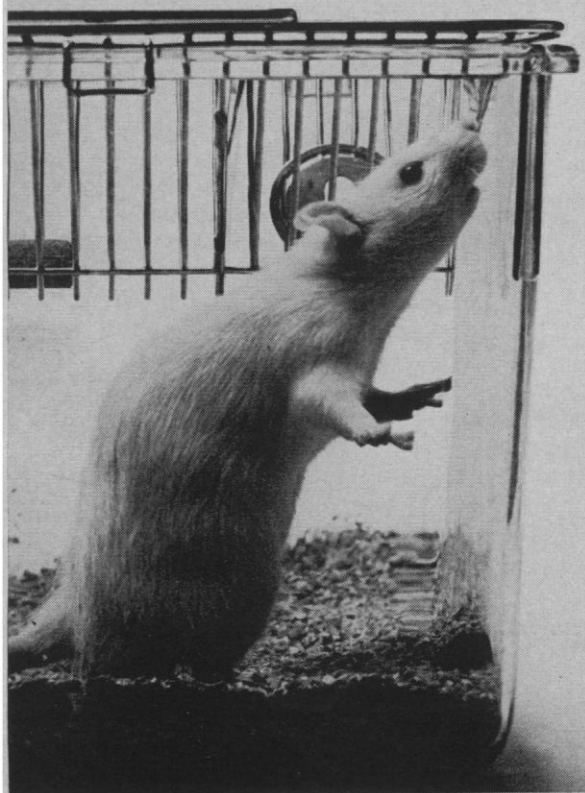


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Recalcitrant Honey Bees

The fine discussion by Gould *et al.* (1) is a worthy continuation of the series by Von Frisch (2) and Wenner *et al.* (3) which I have followed in *Science* with fascination. Gould points up the ever greater ambiguity of honey bee behavior, an ambiguity that may be unresolvable, considering that we scarcely understand rat behavior, much less our own.

The following experiment in the genre is unusually clear-cut, however. I placed a hive of honey bees (*Apis*) in the middle of a large open field (1 hectare, or 10 meters \times 1000 meters), then walked to one end of the field and constructed a feeding station. No sooner (5 to 30 seconds) had I placed the feeding solution in the dish, than the entire swarm of bees descended and began to feed. They apparently had been waiting nearby in a tree. I was unable to repeat the experiment, because, when they finished, the bees left and have not been seen since (by me), no doubt being impatient of such pointless (to them) games, or afraid of being "discarded" (1, p. 547). This may or may not be true.

Several things are immediately clear. Bees always seem to know a little better than the experimenter just what they are about. They seem to think along somewhat the same lines that we do, but to a little better effect. And they pursue their ends doggedly, altering their response to fit the situation, being altogether humorless, at least under scrutiny.

My own experiments in this field have thus ended. I should advocate, however, that the funds for ABM and SST be diverted to other scholars interested in apiology, a pleasant occupation and a less harmful one (except to bees).

FRED G. HILL

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South Burlington, Vermont 05401

References

1. J. L. Gould, M. Henerey, M. C. MacLeod, *Science* **169**, 544 (1970).
2. K. von Frisch, *ibid.* **158**, 1072 (1967).
3. A. M. Wenner, *ibid.* **155**, 847 (1967); D. L. Johnson, *ibid.*, p. 844; A. M. Wenner and D. L. Johnson, *ibid.* **158**, 1076 (1967); A. M. Wenner, P. H. Wells, D. L. Johnson, *ibid.* **164**, 84 (1969).

Brutus Struck Down

In his editorial "Science: Attack and defense" (14 Aug., p. 633), Thimann's logic slipped a little with his conclu-

sion, "No, the only effective defense of science is through strengthening science itself." And by this he means, among other things, "our devotion to our research and teaching . . . and lively awareness of useful and humane applications." I doubt if one can teach science to alert college students today without extending the boundary of science to include, as an intrinsic part of each discipline, the value judgments concerning the place of one's subspecialty within the societal perspective. Useful and humane application is mainly what the nonscience community is asking for. Science shares the responsibility for the utilization of knowledge and its best defense is to attack the two-valued, but obsolete, split between science and society.

