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COVER: An electron neutrino has entered Fermilab's 15-foot bubble chamber near the center of the bottom of the picture. The neutrino, which makes no track, strikes a nucleus and produces a number of particles (diverging tracks). The signature of the electron type of neutrino is a fast electron, which produces the "shower" of particles in the center of the picture. If experimenters should find another kind of neutrino, the tau neutrino, where they expect electron neutrinos, they will know that neutrino identities oscillate back and forth. See p. 377. (Photo: Fermilab)

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LETTERS

Monkeying around with language

A central issue in the current controversy over whether apes can "talk" (SN: 5/10/80, p. 298; 8/19/78, p. 117; SCIENCE: 207, p. 1330) has been ignored. Definitions of words such as "language" or "talk" are essentially arbitrary. There exists no essence of "language" anywhere in nature, including our heads. Thus, we will never discover the "true meaning" of "language" by analyzing and comparing the behavior of apes to humans. Depending upon our individual prejudices, we use the word "language" as we wish; however, it is necessary to reveal *how* we are using it in order to participate meaningfully in discussions involving the word. Only when definitions are clarified can such a discussion proceed from a useless, verbal exercise, to exploration of a real problem which has a solution.

Although never right or wrong, true or false, definitions are more or less appropriate, as judged by criteria such as clarity, usefulness and conventionality. Rather than argue over whether apes use a "language," we should discuss which specified definition of "language" best fulfills the criteria for an appropriate and useful definition. Once this is agreed upon, apes either do or do not use a "language," by definition. In general, the controversy is not over how apes and people behave so much as it is over loose and unspecified definitions used to describe this behavior. (By my definition, apes can "talk," by yours, perhaps, they cannot!)

*Barbara E. Wright
 Boston, Mass.*

Your reporter, Joel Greenberg, mistook my saying that the macaques were behaving like pigeons in the arbitrary-matching task as "indirect and uncertain support" for Herbert Terrace's debunking of nonhuman language research. I wish to dissociate myself from Terrace's point of view. Unlike Terrace, I think the results so far of attempts to instill verbal behavior in nonhuman species support the view that the behavioral capacities underlying linguistic skills exist in varying degree in a wide range of vertebrates. That leaves open the crucial question of what behavioral capacities underlie linguistic skills, and the subsidiary task of specifying the extent to which specific species possess the requisite capacities. To answer such questions we may need a behavioral theory of language as general and abstract as, say, B.F. Skinner's (1957).

References:
 Skinner, B.F., *Verbal Behavior*, New York: Appleton-Century-Crofts, 1957.
*Evelyn F. Segal, Ph.D.
 San Diego, Calif.*

Fallacies of fertility

As one of several medical physicists employed by a large medical center, I very often find myself trying to dispel misconceptions regarding the biological effects of radiation. A common question, sometimes asked jokingly by personnel, is "Will I become sterile?"

In your article, "New bedfellows: Freedom and infertility" (SN: 5/31/80, p. 341), Dr. Mazor is quoted as saying, "...and environmental factors — drugs, chemicals, radiation, etc. — that may have a delayed effect on fertility."

I feel the inclusion of radiation as a factor in the apparent rise of couples with fertility problems was quite unwarranted. The average annual whole body radiation dose to personnel occupationally exposed has been drastically reduced, through stricter protection standards, since the 1920s. In addition, average annual gonadal doses to individuals in the general population have no doubt been reduced. Banning of fluoroscopic shoe-fitting devices and the increased emphasis on patient protection during medical exams (i.e., use of lead aprons during dental X-rays) is supportive of that generalization. When one considers the fact that it takes localized radiation doses to the gonads, on the order of near lethal levels if delivered to the whole body, to produce only temporary impairment of reproductive capacity in man the implication cited seems totally unfounded.

Mankind has much to benefit from the uses of radiation in various manners. It is time to objectively educate the public to the benefits and the risks. Perhaps SCIENCE NEWS can help through future in-depth articles.

*David J. Allard
 Albany, N.Y.*

The answer

The answer to I.I. Rabi's question, "Consider the muon; who ever ordered that?" (SN: 5/10/80, p. 293) seems to lie in the need of neutrinos to oscillate, which in turn follows from wave-particle duality. If there must be an alternative state to which an electron neutrino may oscillate, there must be an alternative particle (the muon) with which to associate this alternative neutrino state.

*John L. Hitchcock, Ph.D.
 San Francisco, Calif.*

Correction: The magnitude 3 or greater quakes that occurred on Mt. St. Helens (SN: 5/24/80, p. 324) took place from midnight May 18 to midnight May 19.

Correction: The true rotational period of Saturn (SN: 5/31/80, p. 341) is 10 hours 39.9 minutes ± 0.3 minutes.

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