similar to the one to be completed at Kitt Peak, funding had not been requested at the time of writing. Design of the European telescope, which continues to benefit from generous cooperation from AURA, is well advanced, to the point where a choice can be made of the supplier of the blank, and the money has been pledged for its construction. In describing the advantages of a fused silica block, spokesmen of the European organization spoke often of the lower coefficient of thermal expansion of quartz, and had not used an imprecise word like "rigidity."

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Oral Reports

The effectiveness of the "short" paper (10 to 15 minutes) at major scientific meetings might be considerably enhanced if speakers would abandon the classic format of the printed article and, instead, use the following order: (i) background information (if needed); (ii) conclusions of present report; (iii) methods; (iv) results; (v) discussion (if needed); (vi) conclusions repeated.

Conclusions cannot be evaluated properly without consideration of the methods used to collect the data. The reader of a printed paper has the chance to flip back and forth among the pages; the listener at a meeting must depend on his memory. If the listener were to be told first the use that was made of the data, he then could evaluate the methods in this light. I believe that papers delivered orally according to this format would be more interesting and informative and, further, would provoke more useful questions and discussion.

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NIH Career Awards

Before I state my profound disapproval of the attitude expressed by I. D. J. Bross in his letter on NIH Career Awards (19 Mar., p. 1395), I want to establish my credentials. First, I am an active researcher. Although I am an administrator (chairman of a large department) and teacher (43 class hours this April), I manage to spend about half my time in my laboratory. I have published three papers in the last 12 months, and I have two in press. On all I am first or sole author, because I did most of the work described. Second, I am grateful for NIH-NSF support of research, not only because it has multiplied resources but because it has given a healthy independence to every scientist competent to command such support. No man or woman in my department need say "Yes, sir" to me in order to be able to work.

The job of a university administrator is to create an atmosphere in which good people can do good teaching and research, and the job of a university faculty member is to teach, to do research, and to carry some of the administrative burden according to his interests and abilities. Teaching at all levels, undergraduate, professional, and graduate, is a job worth doing and doing well.

There has grown up since the war a new generation of faculty members, nursed on NIH-NSF support, which regards its own research productivity as its only valid contribution to society. To members of this group, research alone is a positive good, and administration and teaching, because they interfere with research, are evils. A man who holds such views may have his home most appropriately in a research institute; he does not belong on a university faculty. Since universities, imperfect though they may be, are still our chief means of accumulating, preserving, and transmitting knowledge, scientists and supporting agencies should seek to strengthen universities in all their functions. I believe NIH, NSF, and other granting agencies do understand this obligation, and I am sure that most faculty members cheerfully accept it as well. Any scheme of outside support which allows a faculty member flatly to refuse to accept his just share of teaching and administration is destructive of the best interests of both the university and its faculty, and a scientist who accepts such support without accepting his university obligations is a parasite.

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. . . The scientist is right in asking for the privilege of doing as he pleases as soon as he has credentials, but the judgment should come from his super-

visors and colleagues and not from a remote, outside agency. Although some researchers of exceptional talent can be exempted, teaching, committees, and administration are essential parts of academic life. It demonstrates the effects of prolonged paternalism in this nation when scientists wish to be judged by government committees and to be excused by them from the chores asked by their local administration.

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Advertisements and History

With reference to Hägg's letter ("Saving library space," 2 Apr., p. 21), I suggest that . . . advertising furnishes one of the most important sources of information concerning technological progress and will be of continuing interest to historians of science. For some of the journals which I have bound, I give instructions that nothing be removed. . . . I have found much pleasure and profit in looking at the advertising in *Nature* during its early years in those volumes which were not stripped. This gives me a much better "feel" for the working conditions in science at that time than could be got otherwise.

