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New Description of Thorium Spectra



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New Description of Thorium Spectra

Romuald Zalubas



National Bureau of Standards Monograph 17

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New Description of Thorium Spectra

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Wavelengths and estimated intensities in electrodeless lamp and spark sources are presented for 15121 lines of Th I, Th II, Th III, and Th IV in the spectral range from 2000 to 11550 Å. Previously published interferometric values are in this table rounded off to three decimal places and followed by the letter i.

1. Introduction

In 1868, forty years after Berzelius' discovery of thorium, Thalén measured the first spectral lines of this element [1].¹ Later in 1909, Moore [2] was the first to observe the splitting of thorium lines in a magnetic field. Kayser in volume 6 of his *Handbuch der Spectroskopie* listed 23 papers on the thorium spectra which had appeared up to 1912. His table contained about 1,600 arc and spark lines of thorium. This probably constituted about half of the total number of known lines, for weak lines were not included because at that time he did not see much use for them. Since then there have appeared about 50 more papers dealing with the thorium spectra, some being contributions to special regions of the spectra starting in the vacuum and ending in the infrared region; some dealing with its identification in the solar spectrum, in chemical compounds or in radioactivity decay products; some describing and analyzing Th I, Th II, Th III, and Th IV; and some others being theoretical considerations of the thorium spectra among the other rare earth spectra. Since 1912, three new compilations have been published, namely; in 1939, the *MIT Wavelength tables* [3]; in 1946, the *Specola Vaticana in Die Spektren der Seltenen Erden* gave a list of the known Th I, II, and III lines [4]; and in 1958, Oak Ridge National Laboratory published a *Compilation of Data of some Spectra of Thorium* [5]. In these four descriptions, the references to most of the literature on the thorium spectra can be found; therefore, there is little use in giving a complete bibliography here.

As early as 1926 [6], work on the thorium spectra at the National Bureau of Standards was initiated by Kiess, but never published. Kiess secured some spectrograms of arcs and sparks between thorium metal electrodes in air with a Hilger prism spectrograph having a dispersion of 0.6 Å/mm at $\lambda 2200$ Å. He also measured some of these spectrograms, and these measurements are incorporated in the present publication.

In 1955 the thorium program was resumed at the Bureau under the supervision of Kiess, because halide electrodeless lamps excited by microwaves at 2,450 Mc became available. These lamps

emit much sharper and more numerable lines than conventional arcs in air and do not excite the troublesome atmospheric bands that normally mask selected regions of the spectrum.

The first electrodeless thorium halide (Th I₄ and Th Br₄) lamps were made of thorium metal by combining the metal and halogen. The metal, as later appeared, had impurities of zirconium. Later Bozman succeeded in making a thorium halide lamp, by using Th O₂. These spectrograms were free of zirconium impurities, thus enabling us to eliminate the zirconium lines from our list. The concave grating spectrographs of the Bureau with 7,500, 15,000, and 30,000 lines per inch were used. Spectrograms were taken with various sources, namely with an electrodeless lamp and with a spark having thorium metal electrodes. They also included iron electrodeless lamp exposures to furnish iron secondary wavelength standards.

Zeeman magnetic patterns of Th I and Th II have been produced by using the Bureau electromagnet with fields of about 37,000 oersteds. About 1,000 of these patterns have been measured and the resulting *g*-values determined.

Th I, Th II, and Th III lines have been separated by using the following criteria: (a) Relative intensities in lamp and spark exposures; (b) relative intensities of *n* and *p* components of unresolved Zeeman patterns as compared with a no field exposure; (c) resolved Zeeman patterns; and (d) known classified lines of Th I, Th II, Th III, and Th IV from the literature [7].

Usually, lines relatively stronger in an electrodeless lamp than in a spark exposure are Th I lines; those relatively weak in lamp exposures and stronger in spark exposures are Th II lines; and lines either not present or very weak in lamp exposures but relatively strong in spark exposures are Th III lines.

At least three sets of plates in every region have been secured and measured by "hand and eye." Only near the end of the work some plates were measured by semiautomatic Bureau equipment, which in turn is designed for further processing by electronic computers. Most of the lines have been measured on three plates, and some of

¹ Figures in brackets indicate the literature references on p. 2.

them on as many as eight plates. A few lines are included that have been measured only twice.

Simultaneously with this work, interferometric measurements of thorium secondary standards in the region $\lambda 3287 \text{ \AA}$ — $6989 \text{ \AA}$ were made by Meggers and Stanley [8] at the Bureau. Their results have been used to improve the accuracy of our measurements of thorium lines. The relative intensities of the lines in lamp exposures were first estimated by eye, and later calibrated to a uniform scale in the region from 2000 to 9000 $\text{\AA}$ by using Corliss' et al. [9] unpublished data of relative intensities for 2,000 lines of thorium. Spark intensities have not been calibrated to a uniform scale.

The wavelengths are tabulated in table 1. The first column gives the wavelength in Angstrom units. The letter *i* after the wavelength indicates the thorium standards, wavelengths of which are taken from published interferometric measurements [8] and rounded off to three decimal places. This was done in order to make the list more convenient for users of thorium standards. Our grating wavelengths do not differ more than $\pm 0.005 \text{ \AA}$ from the corresponding interferometric measurements. The second and the third columns contain intensities of lines in electrodeless lamps and sparks in air. The letter symbols are used to describe the character of the lines; *d*—double, *h*—hazy, *w*—wide, *l*—shaded to longer wavelength, and *s*—shaded to shorter wavelength.

The fourth column in the table gives the assignment of the individual line to successive spectra.

Table 1 contains more than twice as many lines as have heretofore been published. It should meet all the present requirements for spectrochemistry, and for an extension of the structural analysis of Th I and Th II between the wavelength limits 2000 and 12000 $\text{\AA}$. The work on the analysis of Th I is continuing at this Bureau. A short account of the present state of analysis of Th I has been published separately [10].

This work could not have been carried to its present stage of completion without the cordial collaboration of several spectroscopists. The author is especially indebted to C. C. Kiess for suggesting the problem, for the use of his unpublished data and for taking a keen interest in the progress of the analysis. W. F. Meggers and R. W. Stanley generously furnished the thorium standard wavelengths used here. W. F. Meggers and C. H. Corliss provided the data for calibrating the intensities of Th I lines. C. H. Corliss and W. R. Bozman provided some of the lamps used for sources, and the latter assisted greatly with the coding, printing and other digital computer work. Mrs. Ruth Peterson has been an invaluable assistant with the computational and clerical work. To all of these it is a pleasure to record my gratitude.

2. References

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WASHINGTON, D. C., March 9, 1960.

Table 1. Wavelengths of Thorium Spectra

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2002.34		125	IV	2134.77		2	II	2173.15	1		I
2004.38		2	III	2135.08	1		I	2173.41	1 w		I
2012.68	1	20	II	2135.45	2		I	2173.51	1 w		I
2018.71		3	II	2136.16	6		I	2174.14	1		I
2027.99		2	III	2137.77		10	III	2174.33	1		I
2028.93	1		I	2138.57	10		I	2174.41		4 w	III
2029.28		12	III	2139.26	1		I	2174.56	1		I
2032.93		2	II	2141.94	2		I	2175.13	1		I
2033.46	1	1	II	2144.14		10	III	2175.82	2		I
2035.72	1		I	2145.38	1 w		I	2176.29	1		I
2036.18		10	III	2146.93		5 w	IV	2176.38	1		I
2037.26	1	5	II	2147.14	5		I	2176.77	1	2	III
2039.58	1	2	III	2148.26	2		I	2176.84		4	II
2040.33		10	III	2149.21	1	50	III	2177.16	2	2	II
2059.79	1	2	II	2151.31	1		I	2177.36	1		I
2062.29		4	III	2151.41	1	2	II	2177.76	1		I
2062.41	1		I	2151.67	1	1	II	2177.87		4 w	III
2064.80		3	III	2152.95	1		I	2177.96	1		I
2065.73	1	3	II	2153.28	2		I	2178.35	1	1	II
2066.74		50 w	IV	2153.38	3		I	2178.47	1		I
2073.04		25	III	2153.56		5	II	2179.42	1	3	II
2074.54		2	II	2154.06	1		I	2180.96	1	1	I
2090.11	1		I	2155.86	1		I	2181.06	1		I
2090.62	1	2	II	2157.09	1		I	2181.15	2	3	II
2090.90	1	15	II	2159.38	1		I	2184.31	1		I
2091.27	1		I	2159.78	1		I	2184.66	1	3	II
2091.62	1	15	II	2160.86	1		I	2184.74		3	II
2099.47	1	15	III	2161.19	1		I	2185.47	1		I
2103.61	1	3 w	III	2161.54	1		I	2185.63	1		I
2105.90	1 h	2 w	III	2162.76	1		I	2186.88	1		I
2108.37	2	3	II	2162.82		50	III	2187.61	5	10	II
2110.15	1	2	II	2163.43		2	II	2189.64		3	II
2111.69	2	3	II	2165.18	1		I	2190.78	1	2	II
2113.98	1		I	2165.89	1		I	2192.01	1		I
2114.63	1		I	2166.21	1		I	2192.33		50	III
2115.26	1	5	III	2166.48	1		I	2192.92	1	1	I
2116.36	1		I	2166.63	1		I	2193.19	1		I
2117.53	2	5	II	2167.24	1		I	2193.92	1		I
2121.64	2	3	II	2167.56	1		I	2194.10	2	2	II
2123.00		2	II	2167.80	2	2	II	2194.64	1		I
2124.11	2		I	2169.25	1		I	2194.90	1		I
2126.59	1		I	2169.47	1		I	2195.19	1		I
2127.28	1		I	2169.57	1	2	II	2196.10	1		I
2127.89	1		I	2170.01	2		I	2196.47	1		I
2128.20	2	2	II	2170.28		5 w	III	2196.65	1		I
2128.55	1	1	II	2171.23	1	3	II	2197.16	1		I
2129.25	1		I	2171.57	1		I	2197.68	2	3	II
2129.36	2	4	II	2172.00	1		I	2198.20	1		I
2132.76	2	5	II	2172.47	1		I	2198.63		50	III
2134.69	1	1	II	2172.69	1		I	2198.73	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2199.75		100	III	2221.55	2	25	III	2259.60		5 w	III
2200.18	10	1	I	2222.14	2		I	2261.75	1		I
2200.48	2		I	2222.20	1		I	2261.91	1		I
2200.97	1		I	2222.27	1		I	2263.40	3	5	II
2201.17	1		I	2222.60	1	2	III	2264.65	1		I
2201.28	1		I	2223.37	2		I	2265.53	1		I
2201.59	1		I	2223.57	1		I	2265.93	2	5	II
2201.72	1		I	2223.61		20	III	2267.30		2	III
2201.92	1		I	2223.69	1		I	2267.85	1		I
2202.20	2		I	2224.23	2	5	II	2268.13	1	4	II
2202.79	1		I	2224.29		10	III	2268.35	1		I
2203.15	1		I	2224.68	1		I	2268.76	1		I
2203.87	1		I	2225.00	1		I	2269.12	1		I
2204.16	1		I	2225.09	1		I	2269.28	1		I
2205.40	1		I	2225.25	1	2	II	2269.59	1		I
2205.97	1		I	2226.41	2	3	II	2270.22	1	1	II
2206.06	1		I	2227.12	2	3	II	2270.63	2	6 w	III
2206.45	1		I	2227.29		2	II	2271.93	1	2	II
2206.65		75	III	2228.90		20	II	2272.71	1		I
2207.22	2		I	2229.96	2		I	2273.95	1	2	II
2207.58	2	2	II	2230.36	4	10	II	2274.19	1		I
2207.98	2		I	2230.85	1		I	2275.50	1		I
2208.05	2	5	III	2231.25	1 h	2	II	2276.14	1		I
2208.33	1		I	2231.35		6	II	2276.51		10	II
2208.54	2		I	2232.20	1		I	2276.99	1		I
2208.98	1	2	II	2233.28	1	2	II	2277.54	2		I
2209.07	1	2	II	2233.36		10 w	III	2278.82		30	III
2209.41	1	2	II	2234.22		10 w	III	2279.79	1		I
2209.71	1		I	2234.51	1		I	2280.43	5	12	II
2210.64	2	5	II	2234.74		2	III	2280.82	2		I
2210.89	10		I	2235.76	1		I	2281.55		200	III
2211.75	4		I	2236.07	2		I	2281.97	4	3	II
2212.42	1		I	2238.31	1		I	2282.40	1		I
2212.48	1		I	2239.76	5	10	II	2282.77	2	4	II
2212.86	2	3	II	2241.55	1		I	2283.39	1		I
2213.12	1		I	2242.53	1	1	II	2283.66	1		I
2213.83	1		I	2243.28	3	5	II	2283.97	1		I
2214.55	1	3	II	2244.43		2	II	2284.27	1	30	II
2215.12	2	2	II	2244.90	1	2	II	2284.62	1	3	III
2216.03		4 w	III	2247.27	1	5	II	2285.31	2	4	II
2216.47	1	1	II	2247.70	2		I	2285.65	1		I
2216.67	5	1	I	2249.58	1 h	10	II	2287.60	2	100	III
2216.78	1	2	II	2251.48		4	III	2288.02	20		I
2217.17	1		I	2251.97		3	II	2289.69	2	1	II
2218.05	2		I	2253.35	1		I	2290.50	2		I
2219.18	1		I	2253.77	1		I	2290.64	2	5	II
2219.87	1		I	2254.26	1		I	2291.65		150	III
2220.07	1		I	2254.96	1		I	2291.86	10		I
2220.24	1		I	2257.22		2	III	2292.58	1		I
2221.09	2	50	III	2257.54	1	5	III	2292.68	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum
2295.15	2	I	2325.97	1	I	2348.60	50	I
2295.76	1	I	2326.93	6	II	2348.82	2	I
2296.08		IV	2327.28	1	I	2349.33	2	II
2297.26		III	2328.30	1	I	2349.50	1 h	II
2298.21		III	2328.53	2	II	2349.68	3	II
2298.86	10	II	2328.60		III	2349.91	10 w	II
2299.29	2	I	2329.06	2	II	2350.33	2	II
2300.70	1	I	2329.35	1	I	2351.74		III
2300.77	1	II	2329.82	4	II	2352.98	20	I
2301.22		III	2330.23	3	I	2354.02	7	II
2301.42	20	I	2330.63	1	II	2354.16	3	I
2302.90	10	I	2330.80	5	II	2354.27	2	II
2304.53	2	II	2331.07	2	II	2354.99	1	II
2305.47	3	II	2331.83	5	I	2355.24	4	II
2306.34	2	II	2332.28	1	I	2355.53	2	I
2306.57	10	I	2332.35	10	I	2355.75	1	I
2306.78	2	II	2332.26	3	II	2355.89		III
2307.07		III	2333.87	2	II	2355.94	2	I
2307.15	1	II	2334.21	2	I	2356.19	10	II
2307.58	10	II	2334.36	10	I	2356.40	10	I
2308.26	1	I	2335.44	10	I	2356.75	10	II
2308.60	2	II	2335.53		III	2357.07	10	I
2309.13	1	I	2336.06	1	I	2357.21		III
2309.42	2	II	2336.20	1	I	2357.42	20	I
2310.87	1	II	2337.34		III	2357.51	2	I
2311.54		III	2337.46	1	I	2357.99	4	I
2311.58		II	2338.33	1	I	2359.74	1	II
2312.46		II	2338.43	1	I	2360.42	1	I
2313.35	2	I	2339.18	1	I	2360.53	20	I
2313.67	2	I	2339.37	1	II	2361.63	4	I
2314.24		III	2339.62	1	II	2362.16	3	II
2314.51	1	I	2339.92	1	I	2362.62		III
2315.09	1	I	2340.64		III	2362.76	20	I
2316.01	1	II	2340.88	1	I	2363.08	1	III
2316.64	1	I	2341.41	3 w	I	2363.12	1	I
2317.16	1	II	2342.36	1	II	2363.43	2	I
2317.45	1	I	2342.46	2	II	2364.02	2	I
2317.74	10	II	2342.66	1	I	2364.19	10	II
2317.94	20	II	2342.87	2	II	2364.62	1	II
2318.61		III	2343.24	1	II	2365.59	2	I
2319.55		III	2343.48	2	II	2366.04	40	II
2321.49	10	I	2344.28		III	2366.39	20	I
2321.62	1	I	2345.35	1	I	2366.98	75	II
2323.80	2	I	2345.91		II	2367.72	2	II
2324.42	1	I	2345.98	10	II	2367.84	2	II
2324.73		III	2346.63	10	I	2368.05	50	II
2325.17	10	I	2347.02	1	II	2368.48	20	I
2325.42	1	I	2347.16	1	I	2368.96	1	III
2325.66	1	II	2348.21		II	2369.27	1	I
2325.74	1	II	2348.29		II	2370.04	5	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2370.39	5		I	2394.53	1	2	II	2410.67	10		I
2370.85	10		I	2394.95	5	1	I	2411.08	1	2	II
2371.16	20		I	2395.22	2 h	2	II	2411.16	2	2	II
2371.43		75	III	2395.63	10	25	II	2411.30	50	75	II
2371.62	10	2	I	2395.69	3	15	II	2411.51	5		I
2372.05	4	5	II	2395.77	1		I	2411.73	20		I
2372.35	1	1	II	2397.10	4	4	II	2412.07	2 h	2	II
2372.63	50	1	I	2397.25	2	2	II	2412.45	5		I
2373.07	1	2	II	2397.35	1	1	II	2413.13	1		I
2373.13	2 w		I	2397.51	10	3	II	2413.41	50	300	II
2373.72	2	2	II	2397.72	5	5	II	2413.49		400	III
2373.84	25	50	II	2397.78		20 w	III	2413.84	10		I
2373.99	5	2	II	2397.88	20		I	2414.36	10		I
2374.73	20		I	2398.28	10	4	II	2414.86	15	6	II
2375.07	30	50	II	2398.50	1		I	2415.31	20		I
2375.83	25	75	II	2398.60	1	3	II	2415.60	10		I
2376.36	2	1	II	2398.75	1	1	II	2416.08	5	2	II
2376.52	10	2	I	2399.09	1	1	II	2416.28	2	1	II
2377.04	5		I	2399.24	1	5	II	2416.95	20	1	I
2377.84	75	125	II	2400.28	10	2	I	2417.09	20	10	II
2378.61	15	10	II	2400.66	10	4	II	2417.17	1		I
2379.75	2	5	II	2400.82	2	2	II	2417.22	10		I
2380.03	2	1	II	2400.95	1		I	2417.49	10		I
2381.49		400	III	2401.14	5	5	II	2418.08	15	20	II
2382.48	15	10	II	2401.57	1		I	2418.30	2	2	II
2382.90	30		I	2401.64	5	5	II	2418.63		2	II
2384.36	30	50	II	2401.73	1 h	1	II	2418.75	1		I
2385.59	15	10	II	2402.66	20	1	I	2419.46	2		I
2386.18	5	5	II	2403.12	15	40	II	2419.56	1		I
2386.23	4		I	2403.21		3	II	2419.80		3	II
2386.51	10		I	2403.40	5	1	I	2419.98	20	25	II
2386.81	20	50	II	2403.60	2	2	II	2420.18	10		I
2388.08	10	2	I	2403.73	2 h	3	II	2421.54	1		I
2388.13	20	30	II	2404.17	50	75	II	2421.83	1		I
2388.83	10	3	II	2404.51	50	50	II	2422.25	10	15	II
2389.02	1		I	2405.58	10	4	II	2422.46	10	2	I
2389.23	10	5	II	2405.85	1	2	II	2422.71	10		I
2389.80	1	1	II	2406.43	20	20	II	2423.00	30	50	II
2390.29	1 h	1	II	2406.69	20	15	II	2423.33	5	3	II
2390.39	2	1	II	2406.98	2	3	II	2423.57	10	4	II
2391.00	3		I	2407.13	20	10	II	2423.67	50	100	II
2391.38	20		I	2407.58	30	20	II	2424.03	20	10	II
2391.53		400	III	2408.23	10		I	2424.54	10	150	III
2391.95	5		I	2408.43	1		I	2424.90		2 w	III
2392.94	2	2	II	2408.67	10	4	II	2425.20	5		I
2393.11	40	75	II	2409.02	1		I	2425.44	1 h	2	II
2393.58	10	8	II	2409.24	15	10	II	2425.54	1		I
2393.79	5		I	2409.46	1	2	II	2425.73	10	2	II
2394.25	2	2	II	2409.59	20	15	II	2426.15	5	2	II
2394.30	2	2	II	2410.07	10	12	II	2426.38	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2426.92	5	2	II	2438.54	5	2	II	2451.33	2		I
2427.18	2		I	2438.61	2	3	II	2451.47	4		I
2427.47	2		I	2438.77	1		I	2451.56	10	1	I
2427.58	2		I	2439.43	5	1	I	2451.72	20		I
2427.74	1		I	2439.74	1		I	2451.98	5		I
2427.98	10	200	III	2439.91	2	1	II	2452.27		4	II
2428.02	1		I	2441.01	2		I	2452.46	30	5	I
2428.14	10		I	2441.26	1	200	III	2452.74	10	10	II
2428.57	5		I	2441.43	1		I	2452.91	2	2	II
2428.78	1	30 w	III	2441.55	2		I	2453.04	2		I
2429.05	10	8	II	2441.66	1		I	2453.26	20	4	I
2429.40	5	4	II	2441.99	5		I	2453.74	10		I
2429.68	10		I	2442.92	1	1	II	2454.16	10	3	II
2430.33	1		I	2443.15	5	2	II	2454.34	2		I
2430.48	5		I	2443.34	1		I	2454.47	10 w	5	II
2430.96	5		I	2443.42	3 h	2	II	2454.52	2	3	II
2431.05	1		I	2443.68	20	4	I	2454.67	5	5	II
2431.15	30	20	II	2443.96	25	20	II	2454.90	10	10	II
2431.71		300	III	2444.04	2		I	2455.50	4		I
2431.86	40		I	2444.46	25	20	II	2455.74	10	12	II
2432.08	10		I	2444.70	1		I	2455.91	2	2	II
2432.13	2		I	2444.94	10		I	2455.97	1		I
2432.26	2		I	2445.06	1		I	2456.30	150	200	II
2432.61	2		I	2445.20	5		I	2456.39	20	15	II
2432.85	75	100	II	2445.44	10	2	I	2456.86	50	40	II
2433.33	1		I	2445.56	3	10	II	2457.04	2		II
2433.63	5	8	II	2445.76	2	1	II	2457.24	2	2	II
2433.83	10	1 h	I	2445.91	1		I	2457.45	10	2	I
2433.95	5	5	II	2446.18	5	2	II	2457.75	20	20	II
2434.11	2	2	II	2446.36	10	5	II	2458.01	20	8	II
2434.23	2	1	II	2446.48	2	2	II	2458.41	5	1	I
2434.43	1		I	2446.60	1 h		II	2458.61	10		I
2434.72	2	2	II	2446.84	10	4	II	2458.77	2	2	II
2434.94	1		I	2447.16	5	1	I	2459.01	50	40	II
2435.15	20	5	I	2447.26	1	1	II	2459.44	5 h	15	II
2435.23	2	2	II	2447.46	5		I	2459.67	2 w	2	II
2435.78	3	2	II	2447.74	1	1	II	2459.90	2		II
2435.95	5		I	2447.85	10	4	I	2460.15	10	3	II
2436.13	2 h	2	II	2447.98	5	3	II	2460.30	2	2	II
2436.34	20	10	II	2448.47	10	4	II	2460.46	1	1	II
2436.43	10		I	2448.70	15	15	II	2460.58	2	2	II
2436.62	1		I	2449.09	20	30	II	2460.79	2	2	II
2436.72	2		I	2449.28	10	2	I	2460.89	5	1	I
2437.11	10		I	2449.51	1		I	2461.21	20	25	II
2437.54	30	75	II	2449.77	1	1	II	2461.59	5		I
2437.67	1		I	2449.86	20	2	I	2461.65	1	1	II
2437.75	1		I	2450.03	1	1	II	2461.89	5	4	II
2438.04	2	3	II	2450.15	1	1	II	2462.33	10	2	I
2438.11	5	2	II	2450.39	20		I	2462.85	30	10	II
2438.38	15	10	II	2450.79	40	50	II	2463.24	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2463.38	5		I	2476.88	10	6	II	2490.10	15	12	II
2463.54	5		I	2476.96	5	20	II	2490.84	2	1	II
2463.68		300	III	2477.09	5	5	II	2491.13	2		I
2463.88	1 h		II	2477.29	5		I	2491.53	5	4	II
2464.04	10		I	2477.46	10	1	I	2492.19	20	20	II
2464.20	1		I	2477.57	10		I	2492.53	10	4	II
2464.29	2		I	2477.78	2 w		I	2492.82	2		I
2464.41	1 h	1	II	2477.88		60	II	2493.03	10	3	II
2464.49	2		I	2477.93	2		I	2493.25	10	10	II
2464.70	1	1	II	2478.47	10	20	II	2493.62	10	5	II
2464.83	10	6	II	2478.70	30 w		I	2493.97	10	5	II
2465.09	2		I	2479.31	1		II	2494.42	4	2	II
2465.21		2	III	2479.54	20	7	I	2494.61	50	75	II
2465.32	2		I	2479.78	5		I	2494.76	5	4	II
2465.62	1		I	2480.11	1	2	II	2494.87	1		I
2465.96	20	6	II	2480.94	2		I	2494.91	2	1	II
2466.13	75	100	II	2481.15	5		I	2495.35	50	100	II
2466.73	1		I	2481.40	40	40	II	2495.56	5	2	II
2466.85	5		I	2481.62	1 w		I	2495.80	1		I
2467.04	10		I	2481.81	10	8	II	2496.01	10	3	II
2467.27	2		I	2482.11	5	3	II	2496.16	10	1	I
2467.41	20	4	I	2482.20	2		I	2496.34	1		I
2467.63		100	III	2482.46	5	5	II	2497.24		400	III
2468.15	50	75	II	2482.63	2 h	2	II	2497.56	15	400	III
2468.35	1		I	2482.73	1		I	2497.72	5		I
2468.71	1 w		I	2482.89	5	5	II	2498.40	50	50	II
2468.91	1		I	2483.54	15	15	II	2498.86	100	70	II
2469.18	20	4	I	2483.71	20		I	2499.68		2	II
2469.28	2		I	2483.95	10	10	II	2499.71	30	6	I
2469.34	1		I	2484.08	5	5	II	2499.97	1		I
2469.73	1		I	2484.18	2	2	II	2500.13	10		I
2470.15	20	12	II	2484.32	2	2	II	2500.44	5		I
2470.59	40	75	II	2484.61	5	3	II	2500.79	10		I
2470.86	1	1	I	2484.74	1		I	2501.12	10	400	III
2470.99	5	4	II	2485.05	30	50	II	2501.68	10		I
2471.16	5	3	II	2485.45	1		I	2502.04	5		I
2471.45	1	1	II	2485.62	1		I	2502.14	1	1	II
2471.67	30	25	II	2485.76	5	5	II	2502.33	10	2	I
2471.92	10	5	II	2486.12	10	12	II	2502.46	20	3	I
2472.50	1		I	2486.38	2	2	II	2502.87	50	30	II
2473.68	10		I	2487.05	2		I	2503.02	10	1	I
2473.81	2		I	2487.18	2		I	2503.23	10	4	II
2473.98	10	200	III	2487.31	10	8	II	2503.31	1		I
2474.53	20	2	I	2487.49	2		I	2503.553	20		I
2475.01	10		I	2488.37	1		I	2503.729	10	2	I
2475.31		150	III	2488.55	10	6	II	2503.853	1		I
2475.38	2		I	2488.76	2		I	2504.284	75	100	II
2475.73	10		I	2488.89	5 w		I	2504.694	2	2	II
2476.13	5		I	2489.22	3		I	2505.263	2	1 h	II
2476.38	10		I	2489.62	75	100	II	2505.388	2	1 h	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2505.601	75	75	II	2522.454	10	2	I	2540.348	15	20	II
2506.012	2	1 h	II	2522.767	30	8	I	2540.720	5 h	4	II
2506.266	10	3	I	2522.959	15	20	II	2541.033	5		I
2506.348	8	4	II	2523.400	2	10 w	II	2541.707	10		I
2507.490	2		I	2523.749	10		I	2541.907	1	100	III
2507.926	50	50	II	2524.219		5	II	2542.649	25	40	II
2508.313	15	15	II	2524.506	2	4	II	2542.880	1		I
2508.734	5		I	2525.389	2	5 w	II	2543.215	10	8	II
2509.584	15	15	II	2525.927	15	20	II	2543.340	20	3	I
2509.699	5	2	II	2526.225	15	15	II	2544.370	3	3	II
2509.964	25	30	II	2526.338	15	20	II	2544.427	30		I
2510.126	2	1	II	2526.818	20		I	2544.608	5		I
2511.156	15	10	II	2527.878	30	10	I	2544.717	1		I
2511.408	10	3	II	2528.361		300	III	2544.914	10		I
2511.592		15 w	III	2528.676	5		I	2545.101		400	III
2511.838	5		I	2529.330	2		I	2545.340	40	25	II
2512.202	5		I	2529.759	10		I	2545.742	20	15	II
2512.465	5		I	2529.978		200	III	2546.057	20		I
2512.520		2 h	III	2530.079	20		I	2546.263	5		I
2512.714	5	300	III	2530.398	20	3	I	2546.960	10	3	I
2512.819	30		I	2531.648	5		I	2547.134	4		I
2513.210	1		I	2531.891	10	20	II	2547.466	5		I
2513.335	5		I	2532.433	30	100	II	2547.900	75	75	II
2513.621	1		I	2533.224	10	15	II	2548.138	40	30	II
2513.930	1		I	2533.525	20		I	2549.011	15		I
2514.108	1		I	2533.632	1	5 w	II	2549.094	1		I
2514.319	12	300	III	2533.873	10	15	II	2549.135		100	III
2514.751	10		I	2533.988	10		I	2549.531	5	400	III
2514.866	10		I	2534.096	10	15	II	2549.985	20	5	I
2515.014	1		I	2534.196	1	1	II	2550.261	10		I
2515.571	2		I	2534.403	2	2	II	2550.374	4		I
2515.703	1		I	2534.582	10	15	II	2550.747	10	2 h	I
2516.428	30	50	II	2534.916	2	4	III	2550.987	10		I
2516.592	5		I	2535.118	2		I	2551.240	20	15	II
2517.939	10	10	II	2535.722	1		I	2551.347	5		I
2519.069	10	10	II	2535.871	15	25	II	2551.560	5	2 h	II
2519.368	2		I	2536.487	20		I	2551.711	5	1	I
2519.559	5		I	2536.546	5	400	III	2551.934	10	5	II
2519.861	10	2	I	2536.668	30		I	2552.150	10	1	I
2520.118	20	15	II	2537.358	10		I	2552.275	5	2	II
2520.304	20	5	I	2537.548	20		I	2552.378	10		I
2520.444	2		I	2537.766	10	10	II	2552.692	2		I
2520.658	75	100	II	2538.446	2		I	2552.911	1 h	1	II
2520.859	5	2	I	2538.684	5	1	I	2553.254	10	10	II
2521.240	2		I	2538.811	1	2 h	II	2553.456	5		I
2521.303	5		I	2538.935	20	25	II	2553.818	10	3	II
2521.771	10	12	II	2539.207	2		I	2554.151	2		I
2521.906	2		I	2539.375	10	10	II	2554.390	30		I
2522.059	2		I	2539.858		20 w	III	2554.651	30		I
2522.106	5		I	2540.170	10		I	2554.747		500	III

