

Cosmic Rays May Be Particles

Physics

Germans Find Similarity to Beta and Alpha Rays

THE cosmic rays, penetrating radiations that come into our ken from somewhere outside the solar system, may not be radiated waves at all, results of the latest experiments indicate. In a communication to the German scientific journal *Forschungen und Fortschritte*, Dr. Walther Bothe of Berlin and Dr. Werner Kolhörster of Potsdam state that they have evidence that the cosmic rays are really high-velocity particles like beta rays, which are free electrons moving at high speed, or possibly like alpha particles, which are the stripped nuclei of hydrogen or helium atoms.

The two German physicists obtained their results with a specially built adaptation of the physical instrument known as the electron counter. It consisted of a cylindrical chamber, within which was a very slender oxidized wire, connected to an electroscope. Whenever a charged particle made contact with the wire the electroscope registered the impact.

Using two of these instruments one above the other within a lead-armored vessel to keep out the earth-originated radiations, Dr. Bothe and Dr. Kolhörster frequently obtained coincidental registrations of particle impacts on their electroscopes. These they regard as having been due, in most cases, to the same particle striking both wires in succession. This would indicate that the particle came from above, with sufficient velocity to carry it through the lead armor and both tubes.

The possibility that cosmic rays may consist of moving particles instead of mere waves of energy is admitted to have radical implications by the two experimenters. To carry such particles through the resistance offered by the earth's atmosphere would require a starting velocity imparted by a potential of at least a billion volts. On the other hand, the total energy of the bombardment that reaches the earth is small, for the measurements indicated only one impact per second for every square

centimeter of exposed surface. Considering the almost infinite minuteness of beta or alpha particles, this sinks to almost immeasurably small quantities.

The possibility that cosmic rays may be penetrating particles rather than true radiations receives some support from work done at the U. S. Bureau of Standards by Dr. L. J. Curtis. Dr. Curtis has used a different method from that employed by Dr. Bothe and Dr. Kolhörster. He states that his results lend some support to the opinion of his German colleagues, but he is not yet satisfied that either the German work or his own constitutes full and conclusive proof.

The technical report of Dr. Curtis' experiments will be published in a few weeks by the Bureau of Standards.

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New Test for Baby's Milk—Continued

is responsible for the care of an artificially fed baby under one year.

In many of the bottle formulae in current use, attempts are made to soften the curd in various ways. One authority on infant feeding states that unless raw milk is modified so that hard curds will not be formed in the baby's stomach, the casein in the milk offers serious digestive difficulties not present if it had been previously boiled.

Boiling is probably the most common method of curd modification in general use at the present time. Adding lime water is another method, while oatmeal gruel is said to give a flocculent precipitate that approximates somewhat the curd of human milk. In some cases it is even necessary to take all the curd out of the milk with pepsin and feed the whey.

In spite of all these changes rung on the milk of the honest bossy cow, many babies refuse to thrive.

For such as these, not to mention their mothers and nurses, the use of the curd test, if its continued use gives such gratifying results as it has achieved already, should prove a

most beneficent boon. It gives the particular advantage that once the right milk is found it requires little or no modification. This, of course, greatly simplifies the preparation of the daily bottle.

"Milk", declares Dr. Hill, "that tests between 10 and 20 grams is especially suited for infant feeding, and in most cases requires little, if any, modification other than proper sterilization. Milk with a test of from 20 to 30 grams is also suitable, but will probably require more modification to be digested properly by delicate infants. A curd test of from 30 to 50 grams is fair, and when properly modified, milk of this curd hardness can be handled by most infants without difficulty. While enough work has not been done to determine accurately these limits, results obtained to date would indicate that milk with a test above 60 grams will probably cause digestive troubles with the infant, and milk which tests more than 100 grams is almost certain to cause trouble unless the infant is especially robust and the milk is greatly diluted and modified."

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