et al. (*1*), using an electrophysiological technique.

4) We agree with Wharton *et al.* that our assignment of a band at 12.5 μ to an isopropylidene group was an unfortunate one. The assignment was based on the absence of this band from the infrared spectrum of the hydrogenated attractant. Gas chromatography of the hydrogenated attractant and the synthetic saturated product on packings different from those described has indeed shown the presence of several peaks, identical in the two preparations.

In spite of the marked instability of our cockroach sex attractant, we are attempting to synthesize this material. In the final analysis, only synthesis can serve as the decisive factor.

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References

1. J. Boeckh, E. Priesner, D. Schneider, M. Jacobson, *Science* **141**, 716 (1963).

Biological Mechanisms of Aging

In a recent very stimulating paper [*Science* **141**, 686 (1963)] Curtis has discussed biological aging processes and concluded, quite justly, that somatic mutations appear to have a primary importance in reducing longevity of living creatures. I think, however, that he has been unjust in holding up the "wear and tear" hypothesis of Selyle, Comfort, and others as antithetical to the "somatic mutation" hypothesis which he espouses so effectively.

While Curtis has shown conclusively that certain stresses, even when applied systematically and repeatedly, do not accelerate aging, he has *not* shown that a wide variety of such stresses (such as are the burden of every living thing) will not do so. As he points out, certain stresses cause irremediable damage to some organ or tissue and thus make eventual failure at that point relatively likely. The beauty of radiation as an experimental stress is that it is general, striking all sensitive tissues at once. But from the experiments reported by Curtis we cannot say that application of a number of specific chemical and disease stresses will not bring about a general loss of viability similar to that caused by radiation. The advance Curtis has made is to suggest (implicitly) that the wear-and-tear hypothesis *is commuted to* the somatic-mutation hypothesis by the recognition that viability-reducing stresses are those which are mutagenic in certain susceptible tissues: those in which mitosis is slow. The two hypotheses are more alike than they first seemed.

Experiments like those of Curtis's group are suggested, in which mice during their laboratory lifetimes are subjected to a carefully selected *range* of stresses. Like Selye, I would include various types of psychological stress, in addition to numerous chemicals and diseases, because such stresses are notorious as "imbalancers" of function in many of the organs now shown to be most susceptible to weakening by somatic mutation.

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I think Whipple's suggestion is excellent and am inclined to agree that if just the right combination of stresses were found it would shorten the life span. But the question would then be: What does this have to do with natural aging? It is apparent there is abundant room for future research.

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Blood of Anthropoid Apes

Readers using the report by Wiener and Moor-Jankowski on blood groups in apes and baboons [*Science* **142**, 3588 (4 Oct. 1963)] will probably also be interested in a neglected paper by Yvan Bereznay [*Bull. Soc. Roy. Zool. Anvers No. 10* (1959)]. Bereznay gives detailed data on blood groups, chemistry, counts, various measurements, and immunoelectrophoretic patterns for nine chimpanzees, six gorillas, and two orang-utans. A finding in some contrast to that of Wiener and Moor-Jankowski concerns the blood groups of gorillas: Bereznay reports type O in four *Gorilla gorilla beringei* and one *G. g. gorilla*, type A in one *G. g. beringei*.

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