THE ORIGIN OF COSMIC RAYS

A PAPER which I presented at the Indianapolis meeting of the American Chemical Society has been erroneously reported in the Science News Supplement of SCIENCE; I do not wish to publish at the present time the details of this work, but I feel that there should be in the literature some compensating statement of my real views.

The paper under discussion dealt with the Millikan-Cameron theory of the origin of cosmic rays. According to this theory a cluster of electrons and protons is gradually built up and spontaneously collapses to form an atomic nucleus, emitting a cosmic ray. I pointed out that on the basis of our present knowledge this clustering process must be supposed to involve triple collisions, and that the rate of these collisions was insufficient by a factor of at least 10^{10} to give the observed cosmic ray intensities. The report to which I object omitted all reference to clustering and to triple collisions, and had me calculating the rate of simultaneous collision of 84 particles, retaining however the relatively small factor of discrepancy, 10^{10}, expressed more quaintly as ten million billion; it is certainly unfortunate that the writer of this account did not know that if I had ade the calculation to which he referred (as I have now done) I should have found a discrepancy not of merely 10^{10}, but of 10^{1700}, which could no doubt be expressed in some picturesque popular way by one sufficiently imaginative.

The account concludes with the statement that my calculations are based solely on the formation of iron atoms; this is not so.

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QUOTATIONS

THE CHEMICAL EXPOSITION

THE week of May 4 will find the Thirteenth National Exposition of Chemical Industries established in the Grand Central Palace in New York with as much space occupied as on former occasions and with a number of new exhibits. The exposition is more than an assembly of new and improved equipment, chemical products, raw materials of the chemical industry, and related items. Admittedly conducted as a commercial enterprise, the exposition nevertheless has become established as an important factor in the chemical life of America. Those familiar with the history of the exposition and the concurrent development of American chemical industry agree that the former has had a great influence upon the latter. It is well to recall that in those early days it was the exposition that served to emphasize the ability of our equipment manufacturers to provide the necessary devices with which to undertake seriously large-scale production of needed chemicals. It was to the earlier expositions also that manufacturers brought the first fruits of their efforts to show how successful they had been in a comparatively new and untried field. Those responsible for the advance of our chemical industry also came in numbers and found the opportunity to decide major questions after conversation with their colleagues.

The exposition is not without an enviable record of services rendered to the exhibitors. Orders approaching a quarter of a million dollars have been known to be placed with exhibitors during the exposition week, and some of the largest purchasers came from foreign lands to see and to buy. The publicity incident to the exposition's activities has been dignified and constructive, thereby adding its bit to our success in winning the sympathy of the general public.

There has been the educational side. Students, accompanied by instructors, have attended, but far more should make the most of the opportunity. However, those who have come—and the number has increased as we have gone along—have been able to see in the compass of a week more pertaining to their work than would be possible in weeks of travel to the various plants and warehouses. The students' courses have called for the cooperation of well-trained specialists, who have been glad to present discussions on topics chosen by the director of the students' courses to produce a well-rounded program and leave the lasting impression which comes from the receipt of valuable information.

The event is important from many points of view. That section of the public which comes in the evening can not fail to go away impressed with the fact that this industry, so little known prior to 1914, is now fundamental to public well-being and is conducted on a scale comparable with other commercial enterprises. There will be stockholders interested in more intimate details of the products of various concerns. There are sure to be bankers and financiers, executives and economists, journalists and teachers, among the crowds of plant operatives, technical men, and students. All are a part of the great army of ultimate consumers whom we seek to serve.

The exposition is an occasion of moment. It is a biennial opportunity to get abreast of new developments. It is one of the yardsticks by which we can measure our progress.—*Industrial and Engineering Chemistry.*