have; 1-year-old infants have some eight to ten times the adult concentration. In view of this, and since the biological effects of radiation are more serious on rapidly growing and metabolizing cells, it seems to me that a separate maximum permissible body burden should be set for children, at approximately 0.003 μc.

That this figure is not unreasonably low is apparent in studying data from some Russian studies (cited by Engstrom *et al.*) on the effects of injecting small amounts of Sr^{90} into dogs; these animals developed bone cancers approximately 3 years after injection of 0.0001 μc of Sr^{90} per gram. Engstrom *et al.* calculate that the retained dose in a 10-kg dog would be of the order of 0.01 to 0.1 μc. Now, a 1-year-old child weighs approximately 10 kg, and it seems evident, to me at least, that its maximal skeletal concentration must not be permitted to reach the order of concentration of Sr^{90} known to cause fatal bone cancers in dogs.

We learn from the article by Kulp *et al.* that in 1966, when the highest skeletal concentration of Sr^{90} in young children will occur, some 1 percent of the world's children are expected to have a skeletal concentration of 20 μμc per gram of calcium. Since the average 1-year-old infant, weighing 10.6 kg, has roughly 100 g of calcium in his body, it follows that in 1966 1 percent of these children will have a total Sr^{90} skeletal level of 0.002 μc, and beyond doubt a significant fraction of 1 percent (hundreds of thousands, millions ?) will have exceeded our suggested limit of 0.003 μc, and some may have skeletal concentrations of the order of those known to cause cancer in dogs.

This happy picture is based on the optimistic assumption that no further testing of nuclear weapons will occur (and neglects to consider the effect of other radioactive fallout elements). But what if nuclear tests continue?

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Imprinting

Eckhard Hess, in his stimulating survey of recent progress in studies of imprinting [*Science* **130**, 133 (1959)] referred briefly to his inability to attain auditory imprinting with mallard ducks, *Anas platyrhyncus*. He did not mention, however, that it has been possible to attain auditory imprinting with other species—for example, *Aix sponsa,* the wood duck [P. H. Klopfer, *Ecology,* **40**, 90 (1959)].

This point would not ordinarily be of great significance except that it illustrates the importance of attending to interspecific differences in the survival value of particular kinds of behavior. Hess' paper shows the wild mallard to be an excellent imprinter, while the wood duck is considered to be poor. But, if auditory rather than visual stimuli are used, quite the reverse situation obtains. To a zoologist this seems reasonable: mallards nest in comparatively open situations, wood ducks in holes recessed in trees. Mallard young can see their mother when she first leaves the nest, the wood duck young cannot. Thus, the seeming importance of visual patterns for imprinting may be a reflection of the dominant sensory modality of the subjects rather than a characteristic of a particular type of behavior. In fact, one of the earliest reports on this subject dealt with olfactory imprinting [W. H. Thorpe and F. G. W. Jones, *Proc. Roy. Soc. (London)* **B124**, 56 (1937)]. The importance of olfaction to most mammals should suggest that it would be a mistake to confine further work in this area to the otherwise ingenious apparatus devised by Hess.

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Peter Klopfer's comments concerning my article are worth noting but do not precisely relate to my findings. Certainly we obtained auditory imprinting in the mallards, as well as in other species, since sound is used in our presentation along with the visual object. What we were not able to demonstrate for the mallard was *auditory imprinting in the egg.*

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Strontium-90 Levels and Wheat

In "Strontium-90 in man III" by Kulp, Schulert, and Hodges [*Science* **129**, 1249 (1959)], "the widespread flow of wheat and powdered milk from the Northern to the Southern Hemisphere" is suggested as a possible explanation for the smaller difference in the strontium-90 levels in bone than in recorded fallout between the two hemispheres.

As related to wheat, at least, this is highly questionable. Argentina and Australia are two of the world's principal wheat exporters. A cursory review of the FAO *World Grain Trade Statistics* indicates that in 1956–57, the latest crop year for which full data are available, movement of wheat (including the wheat equivalent of flour) from the Northern to the Southern Hemisphere was on the order of 1220 thousand metric tons, as compared with a movement of 4300 thousand metric tons of Southern Hemisphere wheat into the Northern Hemisphere. Another 2500 thousand metric tons moved between Southern Hemisphere countries, the largest share of this local trade being represented by Argentine exports to Brazil (1040 thousand metric tons) and Australian exports to New Zealand (340 thousand metric tons). Indonesia, Singapore-Malaya, Ecuador, and the Belgian Congo as well as Brazil are here considered Southern Hemisphere countries, although part of each is in the Northern Hemisphere.

If strontium-90 is moving across the equator in wheat, it would appear probable that the net movement is northward rather than southward.

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We appreciate the correction of Parsons showing that the net flow of wheat, if not of powdered milk, is from the Southern to the Northern Hemisphere. Flow in either direction is, of course, equally effective in bringing the strontium-90 content of human bone toward a mean, so that the North-South ratio of strontium-90 concentration in human