

GENETICS

Radiation Can Harm Race

► IF AN atomic war raises the atomic radiation around us to even the amount considered the "maximum permissible," there would be about a third of a million infants born in the United States alone each year that would carry in their germ cells undesirable characteristics.

These affected genes would go on influencing heredity for generations to come. Persons defective physically or mentally may result.

This was the warning of Dr. A. H. Sturtevant, California Institute of Technology geneticist, who said he believed "it is inexcusable to state that no hazard exists" from increases in high-energy radiation to which human populations are being subjected.

Sources of increased radiation are explosions of A-bombs and H-bombs and the widespread use of medical X-rays. There are two types of hazards, those to the exposed individuals, and those that affect their descendants through genetic damage.

As for radiation increase due to fall-out at current levels, Dr. Sturtevant said, "it may be expected to give about one deleterious mutation per 100,000 germ cells per generation, or, since each individual arises from two germ cells, one per 50,000 conceptions." At present rates of radiation increase due to fall-out, this would lead to about 78 mutated germ cells a year in the United States and to about 1,800 a year for the world, Dr. Sturtevant said.

He sounded a sharp warning against any reckless use of medical X-rays. Radiation from this source, he said, appears to be a far more effective cause of mutation

than is radioactive fall-out in much of the world.

"In the case of pregnancy examinations," he said, "it must be remembered that not only the mother's ovaries but also the germ cells of the child are being exposed. In the case of irradiation of the ovaries of a sterile woman to produce fertility it may be calculated that the resulting child has at least one chance in 50 of carrying a new mutation due to the treatment."

Speaking of the significance of his figures on genetic damage due to bomb fall-out, Dr. Sturtevant said:

"It may seem that this is a negligible proportion, and it should be emphasized that no individual should be particularly disturbed about the probability that his immediate descendants will be affected. But from a humanitarian point of view, any increase at all in the number of individuals that are defective either mentally or physically is not to be lightly dismissed."

The medical use and the fall-out danger Dr. Sturtevant considers different not only in the amounts of irradiation involved, but also in some ethical respects. An individual does not usually have to submit to X-ray examination or treatment and, when he does so, the irradiation is administered for his own personal advantage.

"But we are all of us submitted, willy-nilly, to fall-out," he said, "and while it may be argued that some of this is for our ultimate advantage, it must be recognized that we get fall-out from Russian bombs as well and that the rest of the world gets it from Russian and American bombs alike."

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two years, potatoes, carrots and cabbage were added to the diet, and the amino acid mixture was fed as a thick gravy flavored with tomato puree instead of as soup.

Backward, or mentally deficient, children who do not suffer from phenylalanine poisoning would not be helped by this diet. A simple test of the child's urine detects the unusual defect in body chemistry.

Some patients with epilepsy might also be helped, the studies suggested, since one of the three children stopped having attacks of epilepsy, which had also afflicted him.

"Petit mal epilepsy," the scientists said, "may also be due" to phenylalanine poisoning.

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NUTRITION

Diet Raises I. Q.

► DISCOVERY OF a diet that will raise the I.Q. of mentally defective children suffering from the rare condition, phenylketonuria, was announced by Drs. L. I. Woolf, Ruth Griffiths and Alan Moncrieff of the Hospital for Sick Children, London, in the *British Medical Journal* (Jan. 8).

Three small children, two of them idiots and one an imbecile, have been fed this diet for four-and-a-half to ten months.

The mental ages of all three have increased at a marked rate, their I.Q.'s have risen and they may reach an intelligence level that will allow their going to school and being educated.

The previous lack of mental development in these children was due to a defect in the way their bodies handled the amino acid, phenylalanine. About four out of every 100,000 population are born with this defect.

Since phenylalanine poisoning caused the mental deficiency, Dr. Woolf decided to try

devising a diet that would not contain this amino acid. Unfortunately, all dietary proteins are about equally rich in content of this particular amino acid.

Dr. Woolf solved the problem by using an acid hydrolysate of casein. This milk protein contains all necessary amino acids.

By treating it with charcoal, Dr. Woolf extracted the unwanted phenylalanine. This also removed tryptophan and tyrosine, which were put back into the mixture.

The material was fed as a soup cooked with starch and water. Since the patients were young and backward, the oldest being five years, with a mental age of eight months, soup feedings were particularly suitable for them.

As they progressed in mentality, a special kind of sugar cookie was allowed. They also got as much water and orange juice and sugar-water as they wanted, plus doses of vitamins and minerals.

For a child with a mental age of over