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Low-level in-vivo counting

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1. Although rather hastily conceived and constructed, the steel room built for the 1958 survey of the Marshallese people has proved to be highly satisfactory. The background counting rates are within a factor of two of those achieved at the Argonne facility. The higher rates are to be expected from the use of only 4-inch-thick walls, and we have been fortunate to do so well without the benefit of an elaborate materials testing program.

2. A number of laboratory employees and patients have been counted in the room. In the relatively few people who have been surveyed, there were several instances of unsuspected radioactivity found, particularly in clothing. The activity from Co^{58} , Co^{60} , and Mn^{54} is positively identified and easily detected in patients months after administration.

3. The potential value of a permanent installation of this sort appears much more impressive now than before the steel room was built. Its use in measuring residual activity in patients given long-lived gamma emitters would alone appear to justify construction of such a facility. In addition, its value in case of an accident involving possibly unknown radionuclides is inestimable. I would not consider it at all unreasonable to include a whole-body count as a routine part of the annual physical examination of at least those employees who have frequent or intensive exposures to radioactive sources.

4. I propose that a low-level in-vivo counting facility be installed in the new building as soon as possible.

5. The location of such a facility is perhaps the major unsolved problem. The basement now seems less desirable than previously, chiefly because of difficulty of access. I would favor usurping the north in-vivo counting room for this purpose. This has the advantages of easily restricted access and of a fairly good existing shield in the extra-thick walls. Alternatively, particularly if routine use in the annual physical examinations is seriously contemplated, a location in the industrial medicine wing might be considered. Such a location would be more convenient for many uses and would avoid the hazards of proximity to high-level sources in the medical physics rooms. On the other hand, adequate shielding and appropriate access procedures can keep the background in almost any location satisfactorily low.

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6. Several features of the permanent facility should be different from the present one. The shielding should be the equivalent of six inches of steel. No one seems to be sure that it would help much, but the theory at least suggests that a low-density lining, such as Lucite, would reduce the undesirable scattered radiation, and I would like to try it. The dimensions, particularly the ceiling height, could well be increased a little. The crystal or crystals should be mounted overhead rather than being suspended from an X-ray stand. The door should be larger, and should be mounted on bearings, and so hung as to be easily opened and closed manually.

7. Although steel has proved to be very satisfactory, it is not necessarily the only material to consider, and the fire brick, dunite, may have some advantages.

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