PHYSICS

Cosmic Rays May Have Local Origin in Our Own Galaxy

OUR OWN galaxy may be the birthplace of cosmic rays, instead of remote interstellar space. This drastic revision of scientific thought was tentatively advanced at the Symposium on Cosmic Rays sponsored by the University of Chicago by Nobel Prizeman, Dr. Arthur H. Compton.

The new hypothesis is at variance with the exploding universe theory of the origin of cosmic rays advanced by the Belgian scientist-priest, Abbe G. Lemaitre, which has found considerable acceptance among physicists.

The basis for Dr. Compton's viewpoint is his failure to find any evidence of the so-called "galactic effect" in the rays' intensity.

It has been previously suggested that there should be a variation of the cosmic radiation, throughout the day, if the rays originated beyond the Milky Way. According to theory, more rays should be received in the northern hemisphere than in the southern, because the northern hemisphere would be the forward moving side of the earth, in the rotation of the galaxy.

The situation would be like that of a person riding on a merry-go-round in the rain, who would be hit by more rain drops in the face than in the back, explained Dr. Compton.

Prof. M. S. Vallarta, of the Massachusetts Institute of Technology, told the symposium of his calculations of this "galactic rotation" effect and its magnitude, if it existed. Observations made throughout the world, Dr. Compton said, have failed to find an effect even one-tenth as large. These observations have forced the conclusion that the cosmic rays therefore originate "locally" within our galaxy.

"We should continue to think of the cosmic rays as very old, perhaps dating from the origin of our galaxy itself, perhaps being the accumulation of millions of years of some gradual process giving rise to high energy particles. We should not, however, think of them as coming from space which on an astronomical scale is very remote," the Chicago physicist said.

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HOME ECONOMICS

Keep Stocking Diaries; Life Stories of 253 Pairs

THE life stories of 253 pairs of silk stockings, kept in diary form by 50 school teachers and other employed women, were revealed at the American Home Economics Association meeting.

Dr. Ida A. Anders, professor of textiles and clothing at the University of Tennessee, reported that delicate two-thread hose were worn on the average ten times; three-thread hose 18 times; and four-thread hose 20 times.

Stocking-buying experiences of the 50 women and an additional 50 were also recounted. Dr. Anders found these women were most impressed by appearance of stockings, when buying. Price came second and durability third. Although 29 brands of stockings were bought, 40 per cent of the women stuck to the one brand they preferred.

Children Grow Brighter

A child may grow more intelligent by associating with bright children.

Or, he may lose some of his precious intelligence by having to mingle too closely with dullards.

Evidence regarding this newest psychological understanding of human intelligence was presented by Dr. Beth L. Wellman of the University of Iowa. Dr. Wellman told of children whose I. Q. improved from "average" rating to "genius." Favorable educational experiences were responsible for the change, she said.

A child's intelligence may be helped, she said, by putting the child in situations which encourage him to think independently, to use his intellectual curiosity, and situations which enrich his experience and challenge his ability to keep up with the group. Experiences which lack these opportunities for self development are likely to produce a loss in I. Q., she added.

"Our notion in regard to the nature of intelligence is undergoing radical revision," Dr. Wellman declared. "The idea of an unchangeable I. Q. must be discarded."

Intelligence tests are still useful, she said, but must be interpreted differently.

Living Rooms Evaluated

What the old family living room looks like to young high school students was reported to the meeting.

In one Alabama county, 200 high school boys and girls reported on the living room at home, Henrietta M. Thompson of the University of Alabama said. The results which she described show no problem of ultra-modernism. Oil lamps and unpainted walls are more in evidence.

The students' reports, summed up, include:

1. All but four of the living rooms have pictures; but 40 per cent of the pictures come from calendars and magazines.

2. The average living room has 2.5 windows, but over half of the windows are held up by a stick or hook.

3. The favorite furniture is a set, and the average number of pieces used is 8.5.

4. Ninety-five per cent of the homes are frame buildings, and 44 per cent are unpainted.

5. About one-third of the homes have access to electricity; two-thirds use kerosene or gasoline lamps or a local generating plant.

Improvements especially desired by the high school students Miss Thompson said, include refinished walls and floors, new furniture, radio, new lamps, a definite color scheme, and better arrangement of furniture.

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MEDICINE

Chances Good For Finding Chemical Cure for Cancer

THE CHANCES appear good that a chemical cure for cancer will, some day, be found. This hopeful view is justified by a review Dr. Carl Voegtlin, chief of the National Cancer Institute of the U. S. Public Health Service, recently gave of the present status of the chemical attack on cancer.