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2554.924	5		I	2568.404	1		I	2583.451	50		I
2555.170	75	300	II	2568.661	10	4	II	2584.054	2 w		I
2555.219		100	III	2568.984	1		I	2584.357	1	3 w	III
2555.481	5	6 h	II	2569.240	5		I	2585.010	2		I
2555.661	5		I	2569.480	5		I	2585.248	5	2	II
2555.894	10	1	I	2569.699	2		I	2585.728	5		I
2556.092	20		I	2569.845	20	2 h	I	2586.146	25	50	II
2556.479	15	10	II	2570.090	1		I	2587.063	2		I
2556.739	2		I	2570.256	2		I	2587.237	20	25 w	III
2557.024	10	3	I	2570.663	15	15	II	2587.865	5	2	II
2557.475	2		I	2571.463	20		I	2587.908	2	2 w	II
2557.917	10	1	I	2571.611	10	500	III	2588.916	25	30	II
2558.338	20	6	I	2572.346	1		I	2589.065	100	200	II
2558.522	2		I	2572.457	5		I	2589.480	10	10	II
2558.884	10		I	2572.744	20		I	2589.618	3	3 h	II
2559.113	2		I	2573.139	40	3	I	2589.857	10	10	II
2559.175		150	III	2573.634	20	6	II	2590.065	10	5	II
2559.240	2 h		I	2573.784	1	1	II	2590.225	15	20	II
2559.364	2		I	2573.865	5		I	2590.481	4	4 w	II
2559.418	2		I	2574.485	50	100	II	2590.829	10		I
2559.475	2		I	2574.959	10	1	I	2591.003	10		I
2559.792	20	6	I	2575.095	5		I	2591.224	15	25	III
2560.034	1	2 w	II	2575.416	5		I	2591.369	5	2	II
2560.108	5	2 h	II	2576.210	5	2	II	2591.668	5		I
2560.396	20		I	2576.327	50	50	II	2592.246	2	2	III
2560.557	10		I	2576.688	125	100	II	2592.542	15	15	II
2560.934	20	20	II	2576.905	20	10	II	2592.765	5	8	II
2561.147	10	4	II	2577.045	20	5	I	2593.084	15	15	II
2561.288		15 w	III	2577.285	20	2	I	2593.565	10		I
2561.611	10		I	2577.892	10	10	II	2593.877	20		I
2561.939	50	75	II	2578.250	5	2 h	II	2594.341	7	5 h	II
2562.223	10		I	2578.434	5	8 w	II	2594.656	10	10	II
2562.332	30		I	2578.630	10	10 w	II	2595.031	50	100	II
2562.680	10	4	II	2578.956	15	12	II	2595.622	5		I
2562.939	3		I	2579.437	75	100	II	2596.414	10	5	II
2563.097	5	1 h	II	2579.762	2	2	II	2596.744	50	12	I
2563.256	5		I	2580.350	20	30	II	2597.048	250	200	II
2564.110	10		I	2580.700	40	75	II	2597.326		2000	III
2564.314	2		I	2581.019	5	1	I	2597.648	10		I
2564.387	1	500	III	2581.181	4	4	II	2597.750	20		I
2564.797	10	4	II	2581.457	5		I	2598.063	5		I
2565.597	250	200	II	2581.811	20	6	I	2598.208	10		I
2566.594	125	100	II	2581.976	5		I	2598.506	1		I
2566.923	15	10	II	2582.108	10	10 w	II	2598.732	15	10	II
2567.467	10		I	2582.351	5		I	2598.840	20		I
2567.650	20		I	2582.612	2	2	II	2599.739	30	20	II
2567.792	20		I	2582.939	20	2	I	2600.080	5		I
2567.850		200	III	2583.129	5		I	2600.330	10		I
2567.940	30		I	2583.295	1		I	2600.506	10		I
2568.235	30		I	2583.360		300	III	2600.638		1500	III

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2600.893	250	200	II	2617.116	30	20	II	2633.623	5	1	I
2601.318		10 w	III	2617.832	30	40	II	2633.795	5	3	II
2601.624	20	10	II	2618.903	150	300	II	2634.114	10	12	II
2601.820	30	20	II	2618.996	125	150	II	2634.162	10		I
2602.143	5		I	2619.520	5		I	2634.322	10	2	I
2602.289	10		I	2619.593	5	5 h	II	2634.463	10		I
2602.605	5		I	2619.746	5	1	I	2634.642	10		I
2602.803	2		I	2620.219	5		I	2634.938	40	4	I
2603.013	30	20	II	2620.375	20	20	II	2635.037	40	3	I
2603.294	10	2	I	2620.801	10		I	2635.151	40		I
2603.556	20	10	II	2620.939	30	50	II	2635.296	30	25	II
2603.727	10		I	2621.372	30	100	II	2635.415	30	15	II
2603.911	40	50	II	2621.510	20	20	II	2635.895		500	III
2604.231	10	2	I	2622.353	50	150	II	2636.082	20		I
2604.491	10		I	2622.689	30	30	II	2636.230	10	12	II
2604.712	2		I	2623.100	75		I	2636.412	20	5	II
2604.956	4	1 h	II	2623.447	250	3000	II	2636.675	10		I
2605.210	5		I	2623.797	30		I	2636.876	50	10	I
2605.672	5		I	2624.020	20	4	I	2637.097	20	8	II
2605.997	40	50	II	2624.644	125	10	I	2637.407	10		I
2606.418	20		I	2624.799	20		I	2637.474	5		I
2606.673	10		I	2625.106	50	1	I	2637.696		500 w	III
2607.476	40	30	II	2625.252	20		I	2638.161	50	40	II
2607.775	20	20	II	2625.735	300	3000	II	2638.603	2	200	III
2608.079	10		I	2626.095	30	40	II	2638.779	10		I
2608.321	50	50	II	2626.398	100	200	II	2639.075	20	2	I
2609.225	20	500	III	2626.695	20	4	I	2639.510	200	250	II
2609.857	150	150	II	2627.157	10	2	I	2639.886	50	100	II
2610.040	2 h		I	2627.558	50	75	II	2640.267	100	125	II
2610.404	10		I	2628.014	10		I	2640.397	50	50	II
2611.138	30	50	II	2628.541	10		I	2640.644	20	1	I
2611.271	40	4	I	2628.808	300	500	II	2640.868	40	2	I
2611.425	40	4	I	2628.924	2	2	II	2640.977	5		I
2611.615	50	8	I	2629.069	20	2 h	I	2641.202	2		I
2611.691	100	125	II	2629.378	2	1 h	II	2641.488	500	1500	II
2612.534	50	8	I	2629.614	100	125	II	2641.820	2		I
2612.696	20	20	II	2630.015	250	30	II	2642.397	20	15	II
2612.876	30	50	II	2630.277	10	6	II	2642.606	50	300	II
2613.077	10		I	2630.670	10	5	II	2643.052	10	5	II
2613.319	10	1	I	2630.824	50	75	II	2643.274	50	75	II
2613.652	10		I	2631.576	20	2	I	2643.460	50	75	II
2614.175	50	2 h	I	2631.884	40	6	I	2644.459	20	4	I
2614.363	5	2	II	2632.050	20	2	I	2644.681	50	100	II
2614.956	5	5 h	II	2632.464	50	40	II	2644.768	20	40	II
2615.337	30	50	II	2632.546	75	25	II	2645.668	10		I
2615.635	40	8	I	2632.647	40	15	II	2646.171	10	2	I
2615.857	5		I	2632.851	75		I	2646.248	10		I
2616.123	40	50	II	2632.926	50	75	II	2646.470	5	2	II
2616.632	20	20	II	2633.123	5		I	2646.715	10		I
2616.856	20	20	II	2633.330	300	500	II	2646.889	20	4	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2646.928	2	6	II	2658.665	300	500	II	2671.050	20		I
2647.078	5		I	2659.206	20	1	I	2671.471	50	100	II
2647.375	20	20	II	2659.274	10	1	I	2671.738		50 w	III
2647.503	20	20	II	2659.433	40	4	I	2672.202	40	4	I
2647.838	2	1 h	II	2659.854	50	100	II	2672.380	5		I
2648.211	50	100	II	2660.599	50	75	II	2672.576	40	10	II
2648.403	50		I	2660.965	20	10	II	2672.666	20	5	I
2648.653	30	40	II	2661.089	10	2	I	2672.733	50	10	II
2648.751	20	30	II	2661.388	100	200	II	2672.945	50	40	II
2649.128	50	10 h	I	2661.728	5	5	II	2673.279	40	4	I
2649.476	125	250	II	2661.975	5	2	II	2673.397	40		I
2649.875	200	500	II	2662.343	150	250	II	2673.486	10		I
2650.585	750	750	II	2662.859	150	250	II	2673.708		700	III
2650.692	5	2	II	2663.192	20		I	2673.917	40	10	I
2650.834	5	1	I	2663.333	50	5	I	2674.028	20		I
2651.131	5		I	2663.530	2		I	2674.263	40	20 w	II
2651.384	5	1	I	2663.659	5		I	2674.320	50	5	I
2651.510	40	10	I	2663.950	40		I	2674.568	20		I
2651.712	50	75	II	2664.059	50	100	II	2674.751	40	15	II
2651.909	40	2	I	2664.211	30	30	II	2674.974	4	4	II
2652.065	50	75	II	2664.362	40	3	I	2675.126	40	8	I
2652.605	40		I	2664.670	2	3	II	2675.232	10		I
2652.740	10	10	II	2664.986	20		I	2675.428	10		I
2652.830	1	1	II	2665.120	5		I	2675.674	75	200	II
2653.167	30	100	II	2665.274	20	20	II	2675.899	20		I
2653.339	5		I	2665.546	2		I	2676.132	2		I
2653.576	2		I	2665.889	40	100	II	2676.432	20	40	II
2653.730	5		I	2666.138	2		I	2676.578	40	40	II
2653.925	2		I	2666.257	20	8	II	2676.624	30	50	II
2654.090	1	2	II	2666.413	5	4	II	2676.771	2		I
2654.264	5		I	2666.551	50	5	I	2677.150	5	2	II
2654.447	50	1	I	2666.714	10		I	2677.267	2		I
2654.565	2	4	II	2666.813	5		I	2677.353	20	4	I
2654.760	20		I	2666.905		500	III	2677.540	30	20	II
2655.030	5		I	2667.080	50	50	II	2677.668	40		I
2655.307	20		I	2667.539	40	50	II	2677.871	5	5 w	II
2655.420	20	20	II	2667.771	20		I	2678.064		10 w	III
2655.535	20	1	I	2667.998		500	III	2678.165	10		I
2655.890	20	20	II	2668.152	50		I	2678.405	40	4	I
2656.266	30	40	II	2668.315	20		I	2678.509	10		I
2656.533	10		I	2668.544	50	6	I	2678.637	10		I
2656.982	2	1	II	2668.692	10		I	2678.760	10	2	I
2657.114	20	75	II	2669.062	40	2	I	2678.933	40	40	II
2657.365	3 w		I	2669.226	2	1	I	2679.379	10	1	I
2657.618	2		I	2669.446	50	100	II	2679.690	5		I
2657.785	2		I	2669.699	40	10	II	2679.884	40	1	I
2657.880	20	10	II	2670.061	50	1	I	2680.032	2		I
2658.011	5	1	I	2670.281	50		I	2680.208	30	30	II
2658.217	20	20	II	2670.630	20	10	II	2680.686	100		I
2658.488	5	3	II	2670.859	10		I	2680.980		2000	III

