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believers, and I doubt that quantum electrodynamics is necessary."

According to the quantum theory, everything is quantum mechanical; and if not, then the theory must be scrapped, and replaced by a new one (perhaps a neoquantum theory?).

One thing that any theory must explain, however, is the phenomenon of superradiance—greatly enhanced *spontaneous* emission due to coherence in spontaneous radiation processes (R. H. Dicke, Phys. Rev. **93**, 99, 1954).

According to quantum theory, the basic Hilbert-space superposition principle explains superradiance neatly, as an interference effect (constructive interference, as opposed to destructive interference, which can cause extremely low spontaneous-emission rates, also observed experimentally).

However, a semiclassical theory that dispenses with such effects for the electromagnetic field would not appear to be able to explain such extremes in the observed spontaneous-emission rates, and hence one might think that Jaynes would have to do some acrobatic thinking to explain how the semiclassical radiation theory can account for some spontaneous-emission phenomena that have indeed been observed, but for which, so far, only quantum mechanics seems to supply an answer.

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Self-pacing: more caution

We wish to comment on the letter by T. R. Sandin, Julius Taylor and O. B. Okon (October, page 15). The authors, in noting the growing popularity of self-paced courses, offer a cautionary note to those conducting or planning forms of self-paced courses in which disadvantaged students will be enrolled. They point out, "for example, the extreme version of the self-paced course in which the student is given some sort of study guide and then left mostly on his own to achieve the guide's objectives will produce disastrous results for most disadvantaged students." Of course, experience has shown that the standard lecture course will also be disastrous for most of these students. Self-paced courses, *when properly designed and correctly implemented*, have demonstrated again and again their superior ability to generate activity and interest in the subject being studied.

Keller method or PSI courses are only one possibility among many for implementing self-paced instruction. They have the advantage, however, that they have been carefully conceived to modify student behavior by using principles that have evolved from years of work on the development of the reinforcement theory of learning. The Keller method is not an "extreme version" of self-pacing; in fact, it incorporates the desirable features of a self-paced course as cited by Sandin *et al.*

We offer a caution in addition to that of Sandin *et al:* Either use the procedures as put forth by Keller or his disciples[1,2,3] with no modifications, or put in the time and effort required to learn enough reinforcement theory so that you can defend the modifications you are making with reference to reinforcement theory.

The Keller method of instruction is a delicate apparatus. If you don't understand the principles of its operation, the probability that tinkering with it will improve its operation is very small.

References

1. Fred S. Keller, "Good-bye teacher . . .," Journal of Applied Behavior Analysis **1**, 79 (1968).
2. Ben A. Green, Jr, "Physics teaching by the Keller Plan at MIT," Am. J. of Phys. **39**, 764 (July 1971).
3. *Proceedings of the Keller Method Workshop Conference*, (A. J. Dessler, ed) Rice University, Houston, Texas (1972).

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The Gibbs in use

In his letter (October, page 67) Hans Cassell proposes the "Gibbs" as the cgs unit of surface tension. His proposal prompts me to point out that the Gibbs is already in use as a unit of entropy (1 Gibbs = 1 cal deg^{-1}), principally by W. F. Giauque and his coworkers at Berkeley [see, for example, J. Chem. Phys. **42**, 3 (1965)]. It appears that there is no lack of desire to memorialize Gibbs.

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Physicists on coins?

The local chapter of SPS is considering a project of collecting coins that have pictures of physicists or physics equipment on them. We would appreciate any information that anybody has on lists of such coins and we would like to correspond with anybody who has been collecting them. Perhaps we will find that there are not that many coins that