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Simplified Radioactive Fallout Detector

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Abstract. A method for the detection and measurement of radioactive fallout through the use of film badges is described. Differences in exposure are determined by measuring transmitted light through the processed film. This has the advantage of being simple, uncomplicated, and not requiring specially trained technicians.

The "scare potential" of fallout from atomic tests has created a need for a fairly accurate test for personal exposure to radioactivity that can be carried out by any intelligent adult, with or without technical background. With this in mind, the technique here described was conceived; and on March 17, 1958, using film badges provided by AEC of Canada, a year's pilot program was begun.

The equipment for the project consisted of two film badges, a photoelectric exposure meter of the type used by photographers, and a supply of film. Film was loaded into the badge in the conventional manner. One badge, designated control, was placed in a safe place; the other was worn or carried for the specified time. At the end of this time, the film was removed from the badge, processed, dried, and placed in 2x2 slide mounts. To read these, the meter was held in front of a light source of a definite value (in the pilot program a DeJUR meter was used with the 800 level as standard). The control film was slipped in front of the meter, and the light reading noted. The same procedure was followed using the test film, and readings of each were then charted (Figure 1). To determine the trend, the differences between the controls and the tests were charted (Figure 2).

By following the trend on Figure 2, it is easy to determine rise and fall of radioactivity level, particularly when correlated with known atomic tests being carried out by both the United States and other nations. A survey of Figure 2 in relation to atomic tests during the past year will indicate that both "high points" occurred about five weeks after a Pacific test. We know the Pacific winds circle to the north from the test area, come east across Alaska, and down the Pacific coast. It would seem that some small amount of fallout was carried along on these winds to the south-central California area where this pilot program was conducted. However, it must also be noted that the overall radiation did not reach, or approximate, the danger level.

Of course, the actual radiation level can not be determined by

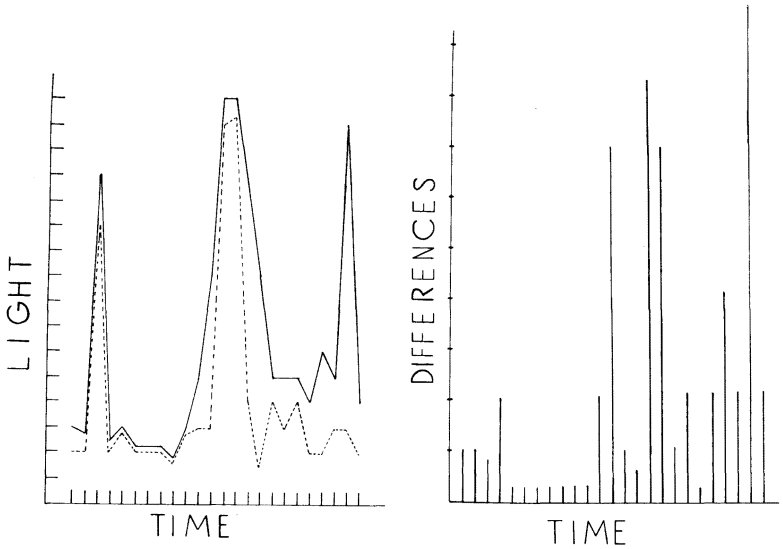

Figure 1. Source intensity was based on 800 reading on DeJUR meter 42784. Light is measured in equal units (22) from 800 to .5 as indicated in left hand column. Time is measured in equal seven day units starting on March 17, 1958. ———Test; . . . . . Control.

Figure 2. Comparing differences in intensity between test and control. Each mark on left indicates one meter calibration.

this method alone, but when it is accompanied by spot checking of films from time to time by a reputable badge monitoring service, it can give a fairly accurate report. At the same time, once highs and lows are established, a trend report is provided to dispel rumors or prompt protective action. A major advantage is the fact that this method can be carried out anywhere, whether there are specialized monitoring teams available or not.

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