STANFORD C. ERICKSEN

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Look here, Professor Thimann, you and I are in our 60's—not far from death. We may die like animals, not knowing where we came from or where we are going. It cannot be too soon for us to demand that science and religion find out why we are here and where we are going. In your "only effective defense of science," you completely overlook the idea that science is the means and method for discovering man's destiny. Science uninvolved in a search and conquest of man's place in the universe is a science beheaded.

Science has failed to integrate with religion. Instead, theology, the authoritative type of thinking of Aristotle, is still the method of religion. Science is actually inseparable from religion; science should be the method, and religion the goal in the search for the meaning of life. But currently in the United States, science is mostly the basis for technological progress and industrial wealth. Nowhere is science basically the means for discovering the creativity of our universe. . . .

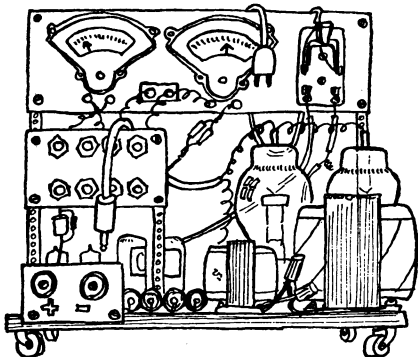
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Thimann's fine message on behalf of science should be taken to heart by all who read it. His recommendation, however, that we emulate Brutus in disregarding threats is rather dangerous. Let us review what happened to "the noblest Roman of them all."

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ideals and great courage, Brutus could not make a lasting impression on his listeners in the populace, who were easily swayed against him by the demagoguery of Mark Antony, a practical politician. So they turned furiously on Brutus, who was termed a traitor (Act III, Scene ii, 158 *et seq.*). He was overwhelmed in battle, and committed suicide by falling on his sword, a day after making the speech quoted by Thimann. Although "arm'd so strong in honesty," Brutus failed to persuade the public of the validity of his struggle against tyranny.

The play ends with Antony and Octavius shedding a crocodile tear on the corpse of Brutus, whose death they have encompassed. They then depart to consolidate their political victory.

THOMAS H. JUKES

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Thimann likens the upright scientist to Brutus, saying,

There is no terror, Cassius, in your threats,
For I am arm'd so strong in honesty,
That they pass me by as the idle wind.

Thimann evidently is of those who believe Brutus was an honorable man. Let us all hope that scientists, including Thimann, realize that they can be and are being used by societies and groups for political ends. They, like all men, are political, and have opinions with "precisely the same worth as those of other citizens." The moment any person or group becomes so assured of his indubitable honesty, his objectivity, his claim to act in Truth that he forgets his responsibility for his creations and for their use, the time is ripe for him to do much worse than be "politicized," or retreat into a monastic cell—it would be time for him to follow in the steps of Brutus.

JARED SPOTKOV

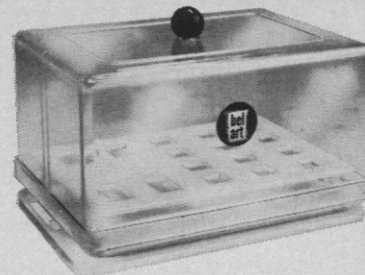
*10491 Kinnard Avenue,
Los Angeles, California 90024*

I never intended to put up Brutus as a patron saint of scientists. Cassius was almost equally wise. However . . .

. . . Brutus,

Made I an error when I quoted you?
'Twas but for your fine words, not for
your fate,
For men have long enjoyed Will Shake-
speare's words,
So pithy and so true. But tell me, pray,
What would you do if you could live again
Those fearsome days? Would you your
best ideals

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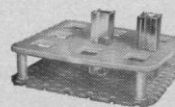
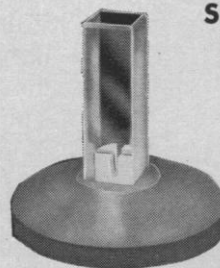
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Forswear, and let your critics have their way,
Till you demean your calling in vain hope
Of sharing theirs?

Brutus:

I would not if I could,
For I can strike a stronger blow for Man
By doing what I best have learned to do
And making it my life, than giving heed
To ev'ry thoughtless wight who may reproach

Me and my science, with false cries of shame

And guilt we feel not. Did not Cassius say,*

"Of your philosophy you make no use
If you give place to accidental evils?"

