

## letters

Colavita that any comprehensive history should include a discussion of the ingenious and carefully carried out experiment of Zahradnicek. A discussion of the work of Zahradnicek and of several others can be found in the references given in my paper. See F. C. Champion and N. Davy, *Properties of Matter*, Blackie, Glasgow (1959).

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## More ancient cathedral

The comments by Leon Cooper (July, page 62), concerning the "humble cathedral" of physics, recalled a preface to an earlier (by almost a half century) text on thermodynamics by Lewis and Randall.<sup>1</sup> In their preface they invoke the metaphor of thermodynamics as an ancient cathedral in which "the curious visitor speaks of serious things, with hushed voice, and as each whisper reverberates through the vaulted nave, the returning echo seems to bear a message of mystery." These authors go on to point out, however, that "in these loftier monuments of scientific thought a tradition has arisen whereby the friendly usages of colloquial speech give way to a certain severity and formality. While this may sometimes promote precise thinking, it more often results in the intimidation of the neophyte. Therefore we have attempted to temper the customary severity of science insofar as is compatible with clarity of thought."

I think Cooper is to be commended for seeking the same objective as that of Lewis and Randall, even though they express it in the somewhat flowery language of an earlier but, perhaps, more innocent age of science.

## Reference

1. G. N. Lewis, M. Randall, *Thermodynamics*, McGraw Hill, New York (1923).

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## People half lives

In May 1970 (page 32) Walter Jordan published a list of death rates or risks that went as follows (in deaths per 10<sup>6</sup> hours of exposure): mountain climbing, 40; riding a motor cycle, 6.6; flying scheduled airlines, 2.4; smoking cigarettes, 1.2; disease and old age, 1.0; private cars in the US, 0.95; railroads and buses, 0.08; and radiation (5 rem per year) 0.05.

It is interesting to turn these into half lives or times by which half the people would be expected to have died if

they exposed themselves to these risks continuously. Our risk table would look like this:

|                            | Half life  |
|----------------------------|------------|
| Mountain climbing          | 2 years    |
| Riding motorcycle          | 12 years   |
| Flying scheduled airlines  | 35 years   |
| Smoking cigarettes         | 63 years   |
| Disease and old age        | 79 years   |
| Private cars in US         | 84 years   |
| Railroads and buses        | 994 years  |
| Radiation (5 rem per year) | 1600 years |

These figures are not the whole story but do give a better perspective.

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## Science and mysticism

It was unfortunate that the statement, "It should be especially useful in helping to win the struggle among today's youth between science and mysticism," appeared in your August editorial (page 88), implying that one must choose between the two. While it is difficult for scientists to accept some forms of mysticism, it is by no means certain that all mysticism must be rejected. Many scientists believe science and mysticism are incompatible, but this is a matter of belief, not accepted by all, and preferably not be put forth as necessary dogma. If science has no place for a person with mystical beliefs it will be much the poorer, in my opinion, and may indeed lose many in the struggle to be accepted as worthwhile.

If you are using the word "mysticism" to be synonymous with "astrology," then I would disagree with your use of the word.

George Ioup  
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## More physics for people

I read with interest the recent letter of Kenneth W. Ford (September, page 9) wherein he calls on physics professors to rise to their responsibility to educate undergraduates who do not have professional goals in physics. At Sonoma we have come to recognize the validity of Ford's admonition at a relatively early point because the far majority of our 5000-member student body does not elect to major in the natural sciences. After much discussion and consultation with students we have begun this year a program of courses leading to a minor in physics that we believe reflects our obligation as physicists to educate people (as Ford emphasizes) as to the character of our science and its relation to their lives. Every student begins the program with a semester of descriptive physics or astronomy in which the subject is portrayed in a form consonant

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