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Art Is Here to Stay

La Fave's recent letter (12 Mar., p. 1242) is forthright enough to merit a rebuttal to his "Conclusion: Help stamp out art!" La Fave regards art and science as "cutthroat competitors." This seems to me to be a misconception which has no future, no past, and no documentation. Far from being inimical to one another, arts and sciences have always coexisted and have been able to do so because they are complementary frames of reference. The arts, in extreme form, are subjective, intuitive, and projective, while sciences, in pure form, are nonsubjective formulations tested against reality. Between the extremes arts and sciences intergrade and are frequently merely different ways of dealing with the same subject matter. A medical illustration and a painting by Dali might be done with the same medium and the same palette of colors and share as a subject the representation of a vital organ. The medical painting would not seek to evoke emotional responses or create lateral images or construct puns. The Dali painting would be a complicated image-cluster with punning and ambiguity, and having as a primary objective the stimulation of free association. These are different ways of speaking and each has its place. Both, incidentally, possess artistic appeal. . . .

Seeking to dispose of art, La Fave has contradicted himself by the use of a very acceptable writing style. Style is a socially preferred and culturally applauded esthetic practice. It is personal, pleasurable, in other words it is an art form. To be consistent and set to work right off to "stamp out art," La Fave should have presented his views in clumping, leaden prose. Displaying an awareness of esthetics is not the best way to brush the arts under the rug. This, fortunately, appears not to be something that many scientists want to do. Some of the best contemporary literary style I can think of is to be found in the pages of *Science*. Obviously, a number of contributors have enjoyed adding an element of art to their presentations. . . .

Wit and art are not less useful to us than mathematics. They may be much *more* functional. Mathematical languages are special inventions—constructs that supply us with unambiguous ways of encoding statements as well as clear instructions for decoding them. There are circumstances, however, under which we require ambiguity. The service that humor and art perform for us is to disguise, in socially acceptable ways, many of our antisocial urges. We need this release in order to survive as socially committed beings who can still keep their egos intact. Martin Grotjahn's *Beyond Laughter* (McGraw-Hill, New York, 1957) is a gold mine of information on the operations of dream-work, wit-work, and art in keeping us presentable to ourselves and to the neighbors—something which mathematics and science are not designed to do. . . .

A good case for the symbiosis of science and art is represented in the practice of medicine. Abstract science and the computer-processing of large masses of information are tools at the disposal of a physician, while the art of medicine provides him with another set of tools. For instance, if 105,000 different cases of heart ailments are broken into components for computer analysis, valuable discoveries can be made demonstrating associations between coronary attacks, weight, age, sex, social group, ethnic group, diet, profession, and so on. But the doctor does not say to an elderly heart patient, "Mrs. Jones, you're a statistical washout." Instead, he becomes an artist, applying his unique, personal experience, wits, and humane emotions. He takes some long-shot gambles . . . And never mind what the Univac said, Mrs. Jones recovers to spend another birthday with her great-grandchildren.

Therefore, let us not waste time and print trying to stamp out art. It is here to stay.

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Photosynthesis on Mars

Your recent editorial "The Martian environment" (6 Feb., p. 683), together with public discussions at the Biophysical Society meeting in San Francisco, prompted me to look into my files for a copy of a letter, dated 16 April 1961, to Phillip Morrison from myself. Since it may have some still useful thoughts on the search for Martian microorganisms, I communicate the main part as follows:

1. It appears to be physically impossible for microorganisms to survive (let alone grow!) at a surface subject to the intense ultraviolet radiation and the extreme dryness present on Mars. . . .
2. On the other hand, ultraviolet radiation and aridity could be readily overcome by a microorganism with a suitable skin. Therefore, the first Martian collecting box should take in a sample with a cookie cutter rather than a sticky tongue.
3. The best hope of demonstrating life in the sample lies in assuming an absolute minimum about the Martian "plants." I suggest as such a minimum that they are photosynthetic.
4. No matter what the detailed mechanism of the photosynthetic process may be, it should be demonstrable calorimetrically. That is, one could show that some of the light absorbed by the sample does not appear as heat. Confirmation of the inference of a biological mechanism might be obtained with an action spectrum.

Note that photosynthesis was measured calorimetrically nearly 30 years ago on earth. [See E. I. Rabinowitch, *Photosynthesis* (Wiley, New York, 1956), vol. 2, p. 1123].

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