KENNETH V. THIMANN

*Office of the Provost,
Crown College, University of
California, Santa Cruz 95060*

* *Julius Caesar*, Act IV, Scene iii

France: Reducing the Ratio

According to a letter addressed by Prime Minister Jacques Chaban-Delmas to the French University Teachers Union (see *Le Monde*, 19 Sept.), there are this year, in the public higher education system, 38,102 teachers for 679,000 students. That makes a student-faculty ratio of about 18 to 1 and not the preposterous figure of 80 to 1 cited by D. S. Greenberg in "Academic finance . . ." (14 Aug., p. 658).

S. WOLFENSTEIN

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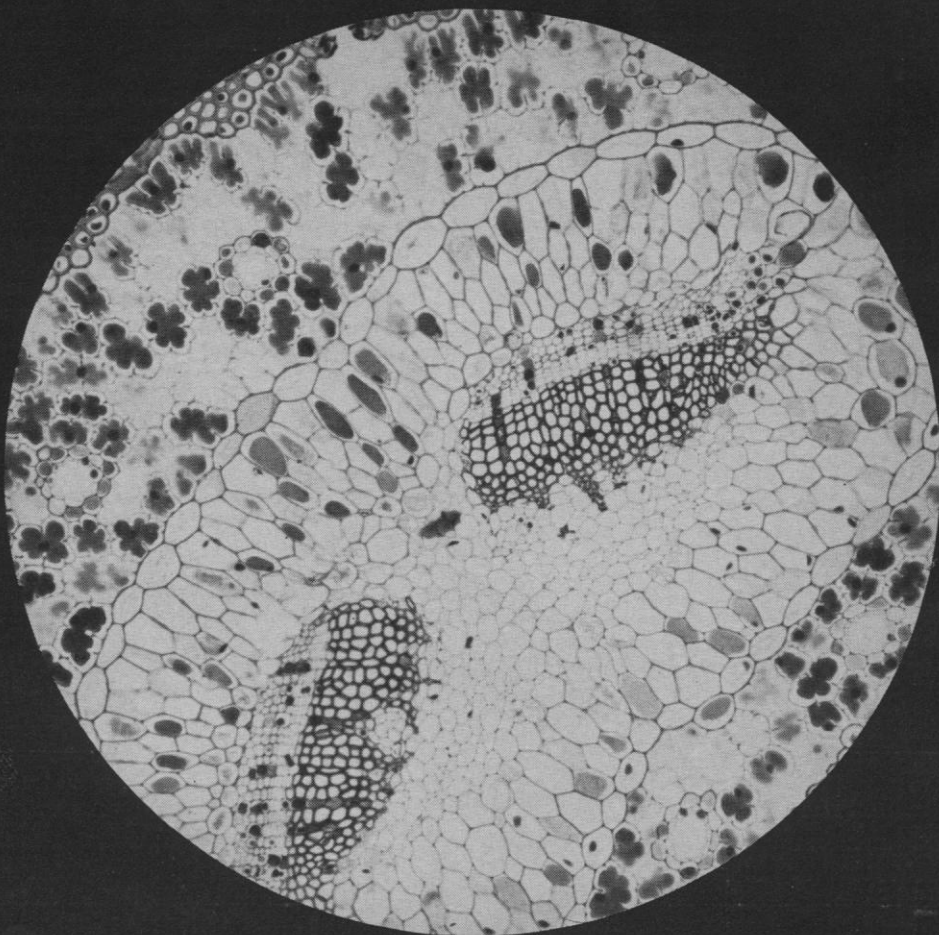
Molecular Biology:

Origin of the Term

In the September 1970 issue of *Physics Today*, in an article "The future of physics," Freeman J. Dyson, of the Institute for Advanced Study at Princeton, speaks of the disapproval on the part of his physicist friends of the fact that Sir Lawrence Bragg, the director of the Cavendish Laboratory, was interested in supporting activities in a field which, Dyson states, did not "even have a name when Bragg was appointed in 1938."

Dyson is here referring, as his article makes clear, to molecular biology. When I pointed out to Dyson that the term "molecular biology" had in fact been used in 1938, he wrote me that he had based his remark on the fact

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