of the eye is one second of arc, a solid object greater than about two feet in its largest dimensions would be resolved in the binocular field, assuming a distance of 10 miles between the observer and the object.

The second observation was of an off-white light that "switched on" above a long, narrow cloud. The intensity of the light varied at a rate of about one "blink" per second. Within a few seconds, this was accompanied by the transient "random flash-bulb effect," all visible in the seven-degree binocular field. Upon depressing the microphone switch of a 37.1 MHz radio, the blinking light extinguished. No other strange events occurred during the evening, although three viewing stations, two of which were separated by 22 miles, were in operation until 2:00 a.m.

The fact that the off-white lights were observed in conjunction with the flash-bulb effect and the fact that the phenomena was observed at relatively low altitude seem to preclude annihilation as a plausible explanation. Two other members of the research team have witnessed the "random flash-bulb effect" independently and on more than one occasion. After personally recording some 100 anomalous events, it is my contention that there is no simple, physical explanation for the variety of phenomena observed.

HARLEY D. RUTLEDGE
Southeast Missouri State University
Cape Girardeau

Earthquake noises

I wish to call attention to Cecil A. Nanney's contribution to earthquake prediction; his work was not cited in Carl Kisslinger's March article on that subject (page 36).

Nanney's article, "Possible Correlations Between Earthquake and Microseisms." *Nature* **181** 802 (1958) presumably lays a foundation for the prediction of some earthquakes.

In a letter to me before his death in October 1973, Nanney wrote, "It is now well known from material researchers, that solids under strain emit acoustic noises prior to fracture. In fact these noises increase up to the moment of fracture just like microseisms, and decrease after the fracture. This is all I was saying (and the microseisms showed) about the earthquakes except on the scale of the earth.

"I read in the newspapers ... that 'the heartbeat of the moon has been observed,' in an apparent reference to continuous oscillations like microseisms, and that this had been observed prior to the largest moon quake. Of course there is a simple explanation in that light of the earthquake–microseism correlation."

As Nanney's chief activity and notable achievement at Bell Telephone Research Laboratories was in solid-state physics, he was able to give little subsequent effort to the problem of earthquakes.

I hope this reference to Nanney's previously overlooked work will be of value to investigators of earthquake prediction.

FRED H. GREENBERG
State University College at Buffalo
Buffalo, New York

Volcanoes in repose

Why limit the distinction of "only active volcano in the 'lower 48 states'" to Mount Lassen, California (caption of cover photo, March, page 5)?

If being "active" is based on the presence of fumarole and thermal-spring activity such as that depicted in the cover photo of Bumpass Hell, it should be noted that Mounts Baker, Rainier and Hood have well known fumarole fields of comparable area and vigor as any thermal zone near Mount Lassen. Within the past few years thermal activity has also been documented at Glacier Peak, and Mounts St. Helens, Adams and Shasta.

Also, if an "active" state is based on the recent time of the last eruptions (1914–17 for Mount Lassen), it should further be noted that eruptive products have been dated to the mid-1800's for some of the above-mentioned volcanoes, while historical observations of additional eruptive activity—dubious or otherwise—permeates 19th-century Pacific Northwest literature. Of what importance is 100 years here or there when the state of a volcano is in question?

It is possibly better to discard the terms "active" or "inactive" and instead consider Mount Lassen, as well as most of the other Quaternary stratovolcanoes of the Cascade Range, as merely in the state of repose, with fumaroles, warm ground and thermal springs common to quiescent volcanoes.

DAVID FRANK
Burton, Washington

Fear of creativity

If I might be permitted to make some polemical remarks concerning the present cultural state of the profession of theoretical physics, I would say the following: Theoretical physics, like most of the archaic institutional forms of the western world, is rushing toward a fatal disaster for which few establishment physicists have dared to take responsibility. The only way to avoid this is through a mutation in our professional

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consciousness. The lack of money for fundamental research is only a symptom of a more deep-seated problem. The fault lies within ourselves and not with our politicians, who respond to us. We have built repressive forms of Imperial ego-serving, scientific-educational complexes along feudalistic lines. The scientific "warlord" system is collapsing under its own weight.

The great physicists of the early twentieth century have by and large failed to pass on their creative spark. This was perhaps caused by the upheaval of the Second World War, with the consequent prostitution of physics to the Satanic mills of the military and the corporations. Virtually all that remains today is a pious hero worship for the golden age of physics.

I find great fear and distrust of the intuitive creative spark among our ranks. Few if any of the great theoretical discoveries have been made by "linear" mathematical thinking but rather, by intuitive leaps of the imagination, with mathematics in a "mopping up" operation. Jeremy Bernstein writes:

"In reviewing Einstein's career, especially in the early years, one is continually struck by the difficulties his contemporaries had in fitting him into the normal spectrum of scientific achievement. By the time of the First World War every physicist realized Einstein was a creative genius but his work was viewed at the time as so unconventional that it is difficult to find a physicist who had fully digested and appreciated the totality of it. This was due in part, perhaps, to the deceptive simplicity of the early papers—results seemed to materialize out of 'thin air' rather than out of long chains of elaborate calculations . . . " J. Bernstein, *Einstein*, Viking, New York (1973), page 187.

The creative process is inherently unstable. The "disruptive" personality traits characteristic of creative genius are systematically repressed and discouraged by our educational institutions. Every physics graduate student of any imagination quickly learns this and is early introduced to the labels of "crackpot," "crazy ideas," and so on. He is told to work on "safe problems" and to develop a sense of "professional taste," which actually means that he should work on whatever ideas happen to be fashionable at the moment.

Our use of the term "speculation" in the pejorative sense, our fear of re-examining fundamental questions on the meaning of quantum mechanics (for instance, the widespread hostile emotional response to David Bohm's papers on hidden variables), our fraud of grading and teaching students according to fixed compartmentalized physics curricula, our distrust of imagination, intuition and analogical thinking, our exaggerated respect for mathematical technique at the expense of physical insight—all of these are inevitably leading to widespread professional despair and cynicism among the younger generation of physicists. These are facts that can only be ignored at great peril by the leaders of the physics establishment. The new generation of theoretical physicists are largely mathematical mandarins who have been professionally emasculated by their graduate training.

With this letter I announce the formation of a new physics *Ecclaesia* (spiritual community), and I invite all who feel as I do to communicate with me on these matters.

JACK SARFATT
International Centre for Theoretical Physics
Trieste, Italy

Engineering and the public

To supplement the information published in your articles on "Public-Interest Science" in June, I would like to report that the Institute of Electrical and Electronics Engineers has formed a Committee on the Social Implications of Technology and a Committee on Man and Radiation. The latter group was formed to provide information on the biological effects of electromagnetic radiation that is readily understandable by a layman, but that is still factual, accurate and complete.

The IEEE has also joined with the other members of the Engineering Liaison Public Relations Committee (AACE, AIIE, ASAE, ASM, ASME, ASQC, ITE, NSPE, and SWE) in sponsoring a series of Public Affairs Involvement Workshops. These are one-day "teaching" sessions to explore ways that engineers can use their expertise in helping to solve local community problems. Three have already been held and two more will be scheduled this year.

MARTIN GITTEN
Institute of Electrical and Electronics Engineers
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