between k and αk, then ν_k can be written as

$$\nu_k=\kappa\int_{\alpha k}^{\infty}[F(k)]^{\frac{1}{2}}k^{-\frac{3}{2}}dk;$$

or, in the approximate forms:

$$\nu_k\cong\kappa[\alpha(k)]^{-4/3}\int_k^{\infty}[F(k)]^{\frac{1}{2}}k^{-\frac{3}{2}}dk \quad \text{for} \quad k_0\ll k\ll k_s \tag{8a}$$

$$\nu_k\cong\kappa[\alpha(k)]^{-4}\int_k^{\infty}[F(k)]^{\frac{1}{2}}k^{-1}dk \quad \text{for} \quad k\gg k_s. \tag{8b}$$

The further assumption that α is a numerical constant will lead one to suppose that in the comparison made by Heisenberg, (8a) is appropriate, while for our present comparison based on S (8b) will be more appropriate. Thus

$$\kappa\alpha^{-4}\cong 0.26 \quad \text{and} \quad \kappa\alpha^{-4/3}\cong 0.85. \tag{9}$$

The corresponding values of κ and α are 1.5 and 1.6 approximately.

The author is much indebted to Professor S. Chandrasekhar for many invaluable discussions.

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Radioactivity in Platinum by Neutron Capture*

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THE stable isotopes of platinum, shown in Fig. 1, will by neutron capture produce radioactive atoms of mass 193, 197, and 199. Previous studies[1] have assigned half-lives of 4.33 days, 18 hr., and 31 min., respectively, to these activities. Specimens of supposedly chemically pure platinum irradiated in the Oak Ridge and Argonne piles yield a complex decay curve as shown in Fig. 2. This curve resolves quite completely into three components, as shown, whose half-lives are 82 days, 3.4 days, and 17.4 hr.

The 82-day activity previously unreported, is found by absorption in aluminum to have beta-radiation with an upper limit of about 0.54 Mev and by absorption in lead, a gamma-ray of energy about 0.6 Mev. That the activity is in platinum was shown by a chemical separation. This emitter is thus isomeric with one of the previously reported radioactive isotopes of mass 197 or 199 probably the former.

Exposures in beta-spectrometers under varying conditions showed that the radioactive platinum emitted more than 20 electron lines, whose energies are shown in Table I. The K–L–M differences, where observable, are in every case characteristic of mercury, and the activity producing the lines decayed with the half-life of 3.4 days. It is thus clear that this activity is due to radioactive gold 199, derived from platinum 199, whose half-life is 31 min., and is formed by neutron capture in platinum 198. The suggested interpretation of each electron line is shown in column 2 of Table I and a summary of the gamma-rays in the final mercury 199 nucleus is given in Table II. The K/L ratio can be roughly estimated from the relative line blackness and is approximately unity for lines arbitrarily numbered 4 and 9 and is much less than unity, indicating a high degree of forbiddenness, for lines 5, 6, and 8.

TABLE I. Electron energies from radioactive platinum.

Electron energy kev	Interpretation	Energy sum kev	Electron energy kev	Interpretation	Energy sum kev
20.4	K^4	103.3	114.8	$L_{1,2}^5$	129.3
45.9	K^5	128.8	117.0	L_3^5	129.2
48.5	K^6	131.4	—	or $L_{1,2}^6$	131.5
50.7	$L_{1,2}^1$	65.2	119.2	L_3^6	131.4
—	or K^7	133.6	—	or $L_{1,2}^7$	133.7
52.4	L_3^1	64.6	124.0	$L_{1,2}^8$	138.5
56.2	K^8	139.1	125.8	M^5	129.4
62.4	$L_{1,2}^2$	76.9	—	or L_3^8	138.0
64.3	L_3^2	76.5	128.0	N^5	128.8
74.7	K^9	157.6	—	or M^6	131.6
84.2	$L_{1,2}^3$	98.7	143.0	$L_{1,2}^9$	157.5
88.0	$L_{1,2}^4$	102.5	145.0	L_3^9	157.2
94.5	M^3	98.1	154.1	M^9	157.7
			156.2	N^9	157.0

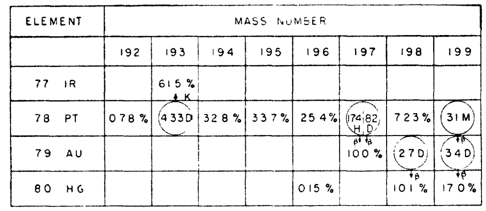

FIG. 1. Isotopic distribution in platinum and neighboring elements.

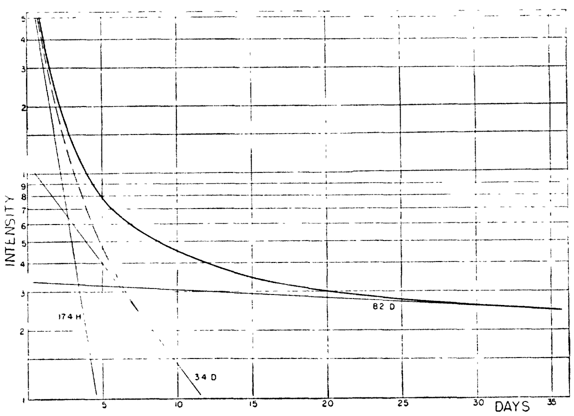

FIG. 2. The decay of activated platinum.

Since the exposure in the pile was of 2 mo. duration, the long-lived emitters were relatively strong compared with the 17.4-hr. activity. It was noted, however, by absorption in aluminum and in lead that beta-radiation whose upper energy was about 0.8 Mev and a gamma-ray of energy 2.2 Mev were present in the freshly irradiated specimen and died out rapidly. No electron conversion lines associated with this short-lived activity could be observed. The radioactive isotopes believed to exist are shown in Fig. 1.

TABLE II. Summary of gamma-energies in mercury 198.

Arbitrary designation	Energy kev	Arbitrary designation	Energy kev
1	65.0	6	131.4
2	76.6	7	133.7
3	98.3	8	138.6
4	103.0	9	157.6
5	129.2		

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An Improvement Effect of the Plateau in Xylene- and Argon-Filled Geiger Counters

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AN improvement effect of the plateau by rest has been observed in a counter tube consisting of a wire between two parallel copper-coated steel plates and filled with a xylene and argon