places), the upper $^1\Pi$ states are influenced by an extensive homogeneous perturbation also. It is this latter which causes the appearance of convergency. The rapid decrease of upper state rotational spacing towards higher v values is a general behavior in the perturbation area, if the perturbing state has the smaller rotational constants, and its narrower vibrational structure also causes decrements in the vibrational spacings of the perturbed state. Such phenomena and the usefulness of constructing $[B'-B'']$ curves in detecting perturbations of any kind has been pointed out by Schmid and Gerö.[2]

A detailed report of the perturbations in the C_2 spectrum will be given later. At this time it seems inadvisable to draw conclusions concerning dissociation possibilities of the C_2 molecule, especially not on the basis of any apparent "convergence limit."

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Investigation of the X-Radiation from Te^{121} (125 Days) by Critical Absorption and Fluorescence

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THE radioactive tellurium isotope Te^{121} (125 ± 5 days) has been investigated by Seaborg, Livingood, and Kennedy,[1] who found that the isotope emits a very complex radiation consisting of electrons and gamma-rays. They considered it probable that Te^{121} decays by K-electron capture to the stable Sb^{121}, but left the possibility open that the radiations are due to an isomeric transition in tellurium. We have now studied the radiations of this isotope in order to find out whether a characteristic x-radiation is emitted. For this purpose we have used the well-known critical absorption method as well as a new "fluorescence method."

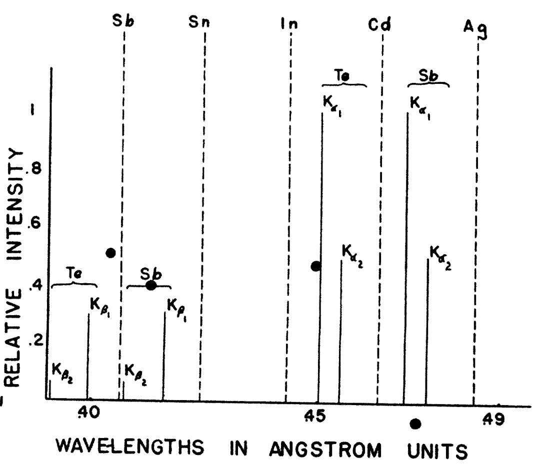

FIG. 1. The diagram shows the K x-ray lines of antimony and tellurium. The intensity of the $K\alpha$ lines is put equal to one. The dashed lines indicate the position of the K-absorption edges of silver, cadmium, indium, tin, and antimony.

The tellurium was separated chemically from a sample of antimony which had been bombarded with deuterons in the 60-inch cyclotron in Berkeley. The radiations from the aged tellurium deposit were detected with a thin walled glass Geiger counter and as absorbers we used thin foils of Ag, Cd, In, and Sn. Figure 1 shows the wave-lengths of the various K x-ray lines of $_{51}Sb$ and $_{52}Te$ and the K-absorption edges of the neighboring elements for $Z=47-50^2$. Figure 2

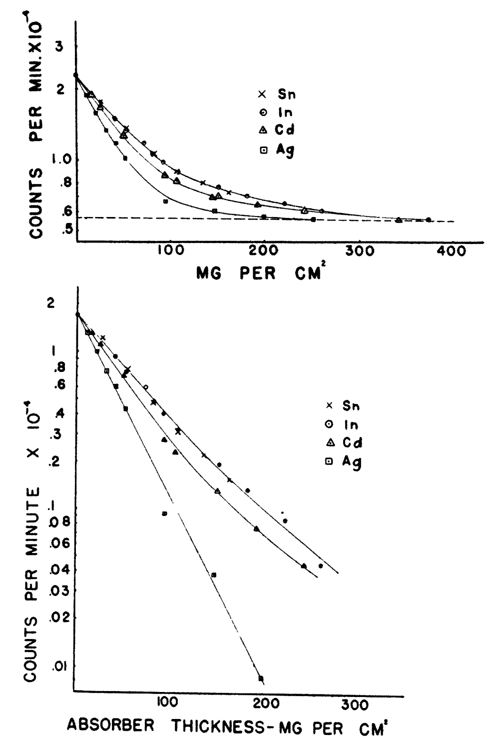

FIG. 2. The upper part of the figure shows the absorption curves of the total radiation from the tellurium sample for tin, indium, cadmium, and silver. The dashed line indicates the contribution of the hard gamma-ray, which was followed up for thicker samples (up to 1 g/cm²) of the four elements. In the lower part, the curves obtained after subtraction of the gamma-ray background are plotted.

shows the absorption curves obtained from the Te sample. The strong absorption in silver indicates that K radiation of antimony is present, but the absorption in cadmium appears to be stronger than might be expected, if no K radiation of tellurium were emitted in addition.

We have therefore investigated the radiation further by a "fluorescence method," which may prove more convenient than the absorption method under certain conditions. For this experiment, the tellurium sample was mounted at a distance of about 5 cm from the counter and a lead wedge was interposed to shield the counter from the direct radiation. Secondary radiation emitted from thin metal foils under an average angle of 100° was recorded by the Geiger counter. The foils, which consisted of the elements Ag, Cd, In, and Sn were of very nearly equal size and weight ($\sim$50 mg/cm²). In order to cut out soft electrons an aluminum foil of 21 mg/cm² was wrapped around the counter. The data confirm the results of the absorption experiments.

The data are: Ag, 290; Cd, 209; In, 160; Sn, 168.

These figures represent counts above the background (212 counts/min.) obtained without the secondary emitters. The errors amount to about 5 percent.

In order to explain why cadmium shows critical absorption for a considerable part of the radiation, one could assume that an isomeric transition in tellurium precedes the K-electron capture whereby an internally converted gamma-ray gives rise to the emission of tellurium K radiation. Therefore, we attempted to separate a Te daughter product by an isomeric separation, making use of the transformation from telluric into tellurous acid.[1] The precipitate was inactive. A daughter product of a half-life > 1 min. and < 1 year would probably have been detected If no isomeric transition takes place, the x-ray component harder than the Sb $K\alpha$ line which we have observed may be explained in the following way. The capture of the K electron by the Te nucleus and the internal conversion of the succeeding γ-rays in the K shell may follow each other so closely that both K electrons may be missing simultaneously in the antimony nuclei. This would lead to a shift of the $K\alpha$ line towards shorter wave-lengths.

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[2] A. H. Compton and S. K. Allison, *X-Rays in Theory and Experiment* (D. Van Nostrand, New York, 1936).