on the days in question. It should be noted that the presence of the solar 0—2 band introduces no complications into the search for the telluric band, inasmuch as in the sun the intensity maximum occurs at about $J=30$ and in the earth's atmosphere at $J=6$. For example, the solar contribution to the equivalent width of the R_3 line is only about 0.005A and the intensity is of course independent of air mass.

The essential absence of CO in the earth's atmosphere over Lake Angelus and Mount Wilson poses an interesting problem. Although it was perhaps plausible that CO should be found over Columbus, Ohio, and absent over Flagstaff, Arizona, it is not so easy to understand why the gas should be present over the Jungfraujoch and absent over Mount Wilson. In fact, in view of the known smog conditions over Los Angeles, one might have expected the converse to be true. The possibility mentioned previously that Migeotte's band might at least in part be the result of solar CO can be ruled out for several reasons. First, the line intensities are variable. Second, the band was absent from Adel's records. Third, solar CO would be expected to produce not only the 0—1 band, but other overlapping difference bands as well, including the 1—2, 2—3, and 3—4 transitions almost certainly, and probably also 4—5 and 5—6. All of these bands should have roughly the same intensity and the region of the positive branch of 0—1 between 2140 cm^{-1} and 2190 cm^{-1} would contain about 100 lines spaced in more or less irregular fashion.

From the above discussion it must provisionally be concluded that CO in the earth's atmosphere is localized in a most peculiar fashion. It would obviously be extremely desirable if observations on the overtone band of CO could be made both at Columbus, Ohio, and at the Jungfraujoch, while at the same time the region of the fundamental should be recorded at Mount Wilson and at Lake Angelus. It is hoped that the latter observations can be carried out in the near future.

Further details of the identification of CO in the sun will be published in the *Astrophysical Journal*.

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The α-Half-Life of Am 241

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BY measurement of the specific α-activity of a sample of AmO_2, it was found in March, 1949, that the α-half-life of Am^{241} must be appreciably shorter than the published values of 490 and 510 years.[1,2] This measurement has recently been repeated and confirmed. The results were reported to the International Congress of Pure and Applied Chemistry, New York, September 10, 1951.

Two samples of Am^{241} were purified by extraction from a sodium acetate buffer solution of *p*H 4.8 into a benzene solution of thenoyltrifluoroacetone. The Am was recovered from the benzene solution by agitation with 0.5*M* nitric acid. It was further purified by precipitating it twice as $Am(OH)_3$, once as AmF_3, and then twice again as $Am(OH)_3$. Finally it was dissolved in 0.5*M* nitric acid.

Spectrographic analysis of the Am showed the presence of traces of B, Mg, Si, Al, Fe, and Ca. These impurities, as their oxides, would account for 1 percent of the weight of the AmO_2. However, the spectrographic analysis was made after the Am samples had been standing in glass tubes for two weeks, whereas the specific activity measurements were made immediately after the Am purification was completed. Therefore it seems best to regard the 1 percent as the maximum impurity content, and to increase the limit of error in the determination by 1 percent rather than to increase the final value for the specific activity of AmO_2 by 1 percent.

Samples of about 5 μg of Am^{241} were weighed as AmO_2 on small disks of platinum, with a standard Chalk River quartz torsion fiber ultra-microbalance.[3] The platinum disks and the AmO_2 were brought to constant weight by repeatedly heating them to about 850°C, as they hung on the balance, with a small induction heating coil. In this way, handling of the weighing pans was practically eliminated, and very consistent weighing results were obtained.[4]

That the compound weighed was really AmO_2 was confirmed by photographing the x-ray diffraction pattern back-reflected from one of the samples.

After the weighing was complete, the α-activity of the sample was measured with a low solid-angle methane filled proportional α-counter.[5] The "geometry" of this counter was determined with an accuracy of $\pm\frac{1}{3}$ percent by careful measurement of its dimensions. Two similar counters were found to agree within the counting statistics ($\pm\frac{1}{3}$ percent). The effect of backscattering of α-particles from the backing material is negligible in a counter of this type. It was not expected that small-angle scattering of α-particles as they left the AmO_2 would be important. This was confirmed by counting one of the samples with and without absorbers of 1.5 and 3.0 mg/cm^2 Al. The counting rate was not altered, within the statistics of the experiment (±0.2 percent), by the presence of the absorbers. Loss of α-counts caused by self-absorption in the source is believed to be negligible because the sources were all thin, and in any case, α-particles leaving the source with as little as $\frac{1}{5}$ of their full range were recorded. Only a very small resolving-time correction was necessary at the counting rates which were used.

TABLE I. Specific activity of AmO_2.

		Mass AmO_2 weighed (μg)	Specific activity α-dis/min μg AmO_2
Sample 1	1.	2.90_2	$6.18_3\times10^6$
	2.	2.97_0	6.15_8
Sample 2	1.	6.95_3	6.18_5
	2.	6.64_7	6.21_0

The results obtained in duplicate determinations of the specific activity of AmO_2 on two different samples of Am^{241} are shown in Table I.

The mean value for the specific activity of AmO_2 is $6.18_4\times10^6$ α-disintegrations/min μg AmO_2. The mean deviation from the mean was only 0.2 percent.

Allowing for the estimated errors in the calibration of the microbalance and α-counter, and the possible presence of up to 1 percent of impurities in the AmO_2, the α-half-life of Am^{241} becomes 470_{-10}^{+5} years.

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