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2681.244	10		I	2692.187	2		I	2705.090	20	10	II
2681.406	10		I	2692.421	2000	750	II	2705.384	50		I
2681.569	40		I	2693.104	30	20	II	2705.653	50		I
2681.879	20		I	2693.297	20		I	2705.849	20		I
2682.021	10	3	II	2693.430	100		I	2706.110	20		I
2682.388	40	2	I	2693.624	10	10	II	2706.178	20		I
2682.700	20	1	I	2693.965	30	30	II	2706.410	75	75	II
2682.855	10	1	I	2694.036	10	200 w	IV	2707.001	20		I
2682.988	10		I	2694.346	10	8	II	2707.217	10	1	I
2683.118	10		I	2694.686	50	40	II	2707.386	40		I
2683.278	50		I	2695.024	50	30	II	2707.461	40		I
2683.486	10 w		I	2695.212	150	200	II	2707.541	40	40	II
2683.615	5 w		I	2695.555	500	1000	II	2708.181	700	150	II
2683.723	5		I	2695.816	100	100	II	2708.340		1000	III
2683.955	10	1	I	2695.986	5		I	2708.950	50		I
2684.289	3000	2000	II	2696.179	50	40	II	2709.044	20		I
2684.677	50	20	II	2696.466	5		I	2709.200	20		I
2685.081	40	10	II	2696.718	10	30	II	2709.413	50	20	II
2685.589	100	15	I	2696.827	100	300	II	2709.542	75		I
2685.836	20		I	2697.546	150	250	II	2709.616	10		I
2685.972	20		I	2697.729	40	3	I	2709.869	30	20	II
2686.107	40		I	2697.989	75		I	2709.936	20		I
2686.185	20	500	III	2698.180	20	3	I	2710.048	20		I
2686.328	5		I	2698.458	5		I	2710.481	50	100	II
2686.501	20		I	2698.743	250	500	II	2710.904	10	1	I
2686.797	20		I	2698.860	2		I	2711.464	100	200	II
2687.133	500	500	II	2699.015	100	8	I	2712.087	40	75	II
2687.512	50	20	II	2699.469	40	1	I	2712.389	40 w		I
2687.615	40		I	2700.602	50	20	II	2712.768	40	50	II
2787.666	200	200	II	2700.787	40	2	I	2712.923	20	10	II
2687.725	20		I	2700.991		50 w	II	2713.251	50	100	II
2687.912	10	1	I	2701.185	20		I	2713.487	20		I
2687.986	5		I	2701.274	10		I	2713.842	100	2 h	I
2688.342	100	200	II	2701.348	20		I	2714.148	20		I
2688.570	10		I	2701.410	4		I	2714.247	20		I
2688.677	50	50	II	2701.596	40		I	2714.617	100	200	II
2688.894	40	1	I	2701.827	150	200	II	2715.089	100	200	II
2689.376	20	10	II	2702.062	40	4	I	2715.303	75	20	II
2689.612	5		I	2702.202	20	2	I	2715.613	50	10	II
2689.715	10		I	2702.388	10		I	2716.320	200	500	II
2689.829	10		I	2702.616	10		I	2716.589	75	50	II
2689.910	10		I	2702.845	40		I	2717.023	20	1	I
2690.079	20	10	II	2702.921	30	30	II	2717.506	20		I
2690.310	50	100	II	2703.193	75	30	II	2717.640	10		I
2690.979	15	20	II	2703.477	40	3	I	2717.775	50		I
2691.030	100	50	II	2703.736	2		I	2718.421	10		I
2691.184	75	200	II	2703.962	1000	300	II	2718.720	40	15	II
2691.369	50	10	II	2704.488	50	30	II	2718.887	3		I
2691.511	20	1	I	2704.752	20		I	2719.191	20	2	I
2691.872	30	3 w	I	2704.903	20		I	2719.303	20		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2719.455	50	100	II	2736.564	75	1	I	2751.758	50	25	II
2719.936	100	200	II	2736.722	75	20	II	2752.168	750	2000	II
2720.349	20		I	2736.978	40		I	2753.093	100	150	II
2720.467	30	40	II	2737.434	100	200	II	2753.346	40		I
2720.632	20		I	2737.865	75	30	II	2753.540	40	50	II
2720.826	40	8	II	2738.104	20		I	2753.823	10		I
2721.175	10		I	2738.222	10		I	2754.034	20		I
2721.375		100	III	2738.331	100	75	II	2754.246	30	20	II
2721.697	500	750	II	2738.815	10	75	II	2754.514	30	10	II
2722.218	50	3	I	2739.132	5	5	II	2754.633	20	10	II
2722.383	100	300	II	2739.344	10		I	2754.782	40	1	I
2723.317	50	200	II	2739.765	50		I	2754.886	40	3	I
2723.827	40	3	I	2740.208	15	10	II	2755.051	75	15	I
2723.950	3		I	2740.476	50	200	II	2755.332	40		I
2724.510	50		I	2740.709	20	2	I	2755.453	5		I
2724.886	100	200	II	2740.976	20	10	II	2755.958	75	200	II
2725.350		500	III	2741.470	50		I	2756.095	2		I
2725.561	50	40	II	2741.772	10		I	2756.450	5		I
2726.185	10		I	2742.222	10		I	2756.513	5		I
2726.320	50		I	2742.409	20		I	2756.705	2		I
2726.491	150	200	II	2742.566	20		I	2756.853	40	5	I
2726.672	5		I	2743.075	300	800	II	2757.073	20		I
2727.246	50	100	II	2743.927	50	10	II	2757.172	10	500	III
2727.402	20	2	I	2744.031		100 w	III	2757.365	50	40	II
2728.183	20		I	2744.136	10		I	2757.643	2		I
2728.459	10		I	2744.247	40		I	2757.882	20	3	I
2728.689	40	5	I	2744.367	20		I	2758.066	20		I
2728.913	75	75	II	2744.404	10		I	2758.229	10		I
2729.040	40	1	I	2744.987	10	5	II	2758.956	40	30	II
2729.333	500	2000	II	2745.200	10		I	2759.067	2		I
2730.272	150	200	II	2745.348	4 w		I	2759.228	2		I
2730.637	20		I	2745.524	125	15	I	2759.411	200	500	II
2730.810	10		I	2745.847	10	5	II	2759.716	75	30	II
2731.207	20		I	2746.022	20	1	I	2759.858	10		I
2731.584	100	100	II	2746.135	10		I	2760.071	3		I
2731.689	15	50 w	III	2746.785	40		I	2760.245	5		I
2731.919	75	50	II	2747.158	100	200	II	2760.401	250	400	II
2732.701	100	75	II	2747.583	50	50	II	2761.016	40	3	I
2732.819	500	750	II	2747.849	75	100	II	2761.413	2		I
2733.204	75	75	II	2748.124	10	8	II	2761.499	10		I
2733.686	10		I	2748.405	100	10	I	2761.671		50 w	III
2733.765	10		I	2748.807	100	200	II	2762.381	50	40	II
2733.904	10		I	2749.340	25	10	II	2762.456	100		I
2734.417	75	75	II	2749.531	150	250	II	2762.631	30	20	II
2734.648	40 w		I	2749.711	50	160	II	2763.617	500	800	II
2735.058	40	50	II	2750.087	40	30	II	2763.888	5		I
2735.205	20	20	II	2750.520	20	2	I	2764.176	20 s	1	I
2735.835	75	30	II	2750.655	30	20	II	2764.643	200	400	II
2736.173	5	5 w	II	2751.032	20 w		I	2764.830	10		I
2736.440	75	25	II	2751.570	75	150	II	2765.123	200	400	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2765.555	75		I	2778.034	50	40	II	2791.669	20	20	II
2765.686	40		I	2778.230		50	III	2791.989	40 w		I
2765.870	5	1000	III	2778.407	20	1	I	2792.364	40		I
2765.966	10		I	2778.708	150	200	II	2792.687	30	50	II
2766.062	5		I	2779.146	5 w		I	2793.060	10		I
2766.459	5		I	2779.358	10		I	2793.236	5		I
2766.563	20		I	2779.471	50	3	I	2793.570	50	50	II
2766.630	30	2	I	2779.663	20	20	II	2793.696	50		I
2766.914	10		I	2779.832	150	5	I	2794.007	50	40	II
2766.980	20		I	2780.031	5		I	2794.261	400	500	II
2767.361	50	40	II	2780.415	75	150	II	2794.460	10		I
2767.678	5		I	2780.701	200	300	II	2794.650	10		I
2767.882	40	10	I	2781.001	50	2	I	2794.811	40	1	I
2768.094	10		I	2781.197	20		I	2794.956	20		I
2768.248	20		I	2781.358	20	20	II	2795.198	40	50	II
2768.411	20		I	2782.369	100	40	II	2795.357	10		I
2768.532	20 s		I	2782.844	5	3	II	2795.913	5		I
2768.851	1000	2000	II	2783.060	150	200	II	2796.202	5		I
2769.340	5 w		I	2783.176	10		I	2796.518	50	50	II
2769.781	10		I	2783.492	200	400	II	2797.023	200	400	II
2769.970	10		I	2783.651	40	2	I	2797.740	150	250	II
2770.132	50	10	I	2783.795	10		I	2798.266	125	250	II
2770.653	5		I	2783.921	20		I	2798.493	20	30	II
2770.825	1000	800	II	2784.060	125	250	II	2798.665	100	100	II
2771.255	40		I	2784.344		300	III	2798.892	30	20	II
2771.493	200	100	II	2784.495	40		I	2799.114	200	750	II
2772.013	100	100	II	2784.979	100	200	II	2799.425	100		I
2772.725	20	10	II	2785.438	5	3	II	2799.543	20	1	I
2772.828	5	4	III	2785.571	30	20 w	II	2799.678	5		I
2773.024	150	18	II	2785.619	50	200	II	2799.883	40		I
2773.518	40	4	I	2786.245	50	150	II	2800.242	50	100	II
2773.955	100	200	II	2786.678	50	40	II	2800.569	300	400	II
2774.074	100	200	II	2786.916	100	200	II	2801.730	50	10	I
2774.492	40		I	2787.133	150	300	II	2801.944	50	60	II
2774.855	100	100	II	2787.867	75		I	2802.276	50	100	II
2775.014	40		I	2788.081	5	4	II	2803.373	100	200	II
2775.080		300	III	2788.487	50		I	2803.582	5		I
2775.238	100		I	2788.682	75	250	II	2803.742	5	2 h	II
2775.474	150	75	II	2788.854	20	10	II	2803.860	5	1	I
2775.804	5		I	2789.075	20		I	2804.213	30	40	II
2775.982	20		I	2789.405	10		I	2804.580	10	8	II
2776.197	100	6	I	2789.529		100 w	III	2804.658	20	20	II
2776.451	20		I	2789.701	40	3	I	2804.908	125	10	I
2776.668	100		I	2789.990	20	1	I	2805.234	10	1	I
2776.734	10		I	2790.422	125	400	II	2805.506	150		I
2776.825		500	III	2790.857	40	1	I	2805.724	20	10	I
2777.036	20		I	2791.013	200	400	II	2805.994	50		I
2777.203	20	2	I	2791.287	50	2	I	2806.495	20		I
2777.457	20		I	2791.439	50	100	II	2806.633	20		I
2777.798	100	100	II	2791.478	40		I	2806.870	20	10	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2807.037	50	10	I	2824.098	20	4	I	2839.079	100	2	I
2807.316	10		I	2824.233	50	1	I	2839.234	300	400	II
2807.707	150	100	II	2824.540	50		I	2839.341	200	150	II
2807.826	30	400	II	2824.701		500	III	2839.606	200	300	II
2808.016	40		I	2825.171	40	20	II	2839.971	40		I
2808.315	50		I	2825.378	75	30	II	2840.154	250	500	II
2808.618	40		I	2825.941	100	125	II	2840.390	25		I
2808.857	50	50	II	2826.546	40		I	2840.834	10		I
2808.990	500	1000	II	2826.862	500	1500	II	2841.164	250	500	II
2809.272	40		I	2827.279	80	120	II	2841.380	100		I
2809.997	40		I	2827.758	100	200	II	2841.574	20		I
2810.362	20	20	II	2827.987	100	200	II	2841.808	75	150	II
2810.570	10	10	II	2828.212	150		I	2842.660	100	75	II
2811.158	30		I	2828.496	150		I	2842.813	1000	2000	II
2811.407	30	500	III	2829.124	50		I	2843.053	75	75	II
2811.737	50	6	I	2829.348	50	1	I	2843.302	75	100	II
2812.284	20	5	II	2829.441	50	100	II	2843.418	20	30	II
2812.421	50	100	II	2829.736	125	1	I	2843.559	2	2	II
2813.423	40		I	2829.936	75	200	II	2843.642	20		I
2814.322	200	200	II	2830.447	200	500	II	2843.936	50		I
2814.467	40	30	II	2830.675	40	2	I	2844.237	30	1	I
2814.566	100	150	II	2830.960	40	2	I	2844.352	50 ^w	1	I
2815.047	40	50	II	2831.195	100	125	II	2845.188	100	200	II
2815.301	20	10	II	2831.384	40		I	2845.826	50	200	II
2816.073	125	200	II	2831.672	30	20	II	2846.044	75		I
2816.919	50	100	II	2832.009	40	10	II	2846.376	40		I
2817.138	75	150	II	2832.314	300	400	II	2846.530	75	200	II
2817.899	5		I	2832.576	10		I	2847.026	5		I
2818.043	20		I	2833.046	75		I	2847.230	20		I
2818.493	20	10	II	2833.329	100	200	II	2847.359	200	700	II
2818.865	10	5	II	2833.532	75	30	II	2847.622	30	20	II
2818.966	10		I	2833.621	3		I	2848.023	50	200	II
2819.087	50		I	2833.888	20		I	2848.085	40		I
2819.328	200	500	II	2834.004	20		I	2848.248	50		I
2820.337	100	300	II	2834.494	75	1000	II	2848.495	75		I
2820.712	20	2	I	2834.778	100	125	II	2848.684	5		I
2820.760	5		I	2835.290	20	1	I	2849.159	50	75	II
2821.072	50		I	2835.637	20	2	I	2849.315	40		I
2821.175	75		I	2835.775	10		I	2849.574		5 ^h	II
2821.314	50		I	2836.048	500	500	II	2849.705	5		I
2821.611	125	200	II	2836.207	100	2	I	2849.930	20		I
2822.026	200	500	II	2836.441	400	100	II	2850.005	2		I
2822.183	75	40	II	2836.628	2	100 ^w	III	2850.611	75		I
2822.260	5		I	2837.299	2000	4000	II	2850.819	40		I
2822.380	40	50 ^h	II	2837.636	10	5	II	2851.261	800	1500	II
2822.566	40	100	II	2837.867	5		I	2851.436	75	200	II
2822.689	50	50	II	2838.243	30	20	II	2851.554	100		I
2822.832	50	40	II	2838.486	100		I	2852.496	75	500	II
2823.132	50	125	II	2838.587	20	10	II	2852.990	10	10	II
2823.554	75	100	II	2838.872	20		I	2853.562	10 ^w		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2854.138	150	800	II	2867.056	30	200 w	II	2880.152	40		I
2854.346	75		I	2867.109	10		I	2880.627	100		I
2854.614	50	40	II	2867.252	40		I	2881.135	150	300	II
2854.917	150	200	II	2867.440	40		I	2882.001	100	400	II
2855.890	50	300	II	2867.690	2	10	II	2882.336	30	20	II
2856.150	5	5	II	2867.925	20	5	I	2882.508	100	250	II
2856.234	20	1	I	2868.250	10		I	2882.772	50		I
2856.302	10		I	2868.440	100	50	II	2883.254	75		I
2856.421	40		I	2868.679	75	300	II	2883.434	20	5	II
2857.137	100		I	2868.960	20		I	2883.611	100	100	II
2857.493	150	500	II	2869.044	5		I	2883.717	75		I
2857.789	10 w		I	2869.398	5		I	2884.291	1500	2000	II
2857.880	4		I	2869.536	20	5 h	II	2885.046	900	1800	II
2858.308	10		I	2869.917	100	500	II	2885.697	10		I
2858.559	5		I	2870.050	50	100	II	2885.964	40	40	II
2858.914	100	200	II	2870.403	1500	2500	II	2886.236	150	300	II
2858.958	20	30	II	2870.815	100	200	II	2886.496	150	300	II
2859.120	5		I	2871.097	40	30	II	2886.644	20		I
2859.219	20		I	2871.728	30	2000	III	2886.973	200		I
2859.603	40		I	2871.979	20 w		I	2887.310	1	5 h	III
2859.768	75	2	I	2872.345	5	4 w	II	2887.814	500	1000	II
2860.048	40	200	III	2872.880	5		I	2888.389	20		I
2860.488	150		I	2873.156	10	1	I	2888.545	20		I
2860.777	75		I	2873.460	5	1	I	2888.771	20		I
2860.901	3		I	2873.717	120	300	II	2888.909	10	30 w	III
2861.060	5		I	2873.985	5		I	2889.205	20	6	II
2861.270	10	5	II	2874.154	5		I	2889.280	20		I
2861.338	200	300	II	2874.337	5		I	2889.482	10		I
2861.416	500	750	II	2874.425	4		I	2889.635	5		I
2862.011	50	30	II	2874.626	75	300	II	2889.749	5	2	I
2862.282	5		I	2874.738	2		I	2890.080	50	4	I
2862.530	40	20	II	2874.902	75	200	II	2890.195	1	3	II
2862.610	100	40 w	II	2874.950		10 w	II	2890.432	2	4	II
2862.880	10		I	2875.466	50		I	2890.493	2	3	II
2863.144	20		I	2875.638	100	500	II	2890.880	5	8	II
2863.508	40		I	2876.032	50		I	2891.249	200	200	II
2863.677	50	1	I	2876.413	150	400	II	2891.725	100	200	II
2864.049	40		I	2876.646	20		I	2891.815	100	200	II
2864.144	10		I	2876.753	20	10	II	2892.171	75	200	II
2864.284	20		I	2876.958	5		I	2892.415	1		I
2864.654	150	500	II	2877.059	5		I	2892.778	2		I
2864.980	10 w		I	2877.387	40	30	II	2892.816	2	1	II
2865.237	100	150	II	2877.540	20		I	2892.904	20		I
2865.485	5		I	2877.810	1		I	2893.076	20		I
2865.608	5		I	2877.967	20 w		I	2893.150	10	20	II
2865.732	40		I	2878.638	100	50	II	2893.749	10	5	II
2866.238	40		I	2879.191	100	100	II	2893.869	10 w		I
2866.401	100	100	II	2879.378	5		I	2894.487	30	30	II
2866.646	100	150	II	2879.530	200	200	II	2894.985	3		I
2866.790	4		I	2880.056	20		I	2895.135	400	200	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spectrum	Wave-length	Intensity Lamp	Spark	Spectrum	Wave-length	Intensity Lamp	Spark	Spectrum
2895.264	5		I	2908.690	4	10	II	2923.952	20	1000	III
2895.738	50	15	II	2908.979	20	30	II	2924.104	75	150	II
2895.941	5	5	II	2909.103	20 w		I	2924.571	75	75	II
2896.002	50		I	2909.297	5		I	2925.054	800	1500	II
2896.312	50		I	2909.375	5		I	2925.525	75	15	I
2896.423	10		I	2909.454	30 w	40 w	II	2925.648		100	III
2896.756	2	1000	III	2909.767	150	100	II	2926.342	50	5	I
2897.069	400	600	II	2909.974	20		I	2926.431	30	20	II
2897.484	20	1	I	2910.157		10 w	III	2926.813	20	10	I
2897.617	20		I	2910.596	600	600	II	2927.258	10		I
2898.260	200	200	II	2910.720	40	20 h	II	2927.373	5		I
2898.354	5		I	2911.320	300	500	II	2927.473	10		I
2898.553	75		I	2912.009	400	400	II	2928.254	1000	1200	II
2898.950	50	100 w	III	2912.151	5		I	2928.699	100	3000 w	III
2899.375	100	50	II	2912.665	50	75	II	2928.994	5		I
2899.723	600	1200	II	2912.761	75	200	II	2929.287	200	250	II
2900.064	20 w		I	2912.985	10		I	2929.775	5		I
2900.117	30		I	2913.704	40	40	II	2930.185	5	5 w	II
2900.360	30		I	2914.348	75	100	II	2930.250	5		I
2900.542	2		I	2914.498	75	100	II	2930.904	150	250	II
2900.648	50	1	I	2914.583	75	100	II	2931.273	75		I
2900.766	50		I	2915.470	20	20	II	2931.518	20		I
2901.063	50		I	2915.753	5		I	2931.652	50		I
2901.328	50	2 h	I	2916.367	150		I	2931.772	75	2	I
2901.380	2		I	2916.481	75	200	II	2932.151	100	75	II
2901.760	10		I	2916.828	4		I	2932.314	20	1	I
2902.156	20	1	I	2916.946	4		I	2932.524	75	100 w	III
2902.474	20	2	I	2917.034	200	400	II	2932.642	100	100	II
2902.708	75		I	2917.411	600	800	II	2932.870	5		I
2903.044	75	50	II	2917.781	100	400	II	2933.095	200	300	II
2903.164	250	400 w	II	2917.898	150	400	II	2934.008	75	25	II
2903.300	4		I	2918.433	4		I	2934.134	200	300	II
2903.564	100	200	II	2918.585	2		I	2934.532	50	20	II
2904.266	75	150	II	2918.916	50		I	2934.989	150	150	II
2904.440	30	40	II	2919.171	75	150	II	2935.653	100	150	II
2904.700	40	30	II	2919.444	50	50	II	2935.758	75	75	II
2905.009	5	100	II	2919.837	300	500	II	2935.812	75	75	II
2905.096	50	20 h	II	2920.050	40	30	II	2936.189	300	700	II
2905.227	20		I	2920.364	100	200	II	2936.460	600	1000	II
2905.316	20		I	2920.937	200	300	II	2937.366	10	5	I
2905.738	10	15	II	2921.085	100	100	II	2937.435	125	500	II
2905.924	200	400	II	2921.364	100	100	II	2938.098	125	100	II
2906.120	200	400	II	2921.558	50	100	II	2938.220		300	III
2907.223	50		I	2921.623	200	400	II	2938.325	10	10 h	II
2907.450	50		I	2922.598	300	300	II	2939.081	5		I
2907.544		5	III	2922.795	50	150	II	2939.567	150	400	II
