The "MULTICOUNTER"

for

Radioactive Iodine Distribution Studies on Human Beings, and Other Uses

presented by

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Mathematical and experimental studies indicate that it is possible to achieve, with several counters, appreciably greater sensitivity and resultant higher accuracy than can be obtained with a single counter. These results are obtained independent of geometry, sample size, or relative position of the source, and to some degree independent of internal absorption.

MULTIPLE G. M. COUNTER TECHNIQUE FOR PRECISE MEASUREMENT OF RADIOACTIVE SOURCES INDEPENDENT OF GEOMETRY AND SAMPLE SIZE (for use in medical and biological isotope applications, (e.g.) studies and therapeutic applications of I^{131}).

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INTRODUCTION

In the biological and medical uses of radioactive isotopes and particularly in the study and treatment of goiter patients with I^{131}, numerous requirements for a precise measurement of the radio isotopes administered and of their distribution in the body exist. One of the authors (S.H.) (1), has treated patients, with toxic goiter, by means of radioactive isotopes of Iodine since March 1941. In this work reliance upon externally placed single geiger counters over the thyroid gland has allowed a qualitative, but not entirely satisfactory quantitative, estimation of the radiation dosage (2). Clinical experience during this interval has indicated that a more precise measurement of radiation dosage might help in avoiding the one undesirable sequel of such therapy (i.e., the development of hypothyroidism from the administration of excessive dosage of I^{131}). It is therefore, suggested that a method of measurement which might be generally applied for the purpose of radiation measurements and which might be independent of geometry, sample size, and slight movement of the patient would be of considerable clinical value.

In the earliest publications from the Massachusetts General Hospital and the Massachusetts Institute of Technology (2), (3), it was clearly appreciated that the usual practice of radiation measurement of a single source by means of a single geiger counter has an accuracy highly dependent upon geometry. A geometrically less critical measuring arrangement was sought by using several counters in a pragmatic manner.