

Deposition of Nuclear Debris and Atmospheric Conditions

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Since any nuclear test explosion had not been conducted during the period from November 1958 to January 1960 and consequently there were no substantial additions of relatively short-lived fission products to the atmosphere by fresh test explosions, it is supposed that the total amount of the nuclear debris from weapon tests in the atmosphere should remain unaltered except for the removal of nuclear debris by the natural deposition to the ground, and that the period was the most useful one for the purpose of studying the rate and mechanism of deposition process of the nuclear debris. As it has been shown in many papers, the rate of deposition of nuclear debris varies considerably at different places and at any particular place at different times of the year. Then in the present paper it is at first studied how the activity concentration of total fission products in rain-water depends upon the atmospheric conditions under which a series of rainfalls occur being accompanied with an extratropical cyclone, for example, the path of a cyclone and the meteorological character of rainfall. Secondly, from the correlation between the day-to-day variation in the fallout activity and the corresponding surface and upper meteorological conditions, some interpretations are given for the mechanism of removal of the nuclear debris from the atmosphere.

Part I. Specific Activity of Nuclear Debris in Rain-water and Weather Conditions near the Earth's Surface.

1. Classification of Radioactive Rain. The meteorological character of rain is generally quite complicated, but to the first approximation rainfalls may be classified at least into the following two types according to the weather conditions, under which each rainfall occurs; the "C-type" and the "W-type". These are shown schematically in Fig. 1. A C-type of rain is a cold front type of rain and is formed in the rear side of a low-pressure. In this case the clouds observed are of the vertically well-developed cumulus or cumulo-nimbus type, showers occur at frequent