2907.774	100	100	II	2922.988	125	125	II	2939.616	150	400	II
2908.160	10	2 w	I	2923.379	50		I	2940.080	400		I
2908.360	200	400	II	2923.480	4 w		I	2940.301	40	12	II
2908.506	75		I	2923.639	50		I	2940.581	150	150	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2940.676	150	250	II	2953.568	50	50	II	2966.640	4	4	II
2940.862	5		I	2953.604	5		I	2967.229	40	30	II
2941.314	125	150	II	2954.361	10	2	I	2967.816	50	4	I
2941.886	100	150	II	2954.555	4		I	2968.007	5 w		I
2942.625	250	500	II	2954.883	100	200	II	2968.320	5		I
2942.857	1500	1700	II	2955.033	200	400	II	2968.687	1000	1400	II
2942.987	50		I	2955.603	200	300	II	2969.062	100	100	II
2943.088	30		I	2955.850	100	200	II	2969.377	125	125	II
2943.235	5		I	2956.244	10	5	II	2969.823	300	250	II
2943.340	3		I	2956.630	40	50	II	2970.016	5	4	II
2943.440	3		I	2956.822	10		I	2970.080	50	20	II
2943.717	50		I	2957.065	40	40	II	2970.573	50		I
2943.848	5		I	2957.580	600	1000	II	2970.628	75	50	II
2943.953	50	20	II	2957.920	250	200	II	2970.816	75	30	II
2944.382	4		I	2958.141	125	400	II	2971.102		10 w	III
2944.463	120	250	II	2958.371	50	1	I	2971.479	600	400	II
2944.615	50	12	I	2958.566	50	30	II	2971.721	5		I
2944.948	125	250	II	2958.830	10		I	2971.970	5		I
2945.343	5	10 w	III	2959.139	50		I	2972.223	300	400	II
2945.504	5		I	2959.277	50	100	II	2972.442	2		I
2945.889	30	30 h	II	2959.448	5	2	II	2972.884	75	50	II
2946.255	100	100	II	2959.863	50	75	II	2973.530	300	600	II
2946.539	5		I	2960.167	2		I	2974.009	900	1000	II
2946.610	30	250	II	2960.368	2 h		I	2974.088	400	50	I
2946.927	50	10	I	2960.529	20	10	II	2974.409	50	30	II
2947.230	75		I	2960.774	75	75	II	2974.846	10		I
2947.461	25		I	2960.986	10		I	2974.930		1000	III
2947.840	20	30	II	2961.263	2		I	2975.051	5		I
2948.367	50	50 w	II	2961.380	2		I	2975.488	5		I
2948.513	5		I	2961.476	20	1000	III	2975.591	10		I
2948.778	50	75	II	2961.532	5		I	2976.017	300	300	II
2949.065	400	900	II	2961.775	15	200	III	2976.097	75		I
2949.234	100	100	II	2961.798		10	II	2976.490	10		I
2949.543	100	15	I	2961.938	5		II	2976.644	125	125	II
2949.934	300	500	II	2962.016	100		I	2977.023	25	1	I
2950.433	300	400	II	2962.563	5		I	2977.300		200 w	III
2950.752	20 w	30	II	2963.048	5	5	II	2978.321	100		I
2950.864	5		I	2963.442	5		I	2978.476	75		I
2951.061	10	5	II	2963.612	100	150	II	2978.652	50		I
2951.206	200	400	II	2963.874	100	150	II	2978.716		3000 w	III
2951.567	120	150	II	2964.001	100	150	II	2978.789	75		I
2951.902	50	50	II	2964.111	125	125	II	2979.031	125		I
2952.125	100	125	II	2964.572	5		I	2979.483	2		I
2952.482	5		I	2964.918	400	600	II	2979.840	75	2	I
2952.586	10	10	II	2965.114	120	75	II	2980.102	25		I
2952.745	5	1	I	2965.495	400	600	II	2980.326	200	300	II
2952.808	5		I	2966.054	10		I	2981.329	300	400	II
2953.050	25		I	2966.148	100	75	II	2981.400	10	5 h	II
2953.124	10		I	2966.418	50	20	II	2981.478	300	400	II
2953.454	10		I	2966.542	2	2 h	II	2981.837	400	400	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
2981.997	100	30	II	2997.819	50	50	II	3015.191	10		I
2982.033	100	20	I	2997.948	5		I	3015.363	20		I
2982.193	75	1	I	2998.132	100	4 h	I	3015.725	150	300	II
2982.430		20	III	2998.605	50	20	II	3016.137	20		I
2982.707	50 h		I	2999.095	300	1200	II	3016.248	20		I
2983.020	100	150	II	2999.275	125	125	II	3016.327	5	10 w	II
2983.213	50	20	II	2999.797	150	250	II	3016.457	3	1 h	I
2983.559	5	10	II	3000.339	150		I	3016.751	40	1	I
2983.662	100	20	I	3000.460	5		I	3017.135	150	300	II
2983.804	450	700	II	3000.612	10		I	3017.441	40	20	II
2984.088	20		I	3000.939	250	250	I	3018.489	200	400	II
2984.408	100	100	II	3001.266	500	600	II	3018.630	3		I
2984.627	50		I	3001.753	50		I	3019.414	200	300	II
2984.764	100	75	II	3002.392	800	800	I	3019.617	30	15	II
2985.242	600	800	II	3002.684	150		I	3019.875	50		I
2985.748	10		I	3003.203	100		I	3020.050		150 w	III
2985.798	10	1	I	3003.595	50		I	3020.318	2	2 h	II
2985.963	10		I	3003.850	40	40	II	3021.476	150	300	II
2986.080		2000	III	3004.247	75		I	3022.096	150	300	II
2986.381	5		I	3004.635	50	40	II	3022.413	2		I
2986.449	5		I	3006.001	100	125	II	3022.512	10		I
2986.770	300	300	II	3006.167	100		I	3023.040	4		I
2986.830	10		I	3006.635	75		I	3023.400	4		I
2987.317	5		I	3006.929	300	600	II	3023.564	5	5	II
2987.674	200		I	3007.474	5		I	3023.642	50		I
2988.235	1400	1800	II	3007.624	300	400	II	3023.784	5		I
2989.274	20		I	3007.796	75	100	II	3024.460	5	5 h	II
2989.552	5	2	II	3007.951	75	75	II	3024.675	200	200	II
2989.710	5		I	3008.272	75	75	II	3024.877	40		I
2989.898	100	200	II	3008.497	200	300	II	3025.124	50	50	II
2990.719	1		I	3008.917	75		I	3025.387	10	10	II
2991.054	600	600	II	3009.550	10		I	3025.446	200	50	II
2991.685	300	500	II	3009.763	150	200	II	3026.149	30	10	II
2992.261	10	10	II	3010.000	50	75	II	3026.572	400	700	II
2992.606	5		I	3010.138	20		I	3027.229	100	30	II
2992.724	5		I	3010.410	6		I	3027.595	75	20	II
2993.071	50		I	3010.729	100	1	I	3027.883		40 w	III
2993.395	10	4	II	3010.898	10	10	II	3028.573	250	500	II
2993.648	300	500	II	3011.297	10		I	3028.821	40		I
2993.814	300	1000	II	3011.592	100	50	II	3029.130	4		I
2994.583	20	5	II	3011.988	4		I	3029.402	10	4	II
2995.167	100		I	3012.704	100	150	II	3029.604	5		I
2995.271	100	150	II	3012.987	10	5	II	3030.025	10	2	II
2995.514	50	100	II	3013.597	100	125	II	3030.484	300	3	I
2995.815		2000	III	3013.774	4		I	3030.712	20		I
2995.959	150		I	3014.207	10		I	3030.864	150	200	II
2996.220	50	50	II	3014.406	50	40	II	3031.195	150	8	I
2996.559	10		I	3014.577	40	20	II	3031.286	150	150	II
2996.986	400	600	II	3014.632	40		I	3031.699	300	50	II
2997.194	150	100	II	3014.918	100	125	II	3031.953	300	400	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3032.004	100	25	I	3048.481	30	1	I	3069.066	75		I
3032.558	2		I	3049.093	1500	2000	II	3069.256	250	300	II
3032.891	40	4	I	3049.650	200	400	II	3069.657	20	2	I
3033.135		100 w	III	3049.858	200	400	II	3069.832	20		I
3033.299	3	30 w	II	3050.310	5		II	3070.012	50		I
3034.063	600	1000	II	3050.627	150		I	3070.294	20		I
3034.318	50	50	II	3050.983	200	400	II	3070.816	600	600	II
3034.636	200		I	3051.786	200	400	II	3070.942	300	300	II
3034.886	40	10	I	3052.120	40		I	3071.185	20		I
3035.109	400	600	II	3052.403	75	100	II	3071.621	20		I
3035.529	100	100	II	3052.774	75	50 h	II	3071.776	10		I
3035.753	100	125	II	3053.456	10		I	3072.114	600	600	II
3036.090	2		I	3053.528	75	2	I	3072.824	500	500	II
3036.912	100	100	II	3053.765	5		I	3073.430	75	100	II
3037.107	50	50	II	3053.842	20		I	3073.807	20	1	I
3037.762	10	6	II	3054.944	3	15	II	3074.091	40		I
3038.007	125	150	II	3055.502	10		I	3074.249	5 w		I
3038.598	400	500	II	3055.696	5		I	3074.515	40		I
3038.814	40	40	II	3055.814	30	1	I	3074.902	5		I
3038.984	20		I	3056.097	75	120	II	3075.056	100	300	II
3039.416	50	30	II	3056.282	20		I	3075.283	20	3	I
3039.526	10	4	II	3056.441	75	100	II	3075.525	20		I
3039.652	4		I	3056.527	5		I	3075.835	50	30	II
3040.047	100	75	II	3056.686	40		I	3076.030	50	75	II
3040.630	10		I	3056.841	75	100	II	3076.407	50	1	I
3040.875	3		I	3057.630	150	150	II	3077.338	200	400	II
3041.508	100	100	II	3057.888	75	100	II	3077.715	200		I
3041.934	50		I	3058.023	125		I	3077.931	100	100	II
3042.302	40	30	II	3058.126	75	50	II	3078.828	2000	3000	II
3042.633	40		I	3058.422	200	400	II	3078.980		2000	III
3042.796	40		I	3059.695	50		I	3079.566	75	3	I
3043.060	200	250	II	3060.177	300	900	II	3079.887	125	125	II
3043.243	150	150	II	3060.440	600	2	I	3080.216	1000	1000	II
3043.601	20	6	II	3061.246	75 w	100 w	II	3080.830	75	25	II
3044.030	1		I	3061.698	150	1200	II	3081.023	40	20	II
3044.336	10		I	3061.811	30		I	3081.657	100	150	II
3044.583	20		I	3062.456	200		I	3081.978	200	300	II
3044.744	50	60	II	3063.027	1000	1000 w	I	3082.167	200	150	II
3045.060	50	40	II	3063.107	10	20 w	II	3082.504	100		I
3045.317	10		I	3065.030	100	125	II	3082.998	150	125	II
3045.557	500	600	II	3065.315	10		I	3083.294	100	800 w	III
3045.764	20		I	3065.681	200		I	3083.605	40	4	I
3046.030	50		I	3065.928	400	300	II	3083.834	50	8	II
3046.142	50	50	II	3066.297		200	III	3084.506	40	10	II
3046.438	20		I	3066.410	100	150	II	3085.465	40	50	II
3046.952	400	600	II	3066.797	10		I	3085.774	50		I
3047.192	5		I	3067.726	1000	2000 w	II	3086.200	2 w		II
3047.813	200	1	I	3068.256	50	50	II	3086.353	20	10	II
3048.027	10	10	II	3068.904	800	100	I	3086.560	50	40	II
3048.229	30	20	II	3068.972	200	300	II	3086.855	40		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3086.919	5		I	3107.035	400	800	II	3125.741	500	500	II
3087.270	5	5	II	3107.345	50	75	II	3125.866	200	150	II
3087.410	75	2	I	3107.622	10		I	3126.055	100	200	II
3087.679	50	3	I	3107.735	10		I	3126.258	40		I
3087.996	40		I	3108.299	1500	2000	II	3126.404	40		I
3088.473	400	600	II	3108.460	20		I	3126.616	10		I
3088.835	75	75	II	3110.026	400	1200	II	3126.924	20		I
3089.627	100	400	II	3110.826	75	25	II	3127.041	20		I
3090.091	250	250	II	3110.944	20		I	3127.212	200	400	II
3090.650	30	10	II	3111.062	10		I	3127.555	100	100	II
3091.642	75	100	II	3111.273	100		I	3127.718	40		I
3091.849	20		I	3111.428	100	100	II	3127.856	50	100 w	II
3092.061	40	1	I	3111.767	100	25	II	3128.309	50 w		I
3092.326	100	125	II	3111.830	75	30	II	3128.582	50	200	II
3092.825	125		I	3112.088	100	200	II	3129.279	50	200	II
3093.048	75	100	II	3112.400		1000	III	3129.977	50	400	II
3093.717	125	2	I	3112.925	20		I	3130.266	50	20	II
3094.011	100	1	I	3113.246	75	50	II	3130.426	50		I
3094.701	50	75	II	3113.421	75 w	6	I	3130.793	75	50	II
3095.043	10		I	3113.878	1	50 w	III	3131.072	200	750	II
3095.616	75	40	II	3114.054	150	200	II	3132.249	20	40	II
3095.747	40	40	II	3114.268	100	200	II	3132.389	75	25	II
3096.266	100	150	II	3115.191	40	10 w	II	3132.824	20	10	I
3096.428	400	300	II	3115.413	20	40	II	3133.620	100	500	II
3096.864	50	30 h	II	3115.539	50		I	3133.983	100		I
3097.137	20	20	II	3115.742	100	300	II	3134.206	50		I
3097.270	300	300	II	3115.943	5		I	3134.425	200	1000	II
3097.956		500	III	3116.282	1000	1000	II	3134.718	20		I
3098.119	20		I	3116.483	200	400	II	3134.889	40		I
3098.328	50		I	3117.152	100	200	II	3135.084	30	300	II
3098.390	40		I	3117.689	200	600	II	3135.163	40	4	I
3098.725	100		I	3118.473	40	40	II	3136.217	700	100	I
3099.735	100	125	II	3118.909	10		I	3136.709	50	200	II
3099.871	100	100	II	3119.365	300	250	II	3136.834	350		I
3100.792	75	30	II	3119.517	1000	2500	II	3137.171	40	200	II
3100.932	75	1500	II	3119.965	40		I	3137.418	20		I
3101.684	250	300	II	3120.158	100	100	II	3137.940	20		I
3102.127	75 w		I	3120.451	75	75	II	3138.199	40		I
3102.490	30		I	3120.882	300		I	3138.322	50	100	II
3102.666	500	1000	II	3121.009	100	200	II	3138.585	10		I
3103.186	50 w		I	3122.107	2	50	II	3139.235	20		I
3103.767	20	2	I	3122.332	50		I	3139.301	2000	1000	II
3103.998	40		I	3122.400		500 w	III	3139.692	10		I
3104.462	150	150	II	3122.571	5		I	3139.890	150	150	II
3104.894	30		I	3122.968	1000	3000	II	3140.070	20	30	II
3104.959	100		I	3123.154	50		I	3140.274	700	75	I
3105.055	200	400	II	3124.002	100	75	II	3140.489	75	30	II
3105.480	100	400	II	3124.390	400	2000	II	3140.944	50	100	II
3105.753	700	1200	II	3125.210	300	1000	II	3141.333	40	50	II
3106.683	150	200	II	3125.513	800	2400	II	3141.841	100	250	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3142.341	30	400 w	III	3160.819	50	75 w	II	3177.880	75	200 w	II
3142.434	40		I	3161.070	50	40	II	3178.246	600	50	I
3142.533	100		I	3161.159	40 h		I	3178.618	75		I
3142.686	75		I	3161.360	200		I	3178.783	75	150	II
3142.838	150	2000	II	3161.684	150	400	II	3179.049	500	1000	II
3143.425	2		I	3162.071	10		I	3180.199	2000	5000	II
3144.128	75		I	3162.576	75	50 w	II	3181.185	100	700	II
3144.500	40	20	II	3162.835	100	700	II	3181.663	400 w	20	I
3144.695	75	75	II	3163.079	40	30	II	3181.780	2	2	II
3145.275	50	100	II	3163.239	40	40	II	3182.042	20		I
3145.636	400	100	I	3163.495	20	1	I	3182.402	200	300	II
3146.044	200	2000	II	3163.708	100		I	3182.638	250	400	II
3146.303	100		I	3163.866	40		I	3183.142	20	40	II
3146.806	40	40	II	3164.301	75	20	II	3183.375	40		I
3147.083	20	20	II	3164.483	100	700	II	3183.552	150	200	II
3147.447	150		I	3165.036	50	3	I	3183.790	100	200	II
3147.737	40		I	3165.623	75	300	II	3183.977	75	100	II
3148.056		500	III	3165.820	250	500	II	3184.264	200		I
3148.226	50		I	3166.094	300	600	II	3184.607	50	75	II
3149.409	20		I	3166.190	20 w		I	3184.946	500	1000	II
3149.599	20		I	3166.811	75	10	I	3185.629	75 w	20	II
3149.963	50	75	II	3167.553	200	500	II	3186.421	10 w		I
3150.457	300	800	II	3168.010	150	4	I	3186.994	100	200	II
3151.017	50		I	3168.315	20 w	10	II	3187.399	300	75	II
3151.182	75		I	3168.724	20	10 h	II	3187.466	20	5	II
3151.647	100	600	II	3168.905	30		I	3188.230	500	1000	II
3151.799	50 h	200 h	II	3168.972	10		I	3188.292	200	500	II
3152.285	50		I	3169.324	150	600	II	3189.040	5	2	II
3152.391	50		I	3169.808	50	75 w	II	3189.558	50		I
3153.209	50	5	II	3169.937	40	2	I	3189.710	125		I
3153.632	50	1	I	3170.419	100	200	II	3190.068	300	600	II
3153.754	20		I	3171.268	400	20	I	3190.171	300	400	II
3154.026	10	5	I	3171.692	100	200	II	3190.352	200	150	II
3154.299	1000	1200	II	3172.110	100	200	II	3190.638	2	4	II
3154.768	800	1500	II	3172.499	50	150	II	3190.720	100	200	II
3155.583	50	20	II	3173.057	40	2	I	3191.085	150	125	II
3155.833	200	500	II	3173.211	75	150	II	3191.207	150	150	II
3156.392	200	300	II	3173.426	400	20	I	3191.838	50	50	II
3156.848	75	10	I	3174.020	50		I	3192.106	100	100	II
3157.220	200	200	II	3174.198	150	500	II	3192.573	400	8	I
3157.333	5 w		I	3174.451	75	200	II	3192.848	20		I
3157.506	40		I	3174.832	100		I	3193.162	150	200	II
3157.912	75	50	II	3175.045	10	5	II	3193.361	150	200	II
3158.391	75	6	I	3175.728	500	2000	II	3193.781	150		I
3158.615	100	200	II	3176.163	200		I	3194.088	50		I
3158.859	40	4	I	3176.504	100	500	II	3194.247	20	20 h	II
3159.070	100	100	II	3177.194	100	300	II	3194.843	10	10 h	II
3159.701	75	50	II	3177.397	75	10	II	3195.162	100	40	II
3160.170	75	75	II	3177.490	50	10	II	3195.316	100	150	II
3160.356	40	10	II	3177.770	50	4	II	3195.687	400	15	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
3196.606	40	I	3215.101	10	I	3232.130	800	I
3196.754	20	I	3215.782	400	I	3232.312	300	I
3197.567	75	75 w II	3215.899	100	2 I	3232.732	75	100 II
3197.703	75	50 II	3216.340	5	I	3232.801	75	30 II
3198.052	40	I	3216.532	40	I	3233.347	100	100 II
3198.229	300	400 II	3216.634	50	1000 III	3233.625	100	50 II
3198.482	300	300 II	3216.781	75	I	3234.511	50	I
3198.704	75	150 II	3216.990	150	3 I	3234.902	50	75 II
3198.962	200	400 II	3217.258	40	I	3235.001	400	I
3200.550	20	20 II	3217.450	500	500 II	3235.387	50	75 II
3200.729	20	I	3217.729	400	10 I	3235.846	1200	1800 II
3201.186	75	150 II	3217.847	150	75 II	3236.575	150	1 I
3201.485	5	I	3218.118	50	I	3236.777	50	2 I
3202.135	75	75 II	3218.315	150	150 II	3237.232	100	500 II
3202.523	100	2 I	3218.750	75	100 II	3237.514	20	2 I
3203.085	40	2 I	3218.867	200	200 II	3238.119	2000	2500 II
3203.232	150	200 II	3219.482	20	I	3238.799	50	50 II
3203.611	150	125 II	3219.938	5 w	I	3238.940	400	20 I
3203.878	150	125 II	3220.352	600	600 II	3239.288	300	400 II
3204.176	75	75 II	3220.980	300	I	3239.914	10	I
3204.466	40	3 I	3221.288	1000	3000 II	3240.210	30	I
3205.067	40	2 I	3221.593	75	I	3240.331	30	10 II
3205.285	100	100 II	3221.869	200	150 II	3240.484	300	400 II
3205.475	50	8 I	3222.805	200	30 I	3240.645	400	2 I
3205.646	150	8 I	3223.166	75	75 II	3241.118	600	800 II
3206.178	200	200 II	3223.281	75	15 II	3241.541	200	150 II
3206.458	40	2 I	3223.489	5	I	3242.160	50	I
3206.938	150	200 II	3223.798	150	100 II	3242.257	200	250 II
3207.192	75	75 II	3223.909	40	1 I	3242.381	150	50 II
3207.783	150	250 II	3224.999	100	I	3243.041	300	200 II
3207.940	150	200 II	3225.419	800	1200 II	3243.574	40	I
3208.029	125	250 II	3225.660	400	40 II	3243.763	20	10 II
3208.515	100	I	3225.901	400	75 I	3243.910	75	I
3209.330	100	100 II	3226.122	300	200 II	3244.041	200	I