The future angle must be kept in

mind for so far there is no chemical cure for cancer and no successful method of treating this condition except by surgery, X-rays or radium. However, Dr. Voegtlin says that in the experimental chemical treatment of cancer, when mice, not humans, are the patients, "some suggestive results have been secured." Referring to the way one germ-caused disease after another has fallen under the attack of new chemical remedies, Dr. Voegtlin says "it may not be over-optimistic to look forward to the time when similar results can be achieved in the chemical treatment of neoplasia (cancer)."

Among the results, achieved by various researchers, which Dr. Voegtlin believes indicate cancer might yield to chemical attack are the following:

The growth of spontaneous breast cancers in mice was arrested in nearly three-fourths of the animals following injections of extract from the placenta or from the skin of embryos. In over one-fifth of the animals the tumors actually grew smaller.

An old gout remedy, colchicine, a coal-tar chemical, arrests cell growth and recent research indicates that the growth of certain mouse cancers can be checked by this drug.

Certain sulfur compounds have been found to have a definite growth-checking effect on breast cancers of mice.

When mice with another kind of cancer are given a substance obtained from one kind of bacteria, hemorrhage and regression of rapidly growing cancers occurs.

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GEOLOGY—AGRICULTURE

Stock-Poisoning Selenium Is Undesired Gift of Volcanoes

Spewed Into Air, It is Brought Down by Rain, Buried, Hardened into Shale, Finally Weathered into Soil.

SELENIUM, the poisonous element named for the moon, that wreaks havoc on livestock in the West and may cause "rheumatism" in human victims, is the unwelcome gift to the soil of volcanic eruptions in the remote geologic past.

This has been determined by U. S. Department of Agriculture scientists, working quietly for several years on the difficult problem presented by stock poisoning occurring in certain parts of the West. Chemical analyses of soils from all over the world indicate that there is no soil entirely free from selenium, though relatively few soils contain enough to be dangerous.

The dangerously seleniferous soils in this country are found mainly in the Great Plains region. They were formed by the weathering of shales deposited during periods of intense volcanic activity when the Rocky Mountains were a-building.

The selenium was not placed directly in the soils by the volcanoes. The poisonous element was spewed into the air and brought down to earth by rain. The clays were subsequently buried and hardened into shale. Later, the shale beds were exposed again, and weathered back into soil. Analyses of soils from Hawaii indicate this air-to-earth route of volcanic selenium.

Selenium causes mischief to livestock when the animals eat plants that have absorbed the poisonous element from the soil. Not all plants absorb it equally. Two members of the pea family, a vetch and a loco weed, are especially serious offenders. Most native grasses, on the other hand, have very low selenium contents.

Animals native or long naturalized in a given region somehow learn that seleniferous plants are not good for them and come to avoid them. Unheeding immigrant animals are as a rule the principal victims.

The first written record of selenium poisoning was made by Marco Polo in western China about 650 years ago—though of course he didn't know what it was. He only noticed "a poisonous plant growing there, which if eaten . . . has the effect of causing the hoofs of animals to drop off. Those of the country, however, being aware of its dangerous quality, take care to avoid it."

The present researches were conducted by Horace G. Byers, John T. Miller, K. T. Williams, and H. W. Lakin of the Bureau of Chemistry and Soils. It is reported in U. S. Department of Agriculture Technical Bulletin No. 601.

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BIOLOGY

Nerve Transmission Both Electrical and Chemical

HOW the various portions of the body communicate with one another through the nerves, how the brain tells the finger to move or a pricked finger tells its plight to the brain—this problem is a major one in physiology. There are two general theories as to the method of communication or transmission in living material, electrical and chemical.

In recent years physiologists have accepted pretty generally the view that transmission along a nerve fiber is in the main an electrical phenomenon. Local currents within the fiber from the excited to the unexcited portion provide for the transmission of that state of excitation which we call a nerve impulse. But the transmission of a state of activity from one nerve fiber to another, as happens in the brain when any of our sense organs are stimulated, or from a nerve fiber to a muscle fiber, as happens when we make a voluntary movement, means the transmission of an excitation from one cell to another.

There is much discussion as to whether the passage over the junction point between the two cells is an electrical or a chemical process. There is much evidence to show that the transition is effected by chemical transmitters, such as acetyl choline, in the case of our voluntary and involuntary movements. According to this view, every movement we make is accompanied by the production of minute amounts of acetyl choline at the ends of the nerve fibers, and it is through this chemical agent that the muscle is set into action.

Other physiologists have held that the nerve impulse when it reaches the junction point is transmitted electrically to the muscle fiber.

These two theories of transmission were the subject of a recent discussion before the Royal Society of London in which a number of European physiologists participated. It is interesting to find that a number of the participants agreed that transmission of excitation in the body from one cell or unit to another may possibly be of a dual character, involving both chemical and electrical processes.

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