Book Reviews

Radiation Effects

Cancer in Atomic Bomb Survivors. ITSUZO SHIGEMATSU and ABRAHAM KAGAN, Eds. Japan Scientific Societies Press, Tokyo, and Plenum, New York, 1986. viii, 196 pp., illus. $55. GANN Monograph on Cancer Research no. 32.

Survivors of the atomic bombings of Hiroshima and Nagasaki in 1945 provide the major source for estimates of irradiation-induced harm to humans, and this slim volume reviews the carcinogenic effects of radiation in the Japanese. The broad basic facts are now well established: The bombings caused acute leukemia with peak incidence five to seven years after irradiation, and solid tumors only after a 15- to 20-year latency with continued increasing incidence 40 years later. Hiroo Kato, epidemiologist with the Radiation Effects Research Foundation (RERF; formerly Atomic Bomb Casualty Commission, ABCC), provides a chapter that summarizes the major findings and gives a total for excess mortality due to irradiation-induced leukemia and cancer. He estimates that from 1950 to 1978, 190 excess deaths from leukemia and 336 excess deaths from cancer occurred, for a total excess mortality of 526 persons among 283,000 survivors.

The 13 chapters in this book address the epidemiological and statistical methods used in studying this vast population, the bombs and their power and composition and emission of radioactive particles, and the epidemiology of specific cancers. In basic destructive power the bombs themselves were both in the range of 15- to 20-kilotons of TNT equivalent. However, the uranium bomb used on Hiroshima generated relatively more neutrons than gamma rays compared to the plutonium bomb Nagasaki received. Attempts to assign actual radiation doses to people at varying distances from the bomb epicenters have been stymied by our inadequate understanding of the physical properties of these two weapons. Another report by the physicists is in preparation, but I doubt that precise consensus on the physical aspects of the irradiation will be achieved. The issue is not simply pedantic, because almost all biological dose- or distance-related effects seem about twice as severe per unit of radiation in Hiroshima as in Nagasaki. Maruyama, in his chapter, reviews the bombs and the problem of dosimetry in a manner comprehensible to the non-physicist.

Concerning carcinogenesis, the RERF/ABCC group of scientists continue to provide support for a direct linear relationship between radiation dose and leukemia and cancer induction. Their data support some excess carcinogenesis when children are the targets, but otherwise the cancers occur in their usual age-related manner. Cancers of all tissue sites, except, curiously, rectum and uterus, have been increased in incidence in bomb survivors in a dose-related way. Kato's chapter has a useful illustration of the relative risks of cancer by dose, and leukemia, of course, leads with a 12-fold relative risk. Although acute lymphocytic leukemia was never detected and tissue lymphomas occur with only modest relative risk of 1.8, multiple myeloma is a B-cell disease that has emerged only after 30 years with a high relative risk of 6. Ichimaru and her colleagues present an interesting discussion of myeloma and also provide a solid review of the leukemia and lymphoma data.

The book, well written and cohesively and carefully edited, is a welcome summary of the current status of carcinogenesis among the people of Hiroshima and Nagasaki. The publication was solicited by the Japanese Cancer Association as part of the total international summing up, in August 1985, of the first 40 years of the atomic age. Somehow, the inhumanity of war, and of nuclear war in particular, hovers over this report. Made more sinister perhaps by the careful prose and guarded conclusions of the statisticians, this is nonetheless the horrifying account of the aftermath of humanity's first venture into nuclear war.

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Early Cognition

The Origins of Logic. One to Two Years. JONAS LANGER. Academic Press, Orlando, FL, 1986. xii, 415 pp. $75; paper, $36.95.

For a time, in the rush to elucidate the remarkable capabilities of newborns and young infants, the second year of life was all but forgotten by psychologists. Recently, however, there has been renewed research attention to the cognitive, social, and emotional transformations that occur during this period. Current studies show that in the second year children make major advances in understanding language and everyday routines, controlling their attention, solving problems, and discovering caregivers as both social partners and conveyers of rules. At the same time, however, less mature behaviors persist, and loss of control sometimes occurs. These mixed patterns of behavior virtually guarantee an unsteady transformation to higher levels of functioning.

In *The Origins of Logic: One to Two Years*, Jonas Langer asserts that the second year is a time of developing logicomathematical knowledge. Langer maintains that logic exists when young children show an awareness of part-whole relationships, reversibility of sets, and the quantitative equivalence of objects. This cognition is not initially based on a symbol system; logical mathematical operations come out of young children's interactions with their environment, and cognitions are constructive products of their own actions and observations. But here too, the transformation to logical thought is not simple; elements of primitive and more advanced forms of cognition coexist.

Langer draws from Piaget, who defined logicomathematical "experiments" as deductive reasoning discoveries made by children in the preoperational stage of thought. Piaget's classic illustration concerned a five-year-old who by chance found that arrangements of objects are independent of their sum. Piaget emphasized that such discoveries result from actions on objects. Langer also gives a prominent role to action, but he places the beginnings of logicomathematical cognition at about 15 months of age. Toddlers, he says, show evidence of composition of sets, decompositions, exchanges, classifications, and substitutions of objects. Langer records in great detail the object manipulations of these very young children as they group and regroup small sets of playthings, seemingly taking into account their forms and functions. According to Langer, these kinds of elementary logicomathematical actions will ultimately be linked to representational ideation.

Are these child acts genuine exemplars of logicomathematical thought? It depends upon one's definition of the construct. A long-held view is that logical thought must involve ideas, sequences of reasoning, proofs, and inferences. Many would argue that the mere grouping of objects and their subsequent displacements do not constitute logicomathematical thought even if children realize that actions are associated with particular principles.

However, Langer is not the first to suggest that very young children have sophisticated cognitive abilities. Other investigators indicate that basically nonverbal infants are able to define simple categories and discriminate small number groupings. These behaviors, some propose, bear a resemblance to those shown by more cognitively mature individuals. Accordingly, the term