3209.752	40	1 I	3226.318	100	I	3244.243	40	I
3209.997	100	4 I	3226.414	200	200 II	3244.453	800	40 I
3210.308	400	600 II	3227.001	300	200 II	3244.880	75	I
3210.785	100	1 I	3227.476	20	I	3245.770	600	1500 II
3211.196	400	4 I	3227.584	50	I	3246.002	70	I
3211.475	2	2 II	3227.784	400	400 II	3246.149	50 w	I
3212.005	300	200 II	3228.093	50	I	3246.583	100	100 II
3212.133	10	2 II	3228.338	10	I	3246.802	100	75 II
3212.337	20	I	3228.526	40	2 I	3247.210	100	I
3212.810	100	100 II	3229.013	1500	2500 II	3247.323	20	I
3213.105	40	2 I	3229.673	50 w	I	3247.591	300	400 II
3213.225	40	I	3229.979	300	75 I	3248.380	75	75 II
3213.576	400	600 II	3230.372	40	I	3248.537	400	400 II
3214.079	400	20 I	3230.862	300	500 II	3248.606	10	I
3214.382	400	4 I	3231.467	100	3 I	3248.690	150	50 II
3214.644	200	2 I	3232.036	100	500 III	3248.900	200	300 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
3249.333	75	I	3272.047	800 12	I	3293.944	400 500	II
3249.866	700 30	I	3272.300	10 w	III	3294.231	300 10	I
3249.920	5 4	II	3272.567	20	II	3294.565	150 150	II
3250.189	150 200	II	3273.894	600 1200	II	3294.745	200 100	II
3251.306	10 15	II	3274.392	200 100	II	3294.991	300 400	II
3251.586	10 w	I	3275.059	400 1600	II	3295.320	400 500	II
3251.919	2000 75	II	3275.248	50	I	3295.525	400 500	II
3252.738	200 800	II	3276.182	200 600	II	3296.600	200 800	II
3252.959	200 800	II	3276.298	50	I	3297.361	350 500	II
3253.687	400 30	I	3276.543	40	I	3297.831	400 500	II
3253.869	400 75	I	3276.706	150	I	3298.038	400 8	I
3254.069	300 2	I	3277.060	300 2	I	3298.689	75	I
3254.583	50	I	3277.690	75	I	3298.799	200	I
3254.816	400 600	II	3277.910	100 100	II	3299.356	20 h	I
3255.512	400 600	II	3278.188	100 100	II	3299.664	75 30	II
3255.922	200	I	3278.746	300 200	II	3300.254	50	I
3256.277	1500 4500	II	3279.017	40	I	3300.611	200 200	II
3256.690	50	I	3280.374	800 1600	II	3300.754	40	I
3257.160	250 500	II	3280.732	150 5	I	3301.263	600 1000	II
3257.374	1300 10	I	3280.958	10 5	II	3301.347	100	I
3257.932	200 250	II	3281.037	400 5	I	3301.634	500 100	II
3258.110	600 50	I	3281.178	75 w	I	3302.163	200 2	I
3258.741	100	I	3281.270	75 100	II	3303.257	100	I
3259.061	800 5	I	3281.408	200 400	II	3303.480	200 50	II
3259.237	100 125	II	3281.967	150 100	II	3304.238 i	3000 50	I
3259.615	300 500	II	3282.120	100 125	II	3305.301	400 s 2	I
3260.922	200 600	II	3282.384	50 w	I	3305.590	40 50	II
3261.113	75 50	II	3282.600	200 400	II	3306.047	40 75	II
3261.543	350 400	II	3282.967	200 250	II	3307.388	20 h	I
3262.668	3000 3000	II	3283.644	100 1	I	3307.554	20 h	I
3263.030	300 400	II	3284.172	500	III	3308.060	200 300	II
3263.183	200 30	I	3285.096	40 2	I	3308.454	40 2	I
3263.624	100 100	II	3285.519	300 2	I	3309.135	300 600	II
3263.762	100 50	II	3285.748	900 5	I	3309.365 i	800 6	I
3264.123	200 200	II	3286.578	400 600	II	3310.238	400 800	II
3264.441	300 400	II	3287.076	10 10	II	3310.481	200 400	II
3265.582	300 400	II	3287.789 i	1600 2000	II	3310.634	250	I
3266.319	150 200	II	3288.156	200 200	II	3310.805	75 40	II
3266.625	400 75	I	3288.376	300 4	I	3310.912	40	I
3266.998	400 800	II	3289.494	125	I	3311.390	100 125	II
3267.435	20	I	3289.626	100	I	3312.070	100 150	II
3267.612	10	I	3290.116	400 100	II	3312.342	20	I
3268.440	150 50	II	3290.233	75	I	3312.661	75 75	II
3268.758	100 30	II	3291.028	50 w	I	3313.064	400 8	I
3269.475	300 400	II	3291.441	20 w 20	II	3313.424	100	II
3270.097	100	I	3291.744	3000 3000	II	3313.642	600 600	II
3270.233	100 100	II	3292.520 i	3000 2500	II	3313.975	100	I
3270.826	600 200	I	3292.924	75 2	I	3314.805	400 1000	II
3271.533	125	I	3293.584	400 400	II	3315.186	100 150	II
3271.881	600 10	I	3293.692	150 200	II	3315.536	75 100	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3315.826	200	40	II	3337.279	300		I	3355.250	300	50	II
3316.204	200	200	II	3337.468	100	20	II	3355.378	75		I
3316.758	20		I	3337.870 i	2000	150	II	3355.545	200	100	II
3317.242	10 h		I	3338.393	600	75	II	3356.678	75		I
3317.551	200	200	II	3338.582	50	10	II	3356.823	300	50	II
3317.734	200	250	II	3338.818	100	20	II	3357.047	75	20	II
3318.232	40	30	II	3339.234	75		I	3357.237	100	30	II
3318.376	200		I	3339.435	100		I	3357.392	20	20	II
3318.965	200	250	II	3340.005	100		I	3357.739	40	10	II
3319.127	300		I	3340.318	125		I	3358.080	40	10	II
3319.602	200	100	II	3340.712	400	3	I	3358.601 i	2000	200	II
3319.904	400	200	I	3342.068	200	50	II	3359.056	100	20	II
3320.292	400	400	II	3342.179	40		I	3359.604	100	3	I
3320.469	400		I	3342.376	75 w		I	3359.750	200	10	II
3320.873	40		I	3342.885	50 h		I	3360.146	200	20	II
3321.047	100		I	3343.156	400		I	3360.367	400	40	II
3321.437	2000	1600	II	3343.257	150	20	II	3360.997	400	8	I
3321.568	75	75	II	3343.337	400		I	3361.193	350	3	I
3322.091	400	3	I	3343.494	200	60	II	3361.612	300	200	II
3322.450	100	125	II	3343.610	400		I	3361.728	400	200	II
3322.945	350	1	I	3343.799	200	15	II	3361.874	75	30	II
3324.752 i	2000	2000	II	3344.300	150	20	II	3362.180	200	20	II
3325.120 i	3000	3000	II	3344.871	500	50	II	3362.497	400	20	II
3326.452	400	500	II	3345.162	200		I	3362.667	200	10	II
3326.775	100		I	3345.359	20	5	II	3363.061	250	15	II
3327.182	50	300	II	3345.828	150	4	I	3363.300	10		I
3327.498	40		I	3345.992	100		I	3363.700	400	25	II
3327.705	50	20	II	3346.552	400	50	II	3364.132	100		I
3328.246	200	50	II	3346.975	300		I	3364.381	100	15	II
3328.630	20	2	I	3347.247	40	15	II	3364.689	1200	100	II
3328.967	100	15	II	3347.405	150		I	3365.129	400		I
3329.723	400	20	I	3347.574	150	50	II	3365.331	800	20	I
3330.477 i	1800	100	I	3347.988	500		I	3365.615	40	10	II
3330.964	200	15	II	3348.297	75		I	3365.975	100		I
3331.188	100	40	II	3348.776	3000	15	I	3366.529	300	300	II
3331.723	200		I	3348.963	800	100	II	3366.706	100	20	II
3332.079	100	20	II	3349.381	200 w	50	II	3367.018	40 h		I
3332.400	100	30	II	3349.838	100 w	10	II	3367.578	350		I
3332.473	100		I	3350.355	200	75	II	3367.810	1200	200	II
3333.127	1000	10	I	3351.228 i	2500	300	II	3369.000	200 w	8	I
3334.041	100 w	20	II	3351.575	150	50	II	3370.150	100 w		I
3334.608	3000	500	II	3351.832	50	10	II	3370.380	75	10	II
3335.056	400	200	II	3352.023	200		I	3370.739	80	4	I
3335.228	250		I	3352.389	50	10	II	3370.888	80		I
3335.688	200		I	3352.736	50		I	3371.465	100	20	II
3336.064	40	50	II	3353.136	200	50	II	3371.790	400	200	II
3336.154	100		I	3353.950	300	100	II	3372.300	60	8	I
3336.568	75		I	3354.177	300	400	II	3372.686	200	30	II
3336.772	100	75	II	3354.611	300	300	II	3372.814	100	5	I
3337.147	400	50	II	3355.101	300	100	I	3373.056	80		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spectrum	Wave-length	Intensity Lamp	Spark	Spectrum	Wave-length	Intensity Lamp	Spark	Spectrum
3373.491	700	100	II	3397.076	50	10	II	3419.172	300	200	II
3374.578	200	75	II	3397.517	1600	15	I	3420.177	40		I
3374.975 i	1600	15	I	3398.099	80		I	3420.369	140	1	I
3375.598	300	5	I	3398.533	1600		I	3421.210 i	2500	200	I
3376.374	250	2 w	I	3399.017	150	20	II	3421.669	50		I
3376.842	200	20	II	3399.322	5	3	II	3422.651	400	100	II
3377.478	200 w	600	III	3400.312	20	20	II	3423.114	300	75	II
3377.660	75	10	II	3400.624	80	1	I	3423.987	1600	50	I
3377.973	20 h	5	II	3400.978	40	10	II	3425.150	400	125	II
3378.566	400	150	II	3401.689	400	75	II	3425.408	160		I
3379.093	100	5	II	3402.021	250	50	II	3425.593	100		I
3379.300	20	5	II	3402.701	1500	500	II	3425.955	200	30	II
3379.669	100	20	II	3403.279	500	100	II	3426.129	100	20	II
3379.963	20	4	II	3403.881	125		I	3427.074	400	10	I
3380.715	20		I	3404.016	125		I	3427.444	40	10	II
3380.860 i	900	6	I	3404.632	300	75	II	3427.984	150	15	II
3381.349	400	50	II	3405.558 i	1400	40	I	3428.625	300	2	I
3381.902	80		I	3406.230	400	50	II	3428.720	250		I
3383.113	400	200	II	3406.540	50		I	3428.998	600	10	I
3383.582	100		I	3406.825	40		I	3429.384	200	15	II
3383.959	5	30	II	3407.617	75	20	II	3429.568	200		I
3384.395	150	2	I	3407.821	200		I	3429.884	400	20	II
3384.983	75	30	II	3408.630	75	10	II	3430.324	50	8	II
3385.531 i	800	200	II	3408.745	200	10	I	3430.536	150	20	II
3386.498	400	200	II	3409.083	40	5	II	3431.008	150	20	II
3386.756	75	20	II	3409.264	250	200	II	3431.251	200		I
3387.129	50	10	II	3410.064	300		I	3431.805	200	100	II
3387.463	150		I	3410.702	20		I	3432.065	50	15 h	II
3387.911	800	5	I	3410.823	20		I	3432.270	40		I
3388.145	75		I	3411.369	200	15	II	3432.378	75		I
3388.576	300	50	II	3411.769	400	100	II	3432.860	40		I
3389.041	350		I	3412.158	125		I	3433.203	50		I
3389.456	900	10	I	3412.398	100	50	II	3433.999 i	3000	300	II
3389.646	300	75	II	3413.013 i	1800	12	I	3434.252	200		I
3390.365	400	20	II	3413.385	200	20	II	3434.736	900	30	I
3390.805	200	18	II	3413.627	150	2	I	3435.170	200	2	I
3392.035 i	6000	500	II	3413.918	100	5	I	3435.372	125 l	2	I
3392.947	100	15	II	3414.506	200	100	II	3435.980	2000	200	II
3393.232	100	15	II	3414.915	75		I	3436.708	1200	50	II
3393.406	200	2	I	3415.121	40 h		I	3437.017	150	20	II
3393.986	200		I	3415.474	50		I	3437.309	2500	30	I
3394.130	200	100	II	3415.884	200	25	II	3437.677	20		I
3394.579	150	50	II	3416.402	100	25	II	3437.780	50	10	II
3394.793	300	100	II	3416.586	100		I	3437.983	40		I
3395.095	80	5	I	3417.099	50	10	II	3438.955	600	200	II
3395.368	200	30	II	3417.487	250		I	3439.403	500		I
3395.658	100 w	20	II	3417.668	15	3	II	3439.722	1000	300	II
3395.979	200	10	II	3417.704	100	20	II	3440.428	80		I
3396.409	200	20	II	3418.769	300	100	II	3441.012	300	50	II
3396.727 i	1400	40	I	3418.937	300	100	II	3441.361	250	50	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3441.509	250		I	3459.632	125	10	II	3476.887	75	6	II
3442.579 i	800	10	I	3461.017	1600	30	I	3477.699	200	50	II
3443.112	250	100	II	3461.216	1600	20	I	3478.125	200	50	II
3443.381	200		I	3461.561	100	1	I	3478.461	200	50	II
3443.506	150 w		I	3462.850 i	2000	200	II	3478.602	150 w		I
3444.003	150	40	II	3463.580	75	5	II	3479.028	150	100	II
3444.250	125	25	I	3463.719	1500	200	II	3479.172 i	800	200	II
3444.790	75		I	3464.417	100	5	II	3479.675	350	10	I
3445.213	250	75	II	3464.470	50	2	I	3480.048	500	2	I
3445.377	200	50	II	3464.571	20	1	I	3480.792	300	5	II
3445.732	300	80	II	3464.720	10		I	3480.994	40	8	II
3446.532	500 i	50	II	3464.862	200 w		I	3481.597	100		I
3446.962	50	4	II	3465.027	150	10	II	3482.278	200	1	I
3447.169	50	2	I	3465.060	40	1	I	3482.546	200	25	II
3447.610	300	40	II	3465.465	50	1	I	3482.762	150	25	II
3447.833	100		I	3465.771	400	200	II	3483.110	200	1	I
3448.946	400		I	3465.915	200	15	II	3483.163	100	20	II
3449.278	200	40	II	3466.082	50	2	I	3483.246	200	2	I
3449.478	75		I	3466.190	100	2	I	3483.402	200	2	I
3449.643	500	100	II	3466.523	800	4	I	3484.072	300	40	II
3449.942	200	50	II	3466.639	1000	5	I	3484.408	75	20	II
3450.250	50		I	3466.886	100	6	II	3484.562	100		I
3450.704	75	5	II	3467.237	150		I	3484.737	300		I
3450.944	150	50	II	3467.360	50	1	I	3484.947	200		I
3451.297	100		I	3467.658	50 w		I	3485.204	500	75	II
3451.702 i	900	20	I	3467.923	125	30	II	3485.465	150	10	II
3452.191	75		I	3468.219 i	2000	75	II	3485.711	100		I
3452.677	200	100	II	3468.705	200	10	II	3486.536	3500	100	I
3452.910	300	2	I	3469.340	1200	20	I	3486.828	200	2	I
3453.511	800	12	I	3469.918	1200	300	II	3486.966	200	10	II
3453.907	75	8	II	3470.557	300	3	I	3487.071	150	30	II
3454.197	150	15	II	3470.998	300	1	I	3487.836	200	40	II
3454.676	75	20	II	3471.207	1200	6	I	3487.974	200		I
3454.955	50	15	II	3471.952	500	4	I	3488.121	100		I
3454.990	15	2	II	3472.687	200	2	I	3488.330	100		I
3455.111	25	3	II	3472.841	100		I	3488.474	100		I
3455.265	100	20	II	3473.027	350	10	II	3488.830	800	2	I
3455.597	400		I	3473.409	150	20	II	3489.187	800	4	I
3455.922	75	10	II	3473.540	400	2	I	3489.499	800 i	10	I
3456.429	200	4	I	3473.770	150	10	II	3489.713	200		I
3456.673	300		I	3473.941	50 w		I	3489.823	100	30	II
3456.920	50	3	II	3474.273	200	15	II	3490.265	200	40	II
3457.062	800	15	I	3474.522	200		I	3490.450	300	50	II
3457.423	100	1	I	3474.708	175		I	3491.571	300	50	II
3457.675	100	10	II	3475.169	50		I	3491.894	600	1	I
3457.810	50		I	3475.533	150	25	II	3492.117	100	1	I
3457.897	75	10	II	3475.946	400 w	3	I	3492.317	100	1	I
3458.136	200		I	3476.237	100		I	3492.357	100 w	1	I
3458.754	50		I	3476.377	400	1	I	3492.460	100 w	1	I
3459.481	150	10	II	3476.545	200	30	II	3492.674	100	15	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3492.893	200	1	I	3506.641	600		I	3519.111	100	2	I
3492.943	400		I	3506.853	200	50	II	3519.693	200	40	II
3493.073	100	10	II	3507.183	500		I	3520.134	100		I
3493.241	200	20	II	3507.507	600		I	3520.680	100	10	II
3493.518 i	2000	150	II	3507.568	10	500	III	3520.704	400		I
3494.172	100 w		I	3507.807	500		I	3521.062	500	3	I
3494.556	100	20 w	II	3508.077	600 w		I	3521.509	100	1	I
3494.801	300	2	I	3508.183	200		I	3521.919	800	200	II
3495.146	100	1	I	3508.353	400		I	3522.268	100	1	I
3495.699	900	1	I	3508.684	200		I	3522.399	50		I
3496.051	500	1	I	3509.094	500		I	3522.565	50		I
3496.810	500	2	I	3509.189	100	10	II	3522.605	100		I
3497.008	200	40	II	3509.803	50	10	II	3522.658	200		I
3497.260	500	5	I	3509.946	200	3	I	3523.021	300		I
3497.458	200	2	I	3510.308	200		I	3523.197	200		I
3497.682	200	30	II	3510.534	250	25	II	3523.306	75		I
3498.001	300	50	II	3510.731	400	50	II	3523.513	500 w	2	I
3498.621 i	900	8	I	3511.004	50		I	3523.682	100		I
3498.957	400		I	3511.157 i	1000	2	I	3523.758	400		I
3498.989	300	50	II	3511.286	100	5	II	3524.180	300		I
3499.821	300		I	3511.559	500	100	II	3524.365	50		I
3499.983	500	40	II	3511.673	1000	500 w	II	3524.706	300		I
3500.097	500		I	3512.347	100		I	3524.905	50		I
3500.263	300 w	2	I	3512.747	400	40	II	3525.123	50	15	II
3500.532	300	25	I	3513.213	300	20	II	3525.626	100	10	II
3500.578	300		I	3513.292	200	2	I	3526.041	200		I
3500.835	200	5	I	3513.438	200		I	3526.249	150	25	II
3501.002	200		I	3513.759	100	4	II	3526.640	500	2	I
3501.217	200		I	3514.286	300		I	3526.761	500	4	I
3501.458	600	75	II	3514.526	700	75	II	3527.006	100		I
3501.626	200	1	I	3514.622	75		I	3527.324	200		I
3501.735	200		I	3514.962	500	10	II	3527.795	250		I
3501.867	500 w	1	I	3515.222	200		I	3528.088	50	6 w	II
3501.942	300	25	II	3515.323	500		I	3528.408	350	2	I
3502.150	75		I	3515.425	75	3	II	3528.816	500	100 w	II
3502.769	500	75	II	3515.550	75	4	II	3528.953	600	150	II
3502.954	600		I	3515.710	200	8	II	3529.385	500	1	I
3503.124	600		I	3515.851	150	8	II	3529.531	50	2	I
3503.611	400	75	II	3515.927	100		I	3529.679	400		I
3503.785 i	500	3	I	3516.003	100 w		I	3530.143	20	6	II
3504.033	200	10	II	3516.359	500	25	II	3530.521	500	40	II
3504.242	200		I	3516.580	400	2	I	3530.741	100	10	II
3504.574	200 w		I	3516.828	500	100	II	3531.038	50		I
3504.631	200		I	3517.256	100		I	3531.134	100		I
3504.849	200		I	3517.455	100		I	3531.282	200		I
3504.991	400		I	3517.960	200 w		I	3531.438	1000	4	I
3505.485	300	50	II	3518.086	100		I	3531.643	125	15	II
3506.044	50		I	3518.139	400		I	3531.870	150	50	II
3506.127	50	10	II	3518.403 i	1000	8	I	3531.925	150	75	II
3506.340	300		I	3518.889	400	50	II	3532.095	100		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3532.500	50		I	3546.801	50 w		I	3561.777	500	7	I
3532.998	20	4	II	3546.943	50 w		I	3562.251	200		I
3533.614	100		I	3547.344	1000		I	3562.529	100		I
3533.714	100	10	II	3547.460	50		I	3562.599	200		I
3534.227	300		I	3547.927	50		I	3563.302	300	2	I
3534.374	100		I	3548.664	200		I	3563.372	800	2	I
3534.646	200		I	3549.060	50		I	3563.705	100		I
3534.909	100		I	3549.282	100		I	3563.911	250	20	II
3535.247	200	1	I	3549.597	1200	3	I	3563.972		50 w	III
3535.375	50	3	II	3549.735	200	50	II	3564.069	50		I
3536.014	600	25	I	3550.045	100		I	3564.233	300		I
3536.631	100	25	II	3550.291	300	50	II	3564.502	150		I
3536.978	100		I	3550.718	400	2	I	3564.601	200	3	I
3537.153	450	100	II	3550.783	300	1	I	3564.715	300	50	II
3537.552	100		I	3550.881	200		I	3565.044	100		I
3537.812	50		I	3551.401 i	1000	15	I	3565.114	200	4	I
3538.210	200		I	3551.738	100		I	3565.176	150		I
3538.502	100		I	3551.881	100	20	II	3565.393	500	20	I
