# Earth Rays May Be Evolution Cause

*Biology*

Rays from the earth itself may be the exciting cause of evolutionary changes in animals and plants. Invisible, short-wave radiations, similar to those given off by radium, have been shown by two University of California experimenters, Dr. E. B. Babcock and Dr. J. L. Collins, to cause mutations, which are the type of change now believed to be responsible for most evolutionary development. This is the first experimental demonstration of an actual evolutionary driving force, emanating from the earth itself.

Not long ago, the scientific world was excited over the wholesale production of mutations by shooting heavy doses of X-rays through the germ-plasm tissues of animals and plants. It was suggested then that similar changes might occur in nature, through the agency of similar radiations known to be given off by the earth. These natural rays are, of course, much feebler than the powerful units used in the laboratory, so that the number of mutations to be looked for in nature would be only a small fraction of those produced under the X-ray tube.

The method of testing that occurred to Dr. Babcock and Dr. Collins was to expose genetically similar strains of fruit-flies in two different localities, one of which was known to have more earth-radiation than the other. By means of sufficiently delicate instruments, they found that the rocks in Twin Peaks tunnel, San Francisco, gave off about twice as much radiation as did the soil of the University of California campus at Berkeley. Accordingly they arranged to expose their comparison cultures in these two places.

The strain of fruit flies they used was known to be liable to produce a mutation of the kind called "sex-linked lethal". That is, every once in so often a culture would arise in which all the males died before hatching, leaving nothing but females in the bottle. Not a very useful sort of mutation, of course, but for demonstration purposes as good as any.

After five months of industrious fly-culturing, the two researchers checked up their records, and found that in the more highly radiant tunnel locality the mutation they were watching occurred about twice as often as it did on the university campus. It turned up in only a small fraction of the cultures in either place, but the percentage was constant and consistent. They regard it as a fair demonstration of the connection between X-ray-like radiations from the earth and the occurrence of evolutionary changes.

"It seems fairly safe to conclude even now," they state, "that the natural ionizing radiation of the earth is an important factor affecting the rate at which new inherited characters appear in animals and plants. While it may not be inferred that ionizing radiation is the direct cause of mutation, yet a way is now open by which this question can be attacked experimentally. But no matter whether earth radiation actually causes mutation or whether it only affects its rate of occurrence, there can be little doubt that it has played and is playing an important role in in the great drama of organic evolution.

"It is well known that there is always more or less ionizing radiation at the surface of the earth; also that there are various natural sources of radioactive materials. Radioactive mineral deposits which lie near the surface of the earth may perhaps be considered the most important sources of the ionizing radiation which presumably affects the course of evolution. Comparative biological surveys of the natural flora and fauna in regions found to have constantly higher rates of ionizing radiation than those which obtain as a general rule on the surface of the earth may reveal valuable confirmatory evidence in support of these findings.

"Of broad theoretical interest, this discovery has equally important practical aspects for agriculture and perhaps even for man himself. The possibilities appear especially attractive in the case of domestic animals which are not so easily treated experimentally with X-rays or radium as are plants for the purpose of inducing new hereditary characters."

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## In This Issue—



## U. S. in Radio Conference

*Radio*

International agreement on radio wave lengths, assignment of special bands for aviation and police use, limitations of power of broadcasting stations and establishment of some international service for measurements of frequency, may be some of the results of an international radio conference to be held in the Hague, beginning September 19. An appropriation of $27,500 for expenses of the American delegation, passed by Congress a few hours before recessing, assures American participation.

Commissioner H. A. LaFount and Capt. Guy Hill, chief engineer, will represent the Federal Radio Commission at the Conference, while other representatives will be chosen by the State Department. These will be selected from the various government departments operating research laboratories and having radio facilities. American companies and radio associations desiring to send representatives may do so, and the State Department has asked that it be given their names.

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