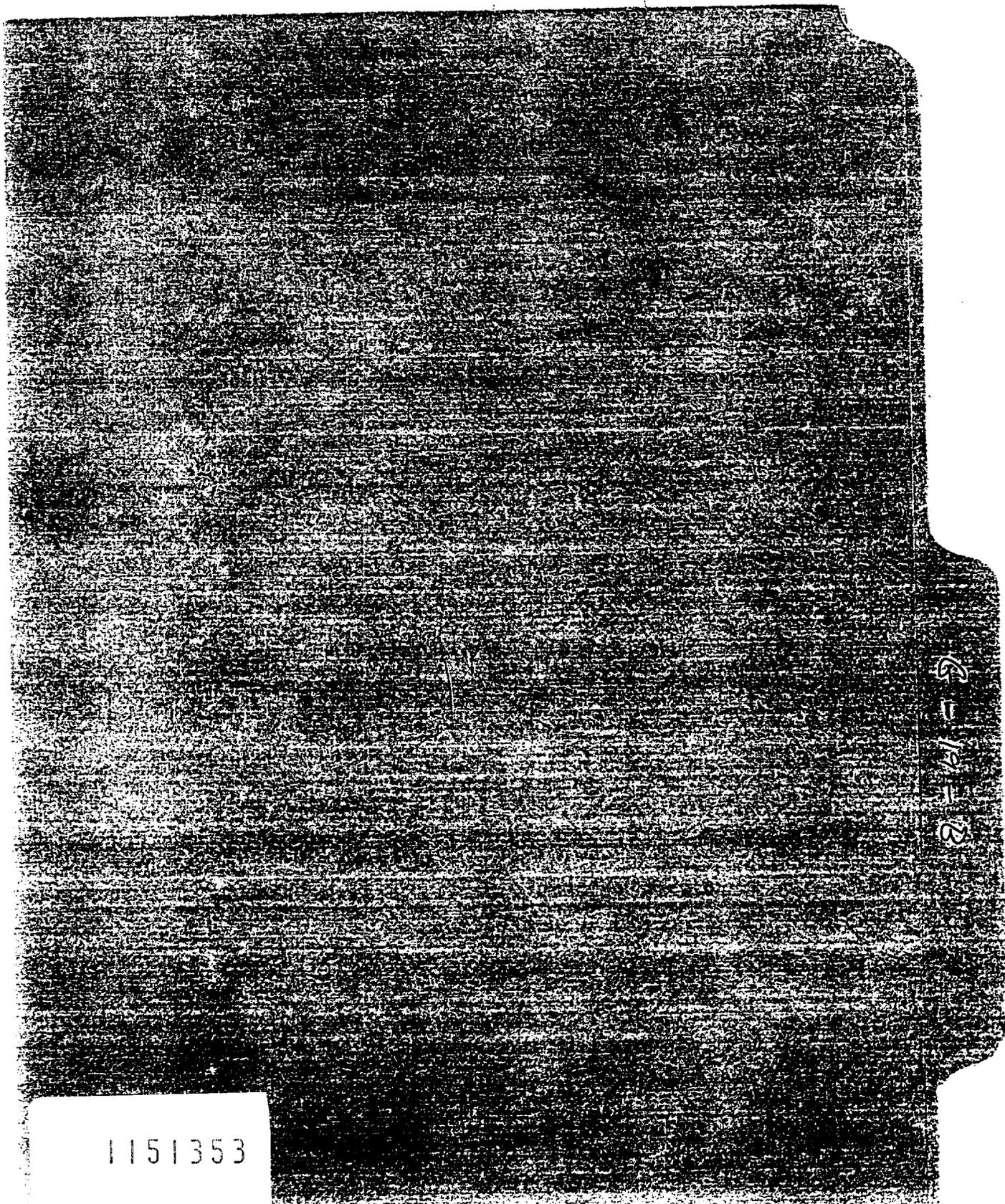


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BOX No. #38 68A588

FOLDER G-19-B



G-19-B

1151353

5 February 1944

MEMORANDUM FOR THE FILES:

Subject: Report on Survey on the Monsanto Chemical Co. Operations.

The Monsanto Chemical Co. will be concerned with the development of an operation which will eventually produce 10 curie of Polonium per month.

The development of the operation has taken place in the last three months, and the first preliminary runs are now beginning. The eventual recovery of Polonium will be made from activated Bismuth from pile reaction. For the present, however, the polonium will be collected from Radio-lead which will be available from the Port Hope mining operations. The contemplated program in its simplest form at present, involves volatilizing the Polonium, which is a decay product of Radio-lead, and collecting it on a cold surface, together with other impurities. Following this, the Polonium is collected on a foil by an electroplating method.

Precautions which would seem to be most effective for these operations involve the introduction of ventilating devices, and enclosing the operations where ever possible. Precautions as to the wearing of gloves, change of clothing, and the wearing of masks, are also being taken. The men will be examined periodically, and in every instance, at least once before their employment. Urine and blood examinations will be conducted monthly, and will be reviewed by Dr. Baker, who has been recently employed by the Monsanto Chemical Co.

Measuring devices are available now, and samples of air will be collected with an electrostatic precipitator. Monitoring will be conducted regularly with a Geiger counter, and general radiation will be surveyed by both meter and film.

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In addition to the general physical examinations, studies of the ridges of the finger-tips will be made with wax impressions. Dr. Bale reviewed the operations on 27 Jan 44, and will submit a report on his recommendations and findings.

As soon as activated Bismuth is available, procedure for extracting Polonium will be considerably modified and will be a chemical process primarily. These operations involve:

- a. Dissolving in Aqua Regia.
- b. Transfer to the evaporating unit.
- c. Scrubbing operation.
- d. Washing operation.
- e. Re-dissolving.
- f. Electro-plating.

These operations have been enclosed where ever possible, and will be thoroughly ventilated. Mechanical handling has been reduced to the minimum.

The primary hazard to health is obviously the introduction of Polonium into the body. It is likely that the only portals of entrance are through the respiratory and gastro-intestinal systems. To establish this and other Biological data on this material, several Biological tracer experiments will be conducted and the available literature will be reviewed.

~~Since~~ Polonium has a half life of 139 days, <sup>and</sup> it emits a very energetic Alpha particle. To introduce into the body any considerable quantity of this material is dangerous. It is possible to calculate the amount of energy available per disintegration, and compare it with Radium and its daughter products. For similar masses, Polonium is roughly 5,000 times as active as Radium, but the single Alpha particle has much less energy than the total number of particles emitted by Radium up to Radium D, which serves effectively to stop the chain because of its long half life. On a first approximation, Polonium would appear to have a thousand times more energy available than a similar amount of Radium.

This would mean that Polonium might be 1,000 times as dangerous as Radium.

This assumes that metabolism of the two metals are similar.

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