

Houston, Tex.  
Dec. 5 1929

Dear Hermann;

I received the copy of your letter a few days ago and your check this morning. Tho I think that you are being much too generous I fear that I have not the strength of character to refuse it and so content myself by thanking you very much for it.

I am beginning to appreciate the difficulties you have been having with those calculations. It seems very annoying that they do not come out as expected. I have looked over my part in them and can find no error. I also have checked the tube efficiency by an independent formula and find that the value I used is correct at least to order of magnitude.

Your part of the calculation which you outline also is correct as far as I can see. The introduction of the factor 1000 to go from water to air is legitimate because the bulk of both water and air is made up of elements of nearly the same atomic weight namely oxygen and nitrogen, the hydrogen being negligible in a rough calculation. The reason for this is that the difference in ionisation is chiefly due to the difference in the No. of quanta absorbed per cc. and this of course depends on the absorption coefficient. The absorption is found to be proportional to the density of the material if its atomic weight remains constant.

I have made a rough calculation of the No. of ions per cc. per dose in air from the 6000 r unit that you gave me and find the value  $1.2 \times 10^{13}$  or if the dose lasted 45 minutes, the No. of ions per cc. per sec. in air is  $4.6 \times 10^9$ . To check this value with the one obtained by the other method note that we should expect  $4.6 \times 10^{12}$  ions per standard conditions in water. This means that each of our primary ions must produce

$4.6 \times 10^{12} / 2 \times 10^{10}$  or 230 secondary ions, which is of about the order we found.

The only thought I have at present, and it probably is no good, is the possibility that stronger natural radiation is produced in the flies by their having some radioactive stuff in their bodies of that they eat some. Potassium is thought to be somewhat radioactive I believe. In this way it might be possible to get a somewhat stronger natural radiation on the flies. I shall think about this possibility further.

Best regards to you and to M rs. Muller. How is David?

Lewis Holt-Smith

572  
1.4

$1.5 \times 10^{12}$   
 $4 \times 10^{12} / 50000$   
285  
182  
285  
280  
285  
5730