3538.772	100	1000 w	III	3552.698	50		I	3565.824	500	2	I
3538.835	100		I	3553.110	400	100	II	3566.193	50	2 w	I
3538.936	50		I	3553.379	300	15	II	3566.542	100		I
3539.321	800	150	II	3553.953	50		I	3567.055	200	30	II
3539.587 i	4000	100	II	3554.336	150		I	3567.264 i	1200	20	I
3539.846	150		I	3554.471	50		I	3567.642	200		I
3540.049	100		I	3554.648	10	5	II	3567.694	250	30	II
3540.323	20	5	II	3555.015	1500	10	I	3567.966	250	30	II
3540.510	100		I	3555.104	200	20	II	3568.056	50 w		I
3540.526	50		I	3555.706	500	4	I	3569.055	50		I
3541.116	50		I	3555.836	200 w		I	3569.193	100 s		I
3541.384	50		I	3556.318	200	25	II	3569.624	250	20	II
3541.623	250	50	II	3556.773	50		I	3569.820	1000	5	I
3541.973	100	15	II	3556.969	150		I	3569.930	10	3	II
3542.209	150	3	I	3557.037	50		I	3570.358	500	2	I
3542.500	500	2	I	3557.467	400	100	II	3570.522	250	1	I
3542.629	200	20	II	3557.692	20		I	3570.826	100 l		I
3543.025	150		I	3557.724	100	2	I	3571.008	300		I
3543.136	50 w		I	3557.811	150		I	3571.573	400	75	II
3543.202	50		I	3558.346	100	3	I	3571.814	100	2	I
3544.018 i	1500	10	I	3558.794	50	1	I	3572.070	300	2	I
3544.258	250		I	3558.843	100	2	I	3572.393	1000	350	II
3544.364	50	6	II	3559.449 i	2500	300	II	3573.217	1000	100	II
3544.474	100	1	I	3559.609	300	20	I	3573.509	500	50	II
3544.779	150	1	I	3559.734	250	30	II	3574.179	400 w		I
3544.851	150		I	3559.951	300	300	II	3574.288	200		I
3544.995	500	30	II	3560.018	300		I	3574.479	200		I
3545.183	200	10	II	3560.688	300		I	3574.615	100 h	1	I
3545.288	100		II	3560.848	75	10	II	3575.121	1000	5	I
3545.394	100	10	II	3560.890	300		I	3575.324	750	200	II
3545.961	500		I	3561.287	50 h		I	3576.486	200	10	I
3546.256	200	20	II	3561.404	250		I	3576.557 i	1000	40	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum
3577.140	50	I	3591.907	20	II	3605.821	750	I
3577.217	400	II	3592.114	75	I	3606.092	125	I
3577.746	100	I	3592.487	50	II	3606.210		150 w III
3578.168	500	II	3592.779 i	2000	I	3606.613	75	I
3578.525	100	I	3593.400	20	I	3606.693	40	3 I
3578.951	800	3 I	3593.877	150	125 II	3606.790	75	I
3579.347	800	150 II	3594.100	100	8 II	3607.028	75	15 II
3579.411	200	50 II	3594.721	100	I	3607.393	75	5 II
3579.452	800	I	3594.988	400	3 I	3607.653	20	I
3579.545	1000	I	3595.250	4	6 III	3607.726	40	I
3579.668	200	I	3595.330	100	20 II	3607.910	40	2 I
3579.900	100 w	I	3595.611	500	10 I	3607.986	20	I
3580.046	25	2 II	3595.969	50	I	3608.377	1200	5 I
3580.227	1000	50 II	3596.308	20 h	I	3609.223	200	100 II
3581.295	200	3 I	3596.535	50	I	3609.443	3000	500 II
3581.347	100	1 I	3596.903	50	6 II	3610.039	200	75 II
3581.753	800	I	3597.019	40	2 I	3610.131	150	100 II
3581.837	300 w	I	3597.495	250	4 I	3610.395	200	150 II
3582.008	1000	30 II	3597.700	50	I	3610.648	150	2 I
3582.389	200	2 I	3598.120 i	2000	20 I	3610.792	150	25 II
3582.486	200	1 I	3598.523	100	I	3611.163	100	I
3583.037	600	50 II	3598.692	125	I	3611.259	40	I
3583.107	1000	1 I	3599.034	50	6 II	3611.513	20	I
3583.294	500	1 I	3599.357	75	15 II	3611.655	20	I
3583.610	100	1 I	3599.725	200	2 I	3611.757	20	I
3583.931	100	I	3599.879	75	8 II	3612.117	40 w	3 II
3584.175 i	800	10 I	3600.202	50	I	3612.427 i	1400	20 II
3585.054	400	100 II	3600.434	250	2 I	3612.865	500	10 I
3585.246	500	I	3600.610	50	2 I	3613.089	20	II
3585.552	100	5 II	3600.824	50	6 II	3613.542	50	I
3585.764	100	25 II	3601.044	600	300 II	3613.616	20	2 II
3585.885	100	10 II	3601.298	100	I	3613.779	200	20 II
3586.481	100	I	3601.611	50	I	3614.009	600	100 II
3586.698	50	I	3601.772	125	1 I	3614.211	500	3 I
3586.959	30	4 II	3601.986	40	6 II	3614.350	500	3 I
3587.097	100	I	3602.301	40	I	3615.132 i	2000	125 II
3587.837	100	I	3602.485	10	3 II	3615.366	75	6 II
3588.223	100	25 II	3602.653	20 w	I	3615.845	100	1 I
3588.303	125	25 II	3602.910	75	I	3616.176	125	1 I
3589.146	125	75 II	3603.037	100	10 II	3616.697	400	12 II
3589.362	400	150 II	3603.208	500	200 II	3617.020	800	200 II
3589.746	1200	15 I	3603.360	150	100 II	3617.116	1200	300 II
3589.995	200	2 I	3603.489	40	I	3617.665	125	I
3590.354	20 h	I	3603.620	75	5 II	3617.743	40	3 II
3590.527	40	10 II	3603.686	75	I	3617.815	75	I
3590.933	125	I	3604.049	500 d	I	3617.941	20	2 I
3591.058	200	200 II	3604.480	75	I	3618.362	800	8 I
3591.256	100	I	3604.680	800	4 I	3618.590	50	I
3591.452	1000	3 I	3605.197	500	2 I	3618.756	200	2 I
3591.621	30	3 II	3605.649	100	15 II	3619.210	200	1 I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3619.345	20	2	I	3630.477	20		I	3641.400	40		I
3619.622	50		I	3630.613	40	4	II	3641.581	20		I
3619.708	75	25	II	3630.844	40 w	1	I	3641.841	100	20	II
3619.924	40		I	3630.986	40		I	3642.249 i	2200	10	I
3620.046	40		I	3631.151	40	5	II	3642.569	400	3	I
3620.287	200		I	3631.703	40		I	3642.889	40	6	II
3620.372	200	75	II	3631.861	100		I	3643.026	40 w		I
3620.499	40	10	II	3632.116	75		I	3643.513	800		I
3620.557	40		I	3632.225	50		I	3643.825	20 w		I
3620.837	250	2	I	3632.624	100	30	II	3644.014	40		I
3621.118	1200	200	II	3632.830 i	1000	10	I	3644.352	100	20	II
3622.282	125		I	3633.079	40		II	3644.716	50	5	II
3622.331	1000	5	I	3633.244	40 s		I	3644.989	100		I
3622.731	40	5	II	3633.370	50	10	II	3645.251	4	2	II
3622.795 i	800	4	I	3633.683	40	3	I	3645.364	200	2	I
3622.932	20	4	II	3633.735	20	1	I	3645.569	100		I
3623.052	10	4	II	3633.908	50		I	3645.707	200	2	I
3623.768	50	2	I	3634.221	100	25	II	3645.885	20 h		I
3623.980	75	75	II	3634.580	1700	15	I	3645.951	40		I
3624.471	400	50	II	3634.907	100		I	3646.271	150	1	I
3624.895	400	150	II	3635.242	100	30	II	3646.580	20		I
3625.027	400	100	II	3635.422	200	200	II	3646.882	100	20	II
3625.147	200	3	I	3635.944	1900	15	I	3647.047	20 w	2	II
3625.625	500	100	II	3636.176	100	20	II	3647.304	100	10	II
3625.889	150	75	II	3636.288	50		I	3647.375	100	10	II
3625.927	250	50	II	3636.350	40	2	I	3647.646	200	50	II
3626.085	75	5	I	3636.566	100	20	II	3648.171	100	15	II
3626.473	100	1	I	3636.831	400	2	I	3648.420	150	20	II
3626.558	100 h	1	I	3637.557	150	25	II	3648.635	50	4	II
3626.619	100 h	1	I	3637.684	50	3	I	3648.852	100	3	I
3626.940	150	4	I	3637.748	40	3 w	II	3649.248	600	150	II
3627.073	50	2	I	3638.000	50		I	3649.733	1200	20	I
3627.152	50	3	II	3638.098	50		I	3650.193	50		I
3627.264	75	10	II	3638.146	50		I	3650.440	75	3	I
3627.339	20		I	3638.316	400	3	I	3650.518	75	5	II
3627.589	50	10	II	3638.642	500	4	I	3650.765	200	75	II
3627.647	20	5	I	3639.445	750	125	II	3651.570	125	6	II
3627.721	20		I	3639.606	10	4 w	II	3651.827	40		I
3627.792	40	3	I	3639.866	400	10	I	3652.166	1000	200	II
3628.023	75		I	3639.994	40 h		I	3652.537	150	50	II
3628.124	50		I	3640.035	50		I	3652.870	40		I
3628.397	20		I	3640.182	20	5	II	3653.093	50		I
3628.556	40 s		I	3640.470	5		I	3653.373	75		I
3628.862	50		I	3640.566	75		I	3653.601	100	10	II
3628.923	20		I	3640.881	40	10	II	3653.812	20		I
3629.007	50		I	3640.922	75		I	3653.918	20	1	I
3629.269	40	2	I	3640.959	50		I	3654.139	20		I
3629.338	50	40	II	3641.109	75	15	II	3654.464	300	4	I
3629.376	40		I	3641.286	50	12	II	3654.583	75	151	II
3629.850	200	2	I	3641.367	40		I	3655.029	20	2	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3655.127	250	2	I	3668.140 i	1000	20	I	3681.105	40	3	II
3655.331	40 w		I	3668.391	75	1	I	3681.178	75	20	II
3655.839	40		I	3668.834	40		I	3681.263	50		I
3655.962	50		I	3668.913	75		I	3681.574	20		I
3656.047	40		I	3669.330	50		I	3681.882	200	50	II
3656.200	125	50	II	3669.406	40	12	II	3682.178	100	1	I
3656.694 i	1000	4	I	3669.642	200	1	I	3682.291	50	1	I
3657.058	125	1	I	3669.969 i	750	15	I	3682.348	75	15	II
3657.296	40 w		I	3670.063	250	50	II	3682.486 i	1000	8	I
3657.526	40	6	II	3670.520	50	1	I	3682.838	10	5	II
3657.644	200		I	3670.635	100	10	II	3683.186	40		I
3658.064	600	150	II	3671.029	20 w		II	3683.312	75	10	II
3658.228	200	100	II	3671.165	40	8	II	3683.491	125	2	II
3658.540	5		I	3671.255	50		I	3683.722	20	3	II
3658.808	1000	5	I	3671.536	700	20	I	3683.849	20		I
3659.509	1500	200 w	II	3671.787	20		I	3683.936	50	8	II
3659.631	1500	50	I	3671.881	40		I	3684.363	50		I
3660.098	50 w	2	II	3671.973	20		I	3684.731	40	2	I
3660.335	50	1	I	3672.299	400	3	I	3684.935	400	10	I
3660.502	200	2	I	3672.517	300	2	I	3685.587	100		I
3660.930	10		I	3672.947	75	12	II	3685.868	100	12	II
3661.470	40	200	III	3673.104	100		I	3686.284	50		I
3661.590	200		I	3673.262	100	50	II	3686.398	40		I
3661.621	500	125 w	II	3673.792	200	100	II	3686.981	100	20	II
3661.981	150	1	I	3674.008	200	2	I	3687.196	150		I
3662.188	50	3	II	3674.089	250	1	I	3687.500	75	20	II
3662.286	50		I	3674.417	40		I	3687.666	100	30	II
3662.571	40	2	I	3674.650	20	2	I	3687.977	500	3	I
3662.637	20	2	II	3674.890	300	3	I	3688.199	50	4	II
3662.753	125		I	3675.136	400		I	3688.265	40	2	II
3662.964	50		I	3675.568	1000	200	II	3688.664	50		I
3663.197	100	50	II	3675.788	400	2	I	3688.759	1000	200	II
3663.552	75		I	3675.961	400	2	I	3689.571	50		I
3663.702	800	250	II	3676.149	300	3	I	3689.731	75		I
3663.967	40		I	3676.689	100	15	II	3690.115	500	30	II
3664.108	150	1	I	3676.822	50	3	I	3690.490	300	50	II
3664.589	100		I	3676.961	20 w		I	3690.624	1000	15	I
3665.043	40		I	3677.087	40	3	II	3691.413	700	8	I
3665.181	75	10	II	3677.308	75		I	3691.615	500	5	I
3665.449	100		I	3677.744	75	25	II	3691.881	1300	3	I
3665.625	75		I	3677.917	100	20	II	3692.076	200	40	II
3665.725	100	25	II	3678.043	150	200	II	3692.390		500	III
3665.905	20		I	3678.272	40	10	II	3692.566 i	1200	4	I
3666.144	20		I	3678.478	400	3	I	3693.247	100		I
3666.374	40	6	II	3678.772	40	6	II	3693.533	100	8	II
3666.802	40	3	I	3679.131	400	3	I	3693.697	125	4	I
3666.984	900	7	I	3679.551	400 h	10	I	3693.809	200	3	I
3667.312	20		I	3679.715	500	200	II	3693.905	200	100	II
3667.459	40		I	3680.443	400	3	I	3693.990	300	15	II
3667.621	150	1	I	3680.604	250	2	I	3694.177	800	2	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3694.243	75		I	3704.968	75	10	II	3716.765	50	3	II
3694.365	400	4	I	3705.942	50	8	II	3716.940	50		I
3694.785	50	3	I	3706.054	50	7	II	3716.986	50		I
3695.050	30	4	II	3706.222	40 w		I	3717.069	50		I
3695.289	600	3	I	3706.409	75	5	II	3717.383	75 w	3	II
3695.742	20		I	3706.771	2400	30	I	3717.508	10		I
3695.976	250	100	II	3706.996	400	12	I	3717.609	10		I
3696.255	20		I	3707.430	100	10	II	3717.830	100	30	II
3696.310	2		I	3707.467	100		I	3718.164	100	18	II
3696.403	40		I	3707.600	75		I	3718.450	10		I
3696.526	75		I	3707.719	75		I	3718.651	100	10	II
3696.647	150	30	II	3708.393	75		I	3719.011	50	3	II
3696.757	100	1	I	3708.482	40		I	3719.147	10		I
3697.032	150	30	II	3708.571	40		I	3719.435 i	3000		I
3697.198	100		I	3708.663	40	4	II	3719.694	50	5	II
3697.503	50		I	3708.757	100	10	II	3719.960	600	300	II
3697.744	200	1	I	3708.884	40		I	3720.307	300	200	II
3698.106	1300	8	I	3709.400	20		I	3720.694	75	10	II
3698.297	100	30	II	3709.625	75	15	II	3720.998	100	2	I
3698.608	50		I	3709.853	125 w	6	I	3721.216	400	3	I
3698.750	75	10	II	3710.074	50		I	3721.344	100 l	5	I
3699.049	100		I	3710.221	50		I	3721.484	75		I
3699.181	200	2	I	3710.288	100		I	3721.821	1500	300	II
3699.352	100	1	I	3710.549	40	5	II	3722.113	1000	200	II
3699.580	5		I	3710.668	40 w		I	3722.818	75		I
3699.882	500	5	I	3710.823	40		I	3723.287	100	30	II
3700.311	125	30	II	3710.942	50		I	3723.656	100	10	II
3700.456	50 h	2	I	3711.304 i	600	150	II	3723.927	100		I
3700.521	20		I	3711.622	600	6	I	3724.171	20 h		I
3700.767	125	100	II	3711.819	125 d	1	I	3724.296	40	1	I
3700.978 i	300	5	I	3711.921	100		I	3724.494	100	4	I
3701.585	75 w		I	3712.185	50		I	3724.662	100	4	I
3701.873	75		I	3712.297	20		I	3724.729	150	100	II
3702.065	100	10	II	3712.368	75		I	3724.935	20		I
3702.135	75		I	3712.540	400	75	II	3725.162	50		I
3702.251	20 h		I	3713.020	20 w	1	I	3725.391	500	4	I
3702.470	50		I	3713.164	20		I	3725.721	100		I
3702.627	20		I	3713.404	20	2	I	3725.866	100		I
3702.867	125	75	II	3713.638	20 w	1	I	3725.961	75		I
3703.233	500	3	I	3713.887	75	4	II	3726.094	20	2	II
3703.460	30		I	3714.072	20	3	I	3726.191	100	4	I
3703.776	600	4	I	3714.295	40	4	II	3726.721	600	100	II
3703.908	200	20	II	3714.329	40	3	II	3726.836	20		I
3703.986	200	20	II	3714.689	50		I	3727.154	400	2	I
3704.085	200	30	II	3715.080	75 s		I	3727.253	300	2	I
3704.141	150		I	3715.558	250	3	I	3727.356	300	2	I
3704.341	75	6	II	3715.717	50 w	3	II	3727.902 i	800	10	I
3704.577	50 w		I	3715.866	100	1	I	3728.131	10	2	II
3704.713	75 w	2	I	3716.216	40	3	II	3728.495	10		I
3704.866	400	2	I	3716.576	200	3	I	3728.572	10		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
3728.668	20	I	3741.885	100 h	1 I	3755.810	1	2 II
3728.733	40	I	3742.028	100	1 I	3755.986	250	3 I
3728.916	100 w	I	3742.066	50	1 I	3756.291	600	25 II
3728.986	10	2 h II	3742.234	100	10 II	3756.450	100	1 I
3729.124	20	I	3742.279	50	I	3756.557	50 w	I
3729.257	10 w	I	3742.585	50 w	I	3756.756	100	6 II
3729.684	50	3 I	3742.737	10	I	3756.891	20	2 h II
3729.949	300	I	3742.923 i	1100	20 I	3757.385	10	I
3730.371	900	5 I	3743.172	20 w	I	3757.695	1000	20 I
3730.620	20	3 II	3743.512	250	50 II	3758.380	15	2 I
3730.749	150	200 II	3743.806	150	8 II	3758.465	600	5 I
3730.885	20	3 II	3743.898	30	I	3758.702	200	2 I
3731.262	200	I	3744.537	75	I	3758.822	60 w	3 II
3731.421	300	50 II	3744.662	100	5 II	3759.266	150	I
3731.686	20 w	I	3744.743	150	20 II	3759.312	300	25 I
3731.811	40 w	I	3744.850	50	I	3759.429	300	8 I
3732.252	100	I	3744.912	150	I	3759.883	75	I
3732.539	100	1 I	3745.182	200	2 I	3760.280	250	50 II
3732.659	75	8 II	3745.660	350	4 I	3760.803	50	I
3732.727	50	2 II	3745.978	900	200 II	3761.104	500	12 I
3732.978	500	4 I	3746.226	50	4 II	3761.214	40	3 I
3733.664	500	5 I	3746.329	30	I	3761.314	300	3 I
3733.945	20	I	3746.464	250	20 II	3761.466	300	3 I
3734.122	20 w	1 I	3746.669	20	I	3761.522	100	1 I
3734.416	40	2 I	3746.794	30	I	3761.700	150	2 I
3734.593	200	75 II	3747.176	50	4 I	3761.886	50 w	2 I
3735.359	50 w	I	3747.235	40	I	3761.960	5	I
3735.510	100	12 II	3747.538	900	300 II	3762.148	10 w	I
3735.835	30	I	3748.272	100	40 II	3762.258	75	I
3736.499	125	2 I	3748.824	100	I	3762.403	75	2 I
3736.935	100	30 II	3748.970	25	10 II	3762.495	10	1 I
3737.509	700	6 I	3749.085	250	2 I	3762.879	1500	300 II
3737.630	10	6 II	3749.410	10	I	3762.935 i	1200	I
3737.930	50	5 II	3749.621	50	3 I	3763.320	250	75 II
3738.106	20	4 II	3749.744	50	I	3763.573	100	20 II
3738.366	75	I	3750.149	20	I	3763.660	40	4 II
3738.434	50	I	3750.492	300	2 I	3764.051	100	15 II
3738.741	10	20 w II	3750.667	40 w	5 w II	3764.189	100	I
3738.836	500	100 II	3751.018	300	2 I	3764.655	50	3 I
3739.185	75	I	3751.122	300	3 I	3764.801	50	I
3739.292	20 w	I	3751.758	10	10 II	3765.241	800	I
3739.395	10 h	I	3751.882	20	I	3765.412	500	3 I
3739.680	150	I	3752.028	10 h	I	3765.537	4	2 II
3739.940	30	I	3752.128	20	I	3765.693	100	I
3740.073	30 h	I	3752.569 i	3500	300 II	3766.076	200	2 I
3740.407	20	4 II	3753.241	250	3 I	3766.445	100	I
3740.739	30	I	3753.453	20	I	3767.210	10	5 II
3740.867	300	75 II	3754.031	400	4 I	3767.468	50	I
3741.194	3000	500 II	3754.593	600	50 II	3767.548	50	I
3741.675	30	2 II	3755.210	900	20 I	3767.899	500	200 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3768.436	250	20	II	3780.524	20		I	3793.203	10	1	I
3768.673	40		I	3780.966 i	350	10	I	3793.305	20		I
3768.775	40		I	3781.314	180	5	I	3793.497	200	10	II
3768.930	20		I	3781.801	20		I	3793.816	250	1	I
3769.095	20		I	3782.103	75	10	II	3794.150	400	100	II
3769.253	50		I	3782.325	20		I	3794.309	40	10	II
3769.592	600	3	I	3783.008	500	300	II	3794.689	400	2	I
3770.054	1300	15	I	3783.289	500	100	II	3795.380	500	30	II
3770.377	10		I	3783.490	100		I	3795.675	50	4	II
3770.557	5 h		I	3783.657	300	30	II	3796.047	100		I
3770.608	10		I	3783.743	30	15 l	II	3796.187	40	2	I
3770.718	50 w		I	3784.129	50 w		I	3796.226	20		I
3770.845	20		I	3784.402	50		I	3796.333	10		I
3770.928	20 h		I	3784.567	250	2	I	3796.371	20		I
3771.370 i	1500	4	I	3784.788	100	1	I	3796.681	100	1	I
3771.617	400		I	3785.145	50		I	3796.724	400	2	I
3771.960	10		I	3785.277	125		I	3796.937	100 h		I
