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Radio Active Compounds

On the 6th of June you were kind enough to ask me to express my opinion as to the radio active compounds that might be of value in medicine in the future. First, I would like to emphasize that the field is so incompletely explored at the present time that I am sure that many uses will be found once free research is again possible. Many of these uses cannot be predicted at this time. This statement is emphasized because of the fact that what follows may seem to be a very short list. I am sure that it will be tremendously expanded in the relatively near future. From the therapeutic point of view the isotopes which have been of interest and presumably will continue to be so are Strontium 89, Potassium 82 and Iodine 131. The amount of these which would be used is hard to predict at the present time. The indications are, insofar as they have been evaluated, that these means for the treatment of neoplastic diseases do not offer any striking advantages over the more classical radio therapy or surgery.

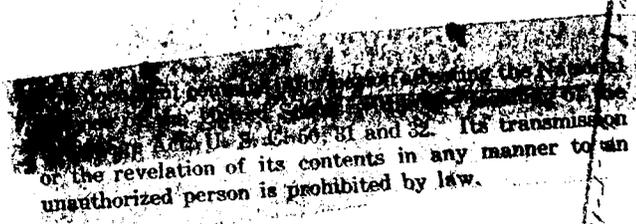
One can expect that other isotopes such as barium for bone tumors, and sodium-24 for possible lymphomas may find a place in the therapy of neoplastic conditions.

Among the possibilities for the use of active isotopes in therapy are use of complex organic salts rather than the inorganic ones which have largely been used up to the present time. This field is almost entirely unexplored. It is theoretically possible that compounds which will localize to a large degree in the tumor may be found. In this instance the choice of active isotopes is presumably not subject to the restrictions of the metabolism of the simple inorganic ion. However, the extent and rapidity with which this aspect of isotope therapy will develop is unknown.

Finally, the future use of isotopes in the therapy of other than neoplastic conditions seems to me to be problematical. Knowing what we know in a general way of radio biology it does not seem too likely that the therapy of other than malignant diseases offers much.

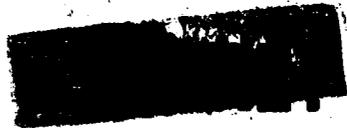
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The use of isotopes in diagnosis would seem to me to be a field which offers great promise. Sodium 24 has already been used with considerable success in the evaluation of peripheral vascular disease. Other possibilities are the use of radioiron in the evaluation of certain types of anemia, carbon 14 in the investigation of carbohydrate metabolism, etc.

It is obvious that the uses of active isotopes in diagnosis and therapy will depend in large measure on the extension of our knowledge in biology through the use of these tools. The role of active isotopes in general biology is not, strictly speaking, within the province of this letter; however, since it determines in large measure the future use of these elements in medicine, it may be well to dwell briefly on it here.

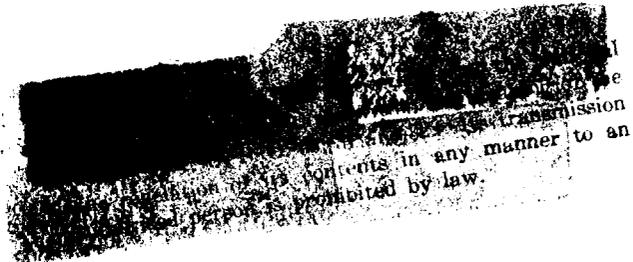
Everyone, I think, is aware of the potentialities of tagged atoms in biologic investigation. I wonder, however, if even the enthusiasts realize the profound impact that this tool will have on the biological sciences. The statement has been made, and probably it is no over statement, that this new development will have as far reaching an effect on the biological sciences as did the development of the microscope.

It is certain that the use of tagged atoms will, in a comparatively short time, facilitate the explanation of many biologic phenomena which are at present unsolved. With the solution of these problems, many uses for tagged atoms bases on these solutions will almost certainly be found in medicine.

To sum up, the foreseeable uses of active isotopes are not great. Probably no more than a few thousand curies per year of strontium, potassium, and iodine for purely medical purposes will be used. It is my feeling, and I strongly emphasize it, that the field of medicine will be tremendously benefited by fundamental investigation in biology with tagged atoms. Following the acquisition of fundamental knowledge the application of that knowledge to medicine will, I am sure, involve a tremendous increase in both the amount and kinds of tagged atoms which will be used.

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Jz
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