

## PHYSICS

## Radioactivity of Air Dust, Rain Water and Turf Grass in Bandung, Java

DURING the period November 1961–December 1962 the radioactivity found in air dust, rain water and turf grass was determined in one single place in Bandung.

The air dust was collected once a month on a sheet of tracing paper, about 0.19 m<sup>2</sup>, covered with a layer of 'Vaseline' (about 2 g per sheet). The paper sheet was fixed at a height of 1.5 m on the internal wall of an enclosed yard and protected from the rain by a concrete horizontal shade. (As comparison with paper sheets exposed in the open shows, the deposition of dust on the paper placed in the yard was independent of the direction of wind but dependent on the degree of turbulence of the air produced in the yard.) The paper sheets were exposed during the last 10 days of every month.

The weight of ash obtained after burning the paper sheets varied usually between 200 and 350 mg per sheet, probably depending on the variety of paper and on the slight variation of the conditions under which burning was carried out. Total error of the determination of the weight of obtained ash was  $+13 \pm 10$  mg. Specific radioactivity of the ash varied between 20 and 90 pc/g with an error of measurement between 300 and 25 per cent.

The rain water was collected in enamelled wash-basins placed in the yard on a table (0.5 m high) under open sky. The basins were normally put out when the rain had already begun and removed after the rain had stopped. The volume of collected and evaporated rain water varied between 1 and 7 l.  $\pm 1$  cm<sup>3</sup>, depending on the intensity of rain.

The weight of sediment obtained after evaporation of the rain water varied, usually between 8 and 35 mg (in one exceptional case, 62 mg) depending on the quantity of evaporated water and its dust content, which varied usually between 4 and 25 mg/l. The error of weighing of the sediment was  $\pm 0.5$  mg due to unavoidable handling of evaporation dishes. The error due to precipitation of the dust from the rain water while it was in the storage before evaporation was usually about  $+5 \pm 2$  mg, depending upon the kind of dust contained in the rain water. The error of sedimentation on the walls of the beaker during the first stage of evaporation was about  $+4 \pm 1.5$  mg. Both of these positive errors were taken into account. Specific radioactivity of the sediment varied between 416 and 11,400 pc/g with an error of measurement between 300 and 5 per cent.

The grass was collected at the end of every month from the same place. The quantity of grass put on the drying shelf varied between  $720 \pm 1$  and  $120 \pm 1$  g. The quantity of dry grass obtained varied correspondingly between

$138 \pm 1$  and  $37 \pm 1$  g. The quantity of dry grass taken for burning was always  $30 \pm 1$  mg.

The quantity of ash obtained after burning of the dry grass varied usually between about 4 and 3 g. The total error in the determination of the weight of ash was  $+13 \pm 10$  mg. Specific radioactivity of ash varied between 120 and 300 pc/g with an error of measurement between 33 and 4 per cent.

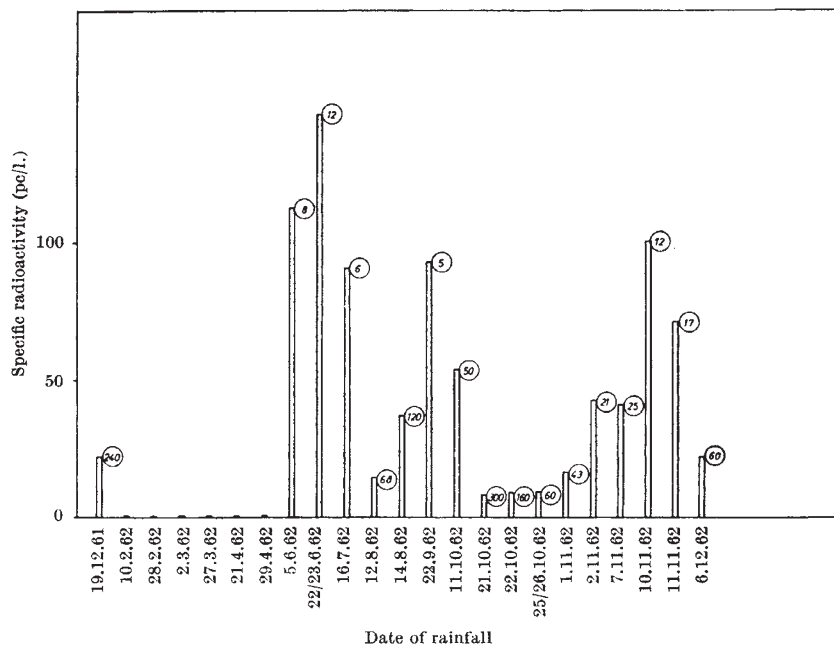


Fig. 1. Specific radioactivity of rainwater. Figures in circles indicate the relative errors of measurement (per cent)

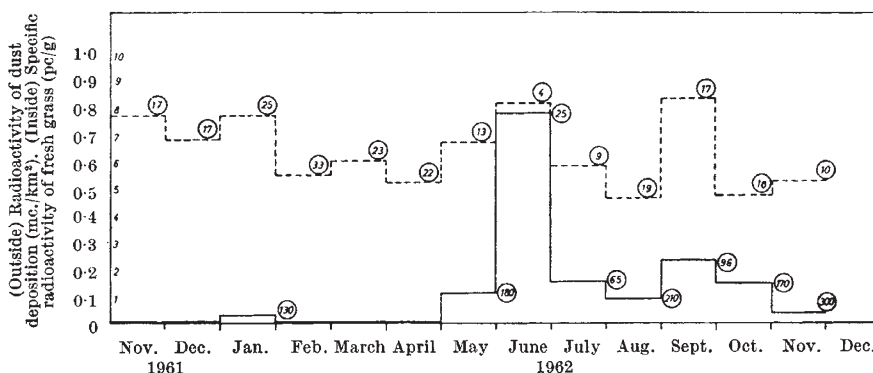


Fig. 2. —, Radioactivity of monthly dust deposition; ---, radioactivity of monthly grass growth. Figures in circles indicate the relative errors of measurement (per cent)

The radioactivity of prepared ash probes was measured in the First Institute of Physics, University of Munich. The sensitivity of measuring equipment was 1 c.p.m. = 4.12 pc. The instrumental error was  $\pm 3$  c.p.m. (12.36 pc) and statistical error  $\pm 0.4$ – $0.6$  c.p.m. Decrease of radioactivity due to decay during the delay of measurements was in all cases within error of measurement.

The radioactivity of air dust deposited per km<sup>2</sup>, specific radioactivity of rain water and of fresh grass calculated from the obtained results of measurements are given in Figs. 1 and 2.

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