Letter To The Editor

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FALLOUT OBSERVATIONS IN INDIA AFTER THE FIRST FRENCH ATOMIC TEST IN SAHARA

The radioactive fallout from the First French Atomic Test carried out at Reggane (26°45′N, 0°05′E) in Sahara on 13 February 1960 at 1130 IST was detected in India at Bombay when the activity deposited on the ground between 15 and 16 February showed a sudden large increase over the daily deposition during the several weeks before the 15th (Fig. 1). Subsequently a large increase in airborne activity was observed at Bombay as well as at all the other monitoring stations in India. The gamma-ray analysis of various surface deposition samples and air-dust samples carried out with a gamma-ray scintillation spectrometer indicated the presence of radioisotopes (Ba-140+La-140), Tc-99m, Te-132 and Ru-103, which are indicative of the presence of fresh fission products.

Fig. 2 gives the monthly average airborne activity for the months of January to April 1960 at Srinagar (34°06′N, 74°55′E), Delhi (28°45′N, 77°20′E), Calcutta (22°34′N, 88°25′E), Nagpur (21°12′N, 79°04′E), Bombay (18°57′N, 72°55′E), Bangalore (12° 57′N, 77°30′E) and Ootacamund (11°23′N, 76°40′E).

Since the weapon was exploded on 13 February, it took 72 hours or less for the cloud to be detected at Bombay, indicating that the cloud moved with the westerlies in the upper troposphere at an average velocity of 40 to 50 kts.

As seen from Fig. 2 an increased level of airborne fallout was observed in February

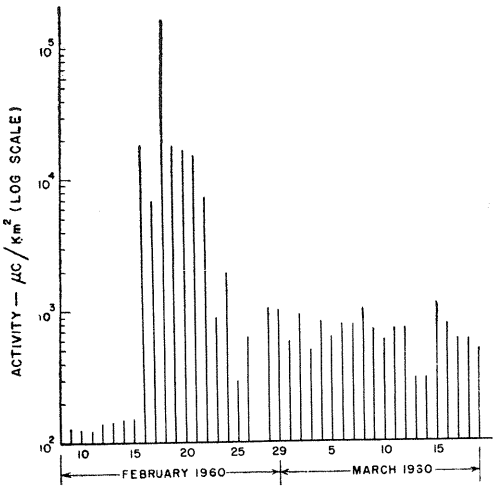

Fig. 1. Daily levels of deposited activity at Bombay before and after the French Atomic Test

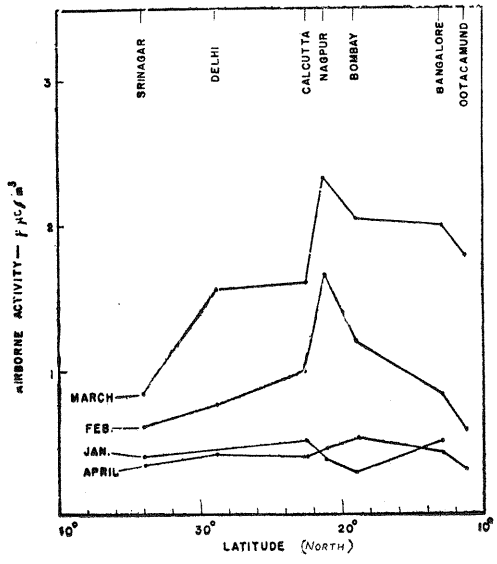

Fig. 2. Latitudinal variation of monthly average airborne activity over India before and after the French Atomic Test

and March at all the monitoring stations. Also a comparatively larger increase is seen at stations situated in the latitude band between 19° and 23°N. During March the activity levels are higher than those during February. This is due to the re-appearance of the cloud after circling the globe, and its greater diffusion in the lower atmosphere. During March a larger increase in the activity levels is seen at stations situated towards the equator. The airborne radioactivity in April corresponds to the pre-test level of January 1960. This is in accordance with the mean tropospheric residence time of about 20-30 days for tropospheric fallout. The levels of airborne radioactivity during January are slightly higher than those during April, at some of the stations. This may be due to the seasonal increase.

An estimate of the radiation dose from the radioactivity due to the French Test has been made. The external gamma radiation dose from deposited activity has been estimated to be about 1·15 mrem (uncorrected for weathering and shielding) and the dose to the lung due to the inhalation of the airborne fission products is estimated to be about 1 mrem. These levels are only small fractions of the dose due to natural sources.

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