3772.234	200	20	II	3785.600 i	1000	300	II	3796.991	50		I
3772.419	20		I	3785.906	100	200	II	3797.201	400	2	I
3772.648	500		I	3786.452	10		I	3797.450	150	75	II
3773.046	100	10	II	3786.876	300	30	II	3797.712	150	2 h	II
3773.306	100		I	3787.105	50	3	II	3798.030	2 h		I
3773.458	50		I	3787.213	20		I	3798.099	400	6	I
3773.744	600	20	II	3787.472	150	30	II	3798.444	10	6	II
3774.194	400	20	II	3787.634	150	1	I	3798.768	50		I
3774.729	250		I	3787.754	40		I	3799.162	30		I
3774.930	2		I	3788.352	300	30	II	3799.263	50	2 h	II
3775.156	200	1	I	3788.744	10		I	3799.384	100		I
3775.311	100	6	II	3789.113	1000	100	II	3800.104	2	2	II
3775.418	200	1	I	3789.164	1500		I	3800.194	300	2	I
3775.905	200	30	II	3789.395	50	2	II	3800.365	300	25	II
3776.272	600	6	I	3789.516	20		I	3800.585	150	150	II
3776.496	100		I	3789.552	15		I	3800.874	20		I
3776.614	200	6	II	3789.601	15	2 w	II	3800.924	20		I
3777.180	100		I	3789.654	20		I	3801.150	10		I
3777.283	40	8	II	3789.948	50	30	II	3801.320	75	10	II
3777.407	200		I	3790.089	50	75	II	3801.441	900	8	I
3777.553	100 w		I	3790.271	20		I	3801.567	500	6	I
3777.743	75	1	I	3790.350	500	4	I	3801.914	100	25	II
3777.818	50	2 h	II	3790.787	1400	20	I	3802.143	150	25	II
3778.045	75	1	I	3791.034	20		I	3802.416	200		I
3778.356	20	2 h	II	3791.215	75		I	3802.620	20		I
3778.518	20		I	3791.293	250	150	II	3802.723	40		I
3778.750	100	3	I	3791.507	150		I	3802.865	200	2	I
3778.910	50	1	I	3791.970	100	15	II	3803.075 i	4000	30	I
3778.980	75		I	3792.096	20		I	3803.607	50 w		I
3779.562	150	1	I	3792.382	300	10	I	3803.837	150	2	I
3779.693	25 w	2	II	3792.726	500	4	I	3803.979	600	5	I
3780.149	75	1	I	3792.953	125 w	8 w	II	3804.120	200		I
3780.288	40	3	II	3793.092	200	1	I	3804.326	150	10	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3804.697	200	12 w	II	3818.093	100	4	II	3831.356	20		I
3804.994	200	20	II	3818.686 i	500	5	I	3831.644	150		I
3805.328	200	100	II	3819.112	150	1	I	3831.737	400	200	II
3805.814	700	125	II	3819.161	301		I	3831.959	20 w		I
3805.962	50	100	II	3819.279	30	3	II	3832.580	50		I
3806.058	20		I	3819.331	50	3	II	3832.782	200	30	II
3806.146	100		I	3819.617	40		I	3832.970	75	20	II
3806.258	30	8 w	II	3819.898	200		I	3833.086	400	4	I
3806.516	50		I	3819.935	40	30	II	3833.224	50	3	II
3806.878	40		I	3820.093	75		I	3833.691	75	12	II
3807.268	200	2	I	3820.786	1200		I	3834.477	40		I
3807.532	15	2	II	3821.425	1000	200	II	3834.887	75		I
3807.677	100 w	5	I	3821.749	100	3	I	3835.068	40 w		I
3807.871	1200	300	II	3822.152	1000	250	II	3835.348	100	1	I
3808.125	300	75	II	3822.704	100	1	I	3835.409	125	1	I
3808.518	5	2	II	3822.855	200	2	I	3835.709	100		I
3808.612	400	10	I	3823.066	600	4	I	3835.958	100	2	I
3808.689	5	3	II	3823.318	125	20	II	3836.208	30	1	I
3809.014	10		I	3823.458	125		I	3836.538	400	4	I
3809.125	50		I	3823.582	400	125	II	3836.582	400	5	I
3809.253	40 w		I	3823.862	30 w		I	3836.709	50	1	I
3809.446	40	3	II	3823.979	50		I	3837.018	40		I
3809.830	400	125	II	3824.066	20	1	I	3837.291	75		I
3810.290	50	2	II	3824.538	40		I	3837.337	75		I
3810.496	100	4	II	3824.751	40		I	3837.806	40	10	II
3810.688	40		I	3825.027	300	200	II	3837.870	2000	100	I
3810.990	700	20	I	3825.123	1200	30	I	3838.631	10 h		I
3811.349	100	20	II	3825.370	50		I	3838.787	50 w		I
3811.754	75		I	3825.516	75		I	3838.856	10 h		I
3811.963	30	2	II	3826.363	400	3	I	3839.409	75	10	II
3812.035	50		I	3826.468	2	2	II	3839.694 i	2500		I
3812.128	20		I	3826.942	400	1501	II	3839.738	500	300	II
3812.396	200	5	I	3827.269	50		I	3840.618	75	1	I
3812.665	50 w		I	3827.498	50		I	3840.799	600	4	I
3812.825	20		I	3828.385 i	3200	30	I	3841.352	40	3	II
3813.067 i	1200	400	II	3828.858	20		I	3841.463	10		I
3813.319	40	10	II	3828.962	50		I	3841.507	10		I
3813.663	200	15	II	3829.032	75		I	3841.638	20		I
3813.809	400	8	I	3829.180	40		I	3841.960 i	1200	300	II
3814.011	50		I	3829.273	8		I	3842.552	150		I
3815.018	200	100	II	3829.333	400	20 w	II	3842.745	40		I
3815.563	300	4	I	3829.419	200	20 w	II	3842.807	30		I
3816.161	200	1	I	3829.650	10		I	3842.898	800	20	II
3816.557	50	10	II	3829.833	50	4 w	II	3843.018	400	4	I
3816.724	50		I	3830.059	400	6	I	3843.415	20	2 h	II
3816.787	50	3	II	3830.304	20		I	3843.509	150	1	I
3817.113	100		I	3830.506	50	151	II	3843.885	20 w		I
3817.290	50 w		I	3830.770	800		I	3844.184	20 w		I
3817.361	100	75	I	3830.828	4	1	II	3844.567	20 h		I
3817.473	800	35	I	3830.934	4	1	II	3844.934	200	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3845.092	200	1	I	3856.621	100	2	I	3870.367	40 w		I
3845.224	30	1	I	3856.755	40		I	3870.687	40		I
3845.299	30		I	3856.818	10		I	3870.766	40		I
3845.534	125	75	II	3857.106	40		I	3870.921	50	4	II
3845.800	20		I	3857.195	10		I	3871.072	75	5	II
3846.039	20		I	3857.351	75	10	II	3871.243	50	4	II
3846.105	20		I	3857.508	150	20	II	3871.456	200	30	II
3846.169	15		I	3857.917	10		I	3871.613	125	20	II
3846.248	125	100	II	3858.359	200	2	I	3871.917	20 w		I
3846.627	200	4	I	3858.910	200	2	I	3872.017	10 h		I
3846.761	30	2	I	3859.457	10		I	3872.358	100	30	II
3846.880	350	2	I	3859.846	500	200	II	3872.718	500	300	II
3847.453	10		I	3859.908	40	30	II	3873.146	200	3	I
3847.618	150		I	3860.649	75		I	3873.470	500	30	I
3848.179	20		I	3861.047	50		I	3873.818	2000	150	I
3848.355	20 w		I	3861.149	20		I	3873.947	20	4	II
3848.628	100		I	3861.360	30		I	3874.239	800		I
3849.060	75		I	3861.509	75		I	3874.861	1800	25	I
3849.180	4	50 w	III	3861.544	50	50	II	3874.956	300	4	I
3849.739	20		I	3861.578	50		I	3875.370	1500	25	I
3849.908	150		I	3862.055	50	4	II	3875.500	5	2	II
3850.128	300	75	II	3862.418	400	50	II	3875.642	200	3	I
3850.278	125	75	II	3862.567	20	2	II	3875.957	75	1	I
3850.686	75 w		I	3862.663	400		I	3876.211	20		I
3851.073	125	1	I	3863.406 i	1200	150	II	3876.258	10		I
3851.153	150	1	I	3863.856	50	3	I	3876.494	20 w	2 w	II
3851.296	4 w		I	3864.114	10		I	3876.550	10		I
3851.667	30		I	3864.766	75		I	3876.802	10 w		I
3852.135	600	12	I	3864.835	100	1	I	3876.944	10 w		I
3852.585	20		I	3864.976	125		I	3877.235	40	3	I
3852.717	40		I	3865.813	10 w		I	3877.458	250	3	I
3852.958	300	50	II	3866.066	125	50	II	3877.597	200	2	I
3853.360	30		I	3866.366	20 w		I	3878.663	150	4	I
3853.434	10 w		I	3866.776	20		I	3879.263	400	3	I
3853.565	40		I	3866.904	400	50	II	3879.445	150		I
3853.641	10		I	3867.266	10		I	3879.642	1000	25	I
3853.793	50	1	I	3867.575	125	8	II	3879.791	2	2	II
3853.830	125		I	3867.848	75	15	II	3879.977	40 w		I
3853.984	75 w		I	3867.966	75 w	4 w	I	3880.192	400	2	I
3854.125	100 w		I	3868.251	125	1	I	3880.538	15		I
3854.307	100 w		I	3868.382	75		I	3881.039	50		I
3854.511 i	1200	400	II	3868.835	30 w		I	3881.319	30 w		I
3854.878	150	75	II	3869.033	20 h		I	3881.496	200	40	II
3855.064	100		I	3869.222	20 h		I	3881.785	50		I
3855.602	30		I	3869.397	30		I	3882.145	200	50	II
3855.676	40		I	3869.664 i	600	12	I	3882.314	100		I
3856.112	10	6	II	3869.970	75	50	II	3882.556	20		I
3856.190	10	8	II	3870.172	50		I	3882.788	20 w		I
3856.360	100		I	3870.229	20		I	3882.859	20		I
3856.517	10	1	I	3870.271	20		I	3883.080	20		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3883.530	100	1	I	3896.267	40		I	3908.023	40 w		I
3883.766	125	1	I	3896.969	30 w		I	3908.101	20		I
3884.131	30 w	1	I	3897.309	40		I	3908.486	30	3	II
3884.312	20	1	I	3897.361	10		I	3908.744	300	10	II
3884.522	300	20	II	3897.609	40 w		I	3908.978	150	1	I
3884.633	50		I	3897.773	75		I	3909.134	250	2	I
3884.820	400	300	II	3897.866	50		I	3909.584	10		I
3885.060	75		I	3898.178	75	1	I	3909.988	75		I
3885.143	40	2	I	3898.431	400	2	I	3910.249	40		I
3885.215	50		I	3898.502	300	4	I	3910.331	20		I
3885.633	30	4	II	3898.792	150	10	II	3910.521	50		I
3885.767	125	6	II	3899.020	100	8	II	3910.617	40 w		I
3886.000	50 w	5	I	3899.314	50	1	I	3910.772	125	1	I
3886.621	50		I	3899.705	10	2	II	3910.979	200	1	I
3886.914	700	6	I	3900.032	30 w		I	3911.168	40		I
3887.010	700	8	I	3900.124	150	40	II	3911.228	20		I
3887.431	25	6	II	3900.573	400	5	I	3911.300	50	4	II
3887.505	75		I	3900.876	1500	300	II	3911.524	75		I
3888.055	50 w	3	I	3901.144	125	100	II	3911.909	600	2	I
3888.229	30		I	3901.658	300	2	I	3912.278	300	100	II
3888.964	40	1	I	3902.116	100	25	II	3912.488	20		I
3889.540	75	1	I	3902.166	150		I	3912.735	30	1	I
3889.608	40		I	3902.472	75	6	II	3913.008	250	100	II
3889.715	20	1	I	3902.729	5	2	II	3913.079	250		I
3889.905	75	1	I	3902.794	75 w		I	3913.301	20		I
3890.053	20		I	3903.098	1500	6	I	3913.450	10 w		I
3890.815	50	3	II	3903.256	5	3 w	II	3913.823	300	10	II
3890.979	4	8	II	3903.476	100		I	3914.164	125	1	I
3891.053	200	30	II	3903.762	40	2	I	3914.289	50		I
3891.198	75	3	II	3903.912	75		I	3914.466	40	4	II
3891.516	50	1	I	3904.001	50		I	3914.530	20		I
3891.723	200	2	I	3904.075	1000	100	II	3914.623	20		I
3892.301	200	20	II	3904.184	100	2	I	3914.787	50		I
3892.426	30	3	II	3904.416	20		I	3914.827	30		I
3892.610	20		I	3904.781	50		I	3915.104	10		I
3892.704	100	1	I	3905.186 i	1500	200	II	3915.197	10		I
3893.025	75	10	II	3905.348	10	50	II	3915.289	75	1	I
3893.112	100	15	II	3905.657	20		I	3915.648	10	1	I
3893.337	75		I	3905.801	50		I	3915.847	100	1	I
3893.411	75	6	II	3905.866	10		I	3916.416	500	3	I
3893.643	200	2	I	3905.921	20		I	3916.587	20	2	I
3893.812	100		I	3906.031	40 w	3 w	II	3916.724	100	150	II
3894.012	20		I	3906.307	75	1	I	3916.788	200	2001	II
3894.402	125	20	II	3906.383	30 h	1	I	3916.816	10		I
3894.702	10		I	3906.711	20 w		I	3917.265	400		I
3894.896	125	20	II	3906.823	30	3 w	II	3918.070	400	50	II
3895.416	2400	75	I	3907.157	125	2	I	3918.284	50	6	II
3895.910	10		I	3907.327	50	3	II	3918.508	300	150	II
3895.986	20		I	3907.542	150	1	I	3919.018	800	15	I
3896.161	40	1	I	3907.901	50	30	II	3919.270	75		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
3919.453	40 w		I	3931.757	10		I	3943.391	400	150	II
3919.974	75		I	3931.998	250	125	II	3943.604	150		I
3920.054	75		I	3932.226	400	150	II	3943.688	250	150	II
3920.305	150	100	II	3932.911 i	1400	15	I	3944.249	400		I
3920.435	125		I	3933.235	200		I	3945.134	150	125	II
3920.542	100	4 w	II	3933.355	75		I	3945.211	75		I
3920.957	50	4	II	3933.655	10	200	II	3945.508	1000	250	II
3921.014	50	4	II	3933.784	30		I	3945.824	500	100	II
3921.167	10		I	3933.965	75	1	I	3946.148	1500	300	II
3921.203	20		I	3934.060	5		I	3946.392	300		I
3921.392	50	6	II	3934.174	20	3	II	3946.478	200 w		I
3921.452	100		I	3934.271	200	2	I	3947.132	250	5	I
3921.533	30		I	3935.205	200	30	II	3947.331	1000	10	I
3922.097	50	4	I	3935.230	5		I	3947.649	20	5	II
3922.216	150	30	II	3935.479	40		I	3947.794	75		I
3922.383	125	1	I	3935.631	100	30	II	3948.027	600	3	I
3923.596	20 w		I	3935.937	75	10	II	3948.133	200	2	I
3923.799 i	400	3	I	3936.350	150	50	II	3948.964 i	1000	300	II
3924.399	250	1	I	3936.586	40 s		I	3949.202	10		I
3924.639	20		I	3936.827	20		I	3949.343	50		I
3924.984	5	20	II	3937.040	400	150	II	3949.463	75		I
3925.091	1000	40	I	3937.285	30		I	3950.394	1000	300	II
3925.209	800	10	I	3937.354	30 w		I	3950.802	100	1	I
3925.587	150	1	I	3937.923	200	75	II	3951.110	100	30	II
3925.731	50		I	3938.086	401		I	3951.546	1500	300	II
3926.053	20		I	3938.145	40		I	3952.199	20	2	I
3926.436	30 w		I	3938.422	50	3	II	3952.450	40	2	I
3926.704	75	30	II	3938.609	200	3	I	3952.759	500	2	I
3926.860	100		I	3938.686	100		I	3952.854	100		I
3927.171	200	125	II	3938.731	20	2	II	3953.337	100		I
3927.420	300	200	II	3938.775	150		I	3953.450	50	50	II
3927.799	100		I	3938.930	20		I	3953.673	50		I
3928.233	10 w	1	I	3939.152	150	2	I	3953.902	20	1	I
3928.298	40		I	3939.313	100	1	I	3953.973	20	1	I
3928.484	20 w		I	3939.532	40		I	3954.067	75		I
3928.693	50	4	II	3939.790	50	12	II	3954.133	75		I
3928.857	150		I	3940.368	50	12	II	3954.462	50	4	II
3928.954	150	4	I	3940.703	100		I	3954.608	10		I
3929.288	100		I	3940.833	100		I	3954.724	75		I
3929.384	75	5	I	3941.136	50		I	3954.929	40		I
3929.667	2500	300	II	3941.226	40	2	I	3955.111	15	10	II
3930.326	40	4	II	3941.365	40	8	II	3955.168	800	3	I
3930.649	75		I	3941.725	50	4	II	3955.256	50	6	II
3930.927	10		I	3942.067	350	40	I	3955.894	200		I
3931.077	75		I	3942.357	200		I	3956.013	200		I
3931.252	75	20 w	II	3942.554	300	2	I	3956.110	40		I
3931.330	40		I	3942.642	300	40	II	3956.176	30		I
3931.425	40		I	3942.857	40	8	II	3956.478	75		I
3931.503	50		I	3942.902	100 w		I	3956.592	400	300	II
3931.642	10		I	3943.257	125	50	II	3956.685	400	200	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
3956.843	20	I	3967.793	20	I	3982.476	50	I
3957.057	20	I	3967.921	10	I	3982.604	25	I
3957.157	100	150 II	3968.483	500	400 II	3982.732	8	I
3957.289	20	I	3969.003	125	40 II	3982.890	40	1 I
3957.472	40	I	3969.335	10	10 w II	3983.007	25	I
3957.595	20	I	3969.523	10	20 w II	3983.168	15	I
3957.796	20	I	3969.660	150	4 I	3983.256	4 w	I
3957.889	10	I	3969.829	10	4 II	3983.493	4 w	I
3958.009	10 w	I	3969.927	20	I	3983.836	8	I
3958.221	40	I	3970.545	15	I	3984.094	75	1 I
3958.477	10	I	3970.650	5	I	3984.370	25	10 II
3958.572	10	I	3970.996	5	I	3984.616	25	15 II
3958.929	40	I	3971.133	100	1 I	3984.873	150	2 I
3959.029	10 w	2 I	3971.583	10	I	3985.242	8	I
3959.222	100	6 II	3971.662	20	I	3985.405	25	6 II
3959.299	1000	6 I	3971.831	10	I	3985.463	15	1 I
3959.597	75	I	3972.153	1400	50 I	3985.735	8	I
3959.799	20	1 I	3972.633	500	10 I	3986.068	40	I
3960.019	20	1 I	3973.196	1100	15 I	3986.225	8	I
3960.141	10	I	3973.331	200	2 I	3986.408	15	2 II
3960.268	100	I	3973.608	50	2 h I	3986.608	15	2 II
3960.331	50	50 II	3973.686	20	I	3986.636	15	5 II
3960.876	125	2 I	3973.995	20	2 h I	3986.679	4	1 I
3960.956	10	2 I	3974.223	125	50 II	3987.075	15	2 II
3961.049	20	I	3974.393	40 h	4 I	3987.216	600	I
3961.294	20	I	3974.830	75	I	3987.480	15	4 II
3961.964	20	2 I	3975.220	100	25 II	3987.552	25	I
3962.100	50	1 I	3975.457	100 w	1 I	3987.705	10	25 II
3962.195	100	I	3975.833	100 h	2 I	3987.781	4	I
3962.338	75	50 II	3975.920	40	I	3987.865	30	I
3962.418	400	I	3976.159	30	I	3988.008	400	300 II
3962.785	30	I	3976.417	600	150 II	3988.384	30	I
3962.920	40	3 II	3977.016	20	I	3988.602	40	10 II
3963.220	200	100 II	3977.790	10	3 w II	3988.849	75	50 II
3963.467	200	125 II	3978.104	10	I	3989.492	25	I
3964.030	300	2 I	3978.429	20	I	3989.584	15	I
3964.329	100 w	I	3979.042	300	50 II	3990.012	150	I
3964.737	100	I	3979.350	20	I	3990.309	25	I
3964.865	100	15 II	3979.397	20	I	3990.490	800	20 I
3965.365	5	I	3979.610	4	I	3990.809	30	I
3965.480	30	I	3979.759	4	I	3990.892	50	I
3965.821	15	I	3979.952	100	2 I	3991.059	5	3 II
3966.050	10	2 II	3980.089 i	1100	10 I	3991.333	8	I
3966.227	40	3 II	3980.748	300	200 II	3991.607	10	4 II
3966.332	40	I	3981.107	500	300 II	3991.731	800	4 I
3966.474	10	I	3981.363	20	I	3992.043	15	3 II
3966.656	200	I	3981.530	200	15 II	3992.275	50	50 II
3966.964	40	50 II	3981.824	300	3 I	3992.616	8	I
3967.210	50	75 II	3982.099	100	12 II	3992.796	4	I
3967.392 i	2000	40 I	3982.228	40	6 II	3993.294	15	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
3993.389	10 w	I	4006.373	100	75 II	4021.423	15	I
3993.511	30	I	4006.721	15	I	4021.542	15 w	I
3993.720	30	10 II	4007.017	600	200 II	4021.750	50	I
3994.001	4	I	4007.509	25	I	4022.082	500 w	100 II
3994.073	8	I	4007.842	30	1 I	4022.721	15	I
3994.352	25	50 II	4008.210 i	1600	30 I	4022.889	10	I
3994.549 i	1200	200 I	4009.048	1600	50 I	4023.151	20	I
3995.030	20 w	4 I	4009.528	15	2 II	4023.334	150	2 I
3995.098	8	I	4009.717	80	2 I	4023.538	15	3 II
3995.188	8	1 I	4009.810	80	2 I	4023.735	8	1 I
3995.240	4	I	4010.094	15	I	4024.174	25	I
3995.348	4	I	4010.279	15	I	4024.459	30	8 II
3995.451	8	I	4010.419	15	3 II	4024.798	100	2 I
3995.597	8	I	4010.525	10	4 II	4025.000	4	2 I
3995.714	8	I	4010.981	4	2 II	4025.160	10	I
3996.061	600	300 II	4011.090	8	2 II	4025.298	4	I
3996.430	15	I	4011.355	50	I	4025.654	400	150 II
3996.509	25	I	4011.590	400	3 I	4025.948	10	I
3996.668	75	I	4011.743	800	50 I	4026.157	400	50 II
3996.932	40	I	4012.495 i	2000	75 I	4026.748	10	2 I
3997.015	50	I	4013.023	10	I	4026.814	8	1 I
3997.106	25	I	4013.101	10	I	4027.006	1000	8 I
