UNIVERSITY OF MICHIGAN
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DEPARTMENT OF PHYSICS

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Dear Szilard,

Thank you for your letter. I was also considering the possibility of using carbon fo slowing down the neutrons; in the obviously optimistuc hypothesis that carbon should have no absorption at all for neutrons, and assuming for the resonance absorption band of uranium the usual data (which also I rather suspect to be optimistic) one finds from an elementary calculation that the ratio of the concentrations (ratio of the numbers of atoms) of uranium and carbon should be about one thousandth in order to avoid too much resonance absorption. According to my estimates a possible recipe might be about 39000 Kg. of carbon mixed with 600 Kg of uranium. If it were really so the amounts of materials would certainly not be too large.

Since however the amount of uranium that can be used, especially in a homogeneous mixture is exceedingly small, even a very small absorption by carbon either at thermal energy or even before might be sufficient for preventing the chain reaction; perhaps the use of thick layers of carbon separated by layers of utanium might allow to use a somewhat larger percentage of uranium.

I have been thinking about the experiment that you propose for measuring the small absorption cross section in carbon. It seems to me that you have probably over estimated the difference between rand and center activity in the carbon sphere; moreover I dont see how you can take into account the contribution of those neutrons that become thermal due to impacts against carbon. Their number should probably not be very large, but might disturb very considerably the measurement of a small difference.

I had discarded heavy water as too expensive; but if you can easily get several tons of it it might work very nicely.

The cyclotron here will start working again next week and I hope to be able to get reliable information on the so called resonance absorption of uranium. I shall inform you of the results.

Yours sincerely

Enrico Fermi

P.S. I have received your second letter. If heavy water is too expensive, as I believe, it would be important to find some way of knowing some

thing of the carbon absorption. It seems to
me that the use of very thick layers of
C might do the trick

Yours

Enrico Fermi