3997.345	25	I	4013.254	20	30 II	4027.338	30	10 II
3997.466	40	10 II	4013.912	75	I	4027.400	8	3 II
3997.867	75	20 II	4014.506	20	25 II	4027.547	30	I
3998.054	25	I	4014.714	300	2 I	4027.653	30	15 II
3998.404	40	I	4015.101	15	2 II	4028.334	40	I
3998.734	40	I	4015.584	8	1 I	4028.696	125	20 II
3998.799	4	II	4015.821	12	4 II	4028.950	50	I
3998.954	125	5 I	4016.110	30	I	4029.023	25	2 II
3999.302	4	I	4016.221	15	I	4029.320	40	10 II
3999.943	10	4 II	4016.297	12	20 II	4029.518	20	I
4000.030	20	I	4016.640	30	I	4029.659	150	5 II
4000.282	400	I	4016.687	50	I	4029.825	150	2 I
4000.438	10	I	4017.064	50	1 I	4030.298	200	10 I
4000.743	8	I	4017.133	50	1 I	4030.839	1800	35 I
4001.060	800	I	4017.258	25	I	4031.079	30 w	20 II
4001.727	40	6 II	4017.484	15	15 II	4031.331	50	10 II
4001.888	150	2 I	4017.725	8	I	4031.478	15	I
4002.367	25	I	4018.099	400	2 I	4031.655	8	I
4003.105	100	100 II	4019.129 i	1200	500 II	4031.774	10	2 w II
4003.307	200	200 II	4019.779	10	1 I	4032.020	15 w	1 I
4003.570	200	2 I	4019.857	50	1 I	4032.248	15 w	2 II
4004.186	8 w	1 I	4020.013	8	I	4032.455	600	200 II
4004.547	4	I	4020.096	15	4 II	4032.595	800	125 I
4004.630	8 w	I	4020.354	150	5 I	4032.888	4	I
4005.085	400	3 I	4020.608	30	I	4033.181	15	2 II
4005.527	75	100 II	4020.770	8	I	4033.480	8	I
4005.568	40	75 II	4021.005	10	I	4033.774	80	1 I
4005.953	100	I	4021.140	50	1 I	4033.908	125	2 I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4034.247	125	100	II	4047.578	15		I	4064.985	30		I
4034.548	4		I	4048.028	30	25	II	4065.247	15	4	II
4034.600	25	1	I	4048.286	200	30	II	4065.545	25		I
4034.895	75	10	II	4048.434	200	20	II	4065.615	30		I
4034.927	30		I	4048.799	4	100	III	4065.683	15	5	II
4035.349	30	1	I	4049.532	30		I	4065.887	30	2	I
4035.471	15		I	4049.833	15	6	II	4066.001	15	5	II
4035.573	15		I	4049.949	400	8 w	I	4066.164	10	2	II
4035.730	25		I	4050.894	800	10	I	4066.430	25		I
4036.048 i	1800	15	I	4051.126	15	4	II	4066.818	50	1	I
4036.357	40	1	I	4051.198	4		I	4066.956	25		I
4036.561	400	200	II	4051.271	4		I	4067.451 i	400	4	I
4036.933	8		I	4051.497	100	1	I	4067.590	10	5	II
4037.047	15		I	4051.899	15		I	4067.873	25	10	II
4037.127	4		I	4052.255	30 w	1	I	4068.017	15	7	II
4037.256	125	25	II	4052.441	15	3	II	4068.469	30		I
4037.559	200	3	I	4052.810	15	1	I	4068.709	20	4	II
4038.226	125	2	I	4053.525	1000	25	I	4069.203	750	400	II
4038.453	40	1	I	4054.180	8	2	II	4069.457	400		I
4038.620	50	2	II	4054.295	200	1	I	4069.753	8	3	II
4038.955	50	1	I	4054.767	8	2	II	4070.039	30		I
4039.018	25		I	4055.231	30	15	II	4070.112	15		I
4039.265	15		I	4055.907	25		I	4070.235	75	2	I
4039.430	125	10	II	4056.005	25		I	4070.673	15	3	II
4039.862	800	10	I	4056.395	15		I	4070.755	40		I
4040.388	30	10	II	4056.635	30	2	II	4071.314	15		I
4040.912	150	3	I	4057.023	15	5	II	4071.548	40		I
4041.203	300	150	II	4057.120	15		I	4071.743	400	8	I
4041.544	15		I	4057.328	40	10	II	4072.172	8	2	II
4041.806	15	4	II	4057.474	8		I	4072.629	400	3	I
4041.974	15		I	4057.777	25	30	II	4072.910	30	20	II
4042.060	15		I	4057.938	50	1	I	4072.999	15		I
4042.260	15		I	4058.317	8		I	4073.170	8		I
4042.642	8		I	4058.675	8		I	4073.278	8		I
4042.977	30	50	II	4059.253 i	1000	25	I	4073.709	200	50	II
4043.123	40	50	II	4059.808	15 h		I	4073.855	100	2	I
4043.395 i	800	20	I	4059.890	250	15	II	4074.239	30	2 h	II
4043.893	8		I	4060.058	20	1	I	4074.434	25		I
4044.227	4		I	4061.618	40		I	4074.642	100	50	II
4044.692	15		I	4061.767	15		I	4074.795	8		I
4044.924	75	1	I	4061.870	15		I	4074.927	10	2	II
4045.223	30		I	4062.076	25		I	4075.050	5	1	II
4045.612	75	30	II	4062.290	8	1	II	4075.503	400	3	I
4045.731	4		I	4062.650	15	2 h	II	4075.707	30	8	II
4046.246	40	1	I	4062.745	8		I	4075.903	125	1	I
4046.621	8		I	4063.059	8	2	II	4076.610	4	2 w	II
4046.822	30		I	4063.403	800	50	II	4076.875	8		I
4047.052	15		I	4063.670	20	5	II	4077.257	4		I
4047.323	4		I	4064.325	400	10	I	4077.620	30	1	I
4047.464	15		I	4064.598	15	3	II	4077.865	25		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
4077.977	30	1 I	4090.582	8	I	4103.103	15	I
4078.459	8	2h II	4090.640	3	I	4103.265	40	50 II
4078.520	8h	2 I	4090.789	5	I	4103.456	25	I
4078.654	15	I	4091.022	15	I	4103.650	4	8 II
4078.872	150	3 I	4091.344	30	6 II	4103.682	350	I
4079.132	25	8 II	4091.529	10	4 II	4103.987	8	I
4079.258	25	I	4091.588	25	I	4104.383	250	150 II
4079.444	4	I	4091.732	40	1 I	4104.837	125	2 I
4079.601	15	8 II	4091.911	8	I	4105.054	25	I
4079.695	30	I	4091.982	40	I	4105.336	800	300 II
4079.894	25	10 I	4092.127	15	I	4105.913	150	75 II
4080.294	10	4 II	4092.316	8	1 II	4106.119	15	10 II
4080.357	150	2 I	4092.474	8	I	4106.217	25	I
4080.704	400	3 I	4092.684	15 w	I	4106.351	25	I
4080.964	15	3 II	4092.824	4 w	I	4106.436	4	I
4081.371	800	10 I	4093.389	30	6 II	4106.525	8	I
4081.586	30	I	4093.552	8	I	4106.573	8	I
4081.847	25	20 II	4093.669	40	I	4106.852	4	I
4082.080	125	4 I	4093.999	4	I	4106.944	8	2 II
4082.258	125	75 II	4094.108	4	I	4107.051	40	I
4082.435	30	1 I	4094.747 i	1600	300 II	4107.291	75	2 I
4082.862	25	I	4095.200	8	I	4107.373	30	20 II
4083.006	4	I	4095.618	4	I	4107.436	8	I
4083.380	4	8 II	4096.072	200	2 I	4107.795	25	20 II
4083.467	500	3 I	4096.324	25	2 II	4107.859	100	I
4083.818	15	I	4096.676	8	I	4108.420 i	800	300 II
4084.084	25	I	4096.817	8	I	4108.964	4 w	I
4084.289	100	I	4096.927	15	I	4109.323	400	6 I
4084.480	5	2 II	4097.327	75	20 II	4109.713	15	I
4084.618	40	I	4097.680	2	8 II	4110.071	15	4 II
4085.041	300	500 II	4097.742	800	4 I	4110.165	4	I
4085.254	200	10 I	4098.084	4	2 II	4110.509	40	100 II
4085.432	600	10 I	4098.398	15	I	4110.638	75	75 II
4085.809	15	15 II	4098.614	8	1 I	4110.826	400	I
4086.042	25	I	4098.728	50	1 I	4110.861	200	150 II
4086.521 i	1600	300 II	4098.936	125	100 II	4111.129	25	6 II
4086.676	20 w	30 w II	4099.209	15 w	1 I	4111.436	8	1 II
4086.925	5	I	4099.308	8	I	4111.609	15	I
4087.167	15	I	4099.552	125	2 I	4111.827	4	1 II
4087.284	350	3 I	4099.992	30	I	4112.101	25	I
4087.674	5	I	4100.341 i	1100	15 I	4112.188	8	I
4087.890	8	I	4100.836	25	150 II	4112.314	30	50 II
4088.200	5 w	I	4100.911	50	I	4112.388	15	I
4088.627	40	I	4101.240	15	I	4112.748	1700	40 I
4088.725	400	3 I	4101.323	10	10 II	4113.554	40	50 II
4089.138	400	3 I	4101.620	4	I	4113.869	30	1 I
4089.624	8	I	4102.290	25	I	4114.050	15	I
4090.036	8	I	4102.617	400	3 I	4115.140	15 w	2 I
4090.099	4	I	4102.819	30	I	4115.262	4	I
4090.195	8	I	4103.005	15	I	4115.539	15	8 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4115.759 i	800	5	I	4131.001	800	15	I	4143.039	15		I
4116.714	1600	500	II	4131.423	75	100	II	4143.183	8	1	I
4117.703	15	2	II	4131.656	40		I	4143.332	25	1	I
4117.838	15	3	II	4131.710	50		I	4143.646	75		I
4118.087	8		I	4132.274	15		I	4144.023	15		I
4118.218	15	2	II	4132.417	4		I	4144.335	40	1	I
4118.325	40		I	4132.608	40		I	4144.448	15		I
4118.483	200	1	I	4132.753 i	600	200	II	4144.573	40	1	I
4118.595	25	4	II	4133.285	15		I	4145.041	15		I
4118.773	25	1	I	4133.602	15		I	4145.292	30		I
4118.940	4		I	4133.953	75		I	4145.838	50	2	I
4119.390	4		I	4134.055	75		I	4145.918	15		I
4119.469	30		I	4134.111	100	100	II	4145.984	8		I
4120.007	15	3 w	II	4134.318	75		I	4146.063	8		I
4120.367	15		I	4134.607	15 w	2	I	4146.497	4		I
4120.405	15		I	4134.828	4		I	4146.658	15	5	II
4120.831	8		I	4134.982	8	1 w	II	4146.964	25		I
4121.854	30	30	II	4135.132	8		I	4147.535	75	1	I
4122.674	125	50	II	4135.286	4		I	4148.017	20	5	II
4122.962	50	20	II	4135.479	200	3	I	4148.169	200	250	II
4123.263	8	2	II	4135.934	8	1	I	4148.344	50	100	II
4123.531	75	15	II	4136.128	30		I	4148.645	30 h	3	II
4123.597	40		I	4136.283	125	5	I	4148.720	50	2	I
4123.719	100		I	4136.401	50	50	II	4148.828	40		I
4124.036	150	1	I	4136.433	100		I	4149.203	200		I
4124.511	30	50	II	4136.882	4		I	4149.987 i	800	200	II
4124.664	40	50	II	4137.013	8		I	4150.072	40		I
4124.772	30		I	4137.117	8		I	4150.365	25	4	II
4124.875	8		I	4137.303	8 w		I	4150.478	15	1	I
4125.462	4		I	4137.607	8	2 w	II	4150.590	15		I
4125.695	30	1	I	4137.880	8	4	II	4150.656	25	1	I
4125.958	15		I	4138.038	150	2	I	4151.141	40		I
4126.029	25		I	4138.291	8	1	I	4151.445	15	4	II
4126.346	30		I	4138.765	30		I	4151.641	8		I
4126.753	25		I	4138.841	40	15	II	4152.139	15		I
4127.412 i	1000	50	I	4138.880	30		I	4152.203	25		I
4128.043	50	1	I	4139.307	15 h	1	I	4153.153	25		I
4128.296	8	4	II	4139.462	25		I	4153.207	8		I
4128.471	8	1	I	4139.610	4		I	4153.576	25		I
4128.608	4		I	4139.756	8		I	4153.733	15	4	II
4128.813	2 w		I	4140.232	400	150	II	4153.861	15		I
4128.912	4		I	4140.383	200	75	II	4153.995	8		I
4129.071	4		I	4141.108	4		I	4154.130	8	1	I
4129.511	100	2	I	4141.326	15		I	4154.374	25	1	I
4129.851	25		I	4141.634	100	100	II	4154.717	100	2	I
4129.914	15	4	II	4141.857	15		I	4155.004	15		I
4130.132	8		I	4142.326	50	3	I	4155.166	4		I
4130.170	8		I	4142.475	100	150	II	4155.295	5	4 w	II
4130.326	200	3	I	4142.702	600	200	II	4155.473	5	2 w	II
4130.668	15	3	II	4142.966	25	2	I	4155.639	8		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
4155.725	8	I	4168.633	150 100	II	4182.158	75 100	II
4155.986	15	I	4169.082	50	I	4182.443	15	I
4156.233	125 75	II	4169.213	75	I	4182.709	50 w	I
4156.521	400 200	II	4169.758	25	I	4182.935	150	I
4157.272	100 2	I	4169.827	75 h	I	4183.562	50 15	II
4157.391	100 1	I	4170.468	125 25	II	4183.948	50 1	I
4157.541	25	I	4170.536	500 10	I	4184.135	500 1	I
4157.760	15 w 1	I	4170.782	100 30	II	4184.277	100 8	II
4157.939	8	I	4171.342	125 125	II	4184.603	250	I
4158.095	8	I	4171.970	25	I	4184.709	40 12	II
4158.535 i	800 15	I	4172.050	25	I	4185.042	30	I
4159.150	40	I	4172.203	8	I	4185.143	250	I
4159.403	15	I	4172.383	40	I	4185.296	75	I
4159.659	500 100	II	4172.625	200	I	4185.471	200	I
4160.057	50	I	4173.304	15	I	4185.809	15	I
4160.286	15	I	4173.449	100 1	I	4185.947	40 5	I
4160.351	50	I	4173.525	75 3	I	4187.136	250 1	I
4160.544	25 1	I	4173.620	4 1	I	4187.308	25	I
4160.732	150 2	I	4173.720	75	I	4188.103	50 2	II
4161.108	70	I	4173.885	50	I	4188.188	40	I
4161.586	125 8	II	4173.953	40 2	II	4188.581	75 10	II
4161.738	300 2	I	4174.055	25	I	4188.664	150	I
4161.887	75 4	II	4174.436	30 6	II	4188.815	25	I
4162.026	15 1	I	4174.650	30	I	4189.562	350 w 1	I
4162.507	400 2	I	4174.764	8	I	4189.631	50 w	I
4162.678	100 75	II	4175.320	30	I	4189.726	30	I
4162.775	150 h	I	4175.397	15 1	I	4189.817	40 4	II
4163.177	200 20	II	4176.018	8 w	I	4190.465	15	I
4163.644	400 50	II	4176.331	30 15	II	4190.623	150	I
4163.729	200 30 i	II	4176.481	50	I	4190.813	100 1	I
4163.944	150 50	I	4176.681	15 w 1	II	4191.022	10	I
4164.252	800	II	4177.162	100 1	I	4191.148	100	I
4164.394	15	I	4177.727	50 w	I	4191.820	150 30	II
4164.452	25	I	4178.060 i	3000 400	II	4191.993	30 3	II
4164.529	40	I	4178.845	250 1	I	4192.362	300 2	I
4164.685	25	I	4179.218	150 1	I	4193.017 i	900 8	I
4164.973	150	I	4179.308	300 1	I	4193.518	150 1	I
4165.071	250 15	I	4179.618	250	I	4194.084	100 20	II
4165.340	15	I	4179.711	125 100	II	4194.218	15	I
4165.766 i	1000 12	I	4179.956	150 100	II	4194.582	30	I
4166.492	15 4	II	4180.326	100	I	4194.934	350 2	I
4166.683	8	I	4180.487	50 w	I	4195.560	500 100	II
4166.903	15	I	4180.556	15 4	II	4195.831	400 50	II
4167.117	40	I	4180.716	75	I	4195.952	100 25	II
4167.269	25 8	II	4180.885	75	I	4196.287	50	I
4167.390	30	I	4180.954	75	I	4196.498	30	I
4167.680	8	I	4181.083	20 2	II	4196.840	50 w	I
4167.862	100 1	I	4181.163	125 4	I	4197.013	25	I
4168.052	200 1	I	4181.344	15 4	II	4197.112	25	I
4168.457	200	I	4181.503	15	I	4197.307	15	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4197.380	40		I	4210.298	5		I	4223.598	300	2	I
4197.661	40		I	4210.451	100	1	I	4223.981	30		I
4197.723	10	2	II	4210.770	400	6	I	4224.246	200	50	II
4197.756	40		I	4210.924	1200	10	I	4224.622	150	20	II
4197.936	100	10	II	4211.294	15 h		I	4224.872	15		I
4198.105	75		I	4211.513	100	30	II	4225.102	10		I
4198.653	100		I	4211.887	100	3	I	4225.517	150		I
4198.879	50		I	4212.314	5 w		I	4225.805	50		I
4198.939	50		I	4212.454	5		I	4226.049	50		I
4199.020	40	30	II	4213.072	400	3	I	4226.305	150		I
4199.430	15 w	1	I	4213.373	300	2	II	4226.780	200	2	I
4199.632	150		I	4213.993	75		I	4227.392	400	3	I
4200.008	30		I	4214.539	50	10	II	4227.650	100	2	I
4200.158	15		I	4214.628	30	7	II	4228.417	150	1	I
4200.392	15 w		I	4214.828 i	200	2	I	4228.682	75	2	I
4200.837	20	2	I	4215.145	5		I	4228.763	125 w	1	I
4200.997	5	2	II	4215.208	10		I	4228.990	40	3	II
4201.607	100	3	I	4215.374	5		I	4229.149	500	2	I
4201.849	500	100	II	4215.630	100		I	4229.454	500	50	II
4202.258	150		I	4215.853	100	1	I	4229.768	15		I
4203.060	50		I	4216.057	300		I	4229.863	30		I
4203.086	40		I	4216.205	50	1	I	4229.954	20 w		I
4203.179	20		I	4216.369	150	2	I	4230.239	50	1	I
4203.292	20		I	4216.937	10 w		I	4230.427 i	600	4	I
4203.437	50		I	4217.070	30		I	4230.822	150		I
4203.578	75		I	4217.192	100 w		I	4230.963	30		I
4203.890	100	1	I	4217.227	100	10	II	4231.076	20		I
4204.044	300	2	I	4217.756	30	2	II	4231.171	25	5 w	II
4204.535	100		I	4217.948	10		I	4231.751	100		I
4204.684	20	1	II	4218.192	150	8 w	II	4231.976	30	2	II
4204.927	15 h	2 w	II	4218.541	100	20	II	4232.533	75	5	II
4205.009	30		I	4219.000	20	2	II	4232.657	15		I
4205.128	100		I	4219.379	100	10	II	4232.707	5		I
4205.389	30	1	I	4219.577	20		I	4233.293	300	50	II
4205.537	50 w		I	4219.680	25	3	I	4233.726	20		I
4205.787	30	5	II	4220.075	750	50	I	4233.902	50		I
4206.053	75		I	4220.400	10		I	4234.231	50		I
4206.663	150	50	II	4220.564	10		I	4234.302	50		I
4207.176	100		I	4220.733	150	1	I	4234.489	10		I
4207.322	5		I	4220.856	20		I	4234.988	75	5	II
4207.480	4		I	4221.152	75		I	4235.095	30		I
4207.612	75		I	4221.691	75	1	I	4235.235	20 w		I
4207.928	15		I	4221.840	5		I	4235.464 i	600	6	I
4208.082	15		I	4222.179	30	4	II	4236.051	150		I
4208.416	150	2	I	4222.444	75 w	1	I	4236.387	75	3	I
4208.891 i	3000	300	I	4222.580	30	1	I	4236.720	10		I
4209.196	100	2	I	4222.656	10		I	4236.926	15	1 w	II
4209.972	150	1	I	4222.751	100	5 w	II	4237.112	35	10	II
4210.090	75	1	I	4222.930	10 w		I	4237.184	30		I
4210.258	10		I	4223.434	400	2	I	4237.531	20		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4237.652	10	1	I	4252.392	15	3 w	II	4269.065	75		I
4238.116	30		I	4252.635	4 h		I	4269.941	200	2	I
4238.374	40		I	4252.801	4 w		I	4270.330	300	50	II
4238.538	20		I	4253.248	40	4	II	4270.735	75		I
4238.585	30		I	4253.534	800	6	I	4271.087	250	25	II
4238.975	25	3	II	4253.862	100	15	I	4271.432	100		I
4239.674	10	2 w	II	4254.016	50	3	II	4272.088	40		I
4239.784	15		I	4254.378	10		I	4272.137	20		I
4239.855	5 h		I	4254.445	100	15	II	4272.292	300	2	I
4239.936	5 w		I	4254.964	4		I	4272.865	400		I
4240.592	100	20	II	4255.238	200		I	4273.357 i	1000	175	II
4240.742	15		I	4255.472	20		I	4274.025	400	75	II
4241.198	150		I	4255.780	200	2	I	4274.322	100	40	II
4241.972	20		I	4256.091	200	40	II	4275.204	30	5	II
4242.338	30	6	II	4256.252	500	4	I	4275.348	8		I
4242.724	75	6	II	4257.496 i	700	5	I	4275.426	8		I
4243.021	40	1	I	4257.893	125	2	I	4275.566	20		I
4243.265	125	1	I	4258.225	30		I	4275.840	4		I
4243.926	400	50	II	4258.515	500	2	I	4276.026	4		I
4244.270	50		I	4258.986	75		I	4276.281	15		I
4244.486	15		I	4259.497	125		I	4276.807	500	50	II
4244.677	10		I	4259.629	8		I	4276.965	250	20 h	II
4244.819	30	2 w	II	4259.718	20		I	4277.314 i	1200	200	II
4245.457	75	3	II	4259.850	15		I	4277.938	10		I
4245.554	50 h	1	I	4259.981	15		I	4278.322	500	5	I
4245.656	5		I	4260.335	800		I	4278.530	2	4	II
4245.856	20 w		I	4260.801	75		I	4278.820	15		I
4245.967	10	1	I	4260.976	100	3	I	4279.062	100	3	I
4246.091	5 w		I	4261.273	40	4	II	4279.275	25		I
4246.329	50		I	4261.484	75	10	II	4279.480	10		I
4246.803	40		I	4261.956	40		I	4279.636	30		I
4247.290	20		I	4262.077	8	3	II	4279.783	10		I
4247.352	20		I	4262.611	200		I	4279.943	10		I
4247.604	125	10	II	4262.726	50	15	II	4280.236	25	8	II
4247.859	30		I	4263.358	300	75	II	4280.567	300	2	I
4247.993	400	75	II	4263.739	20 w		I	4281.067	400	75	II
4248.393	200		I	4264.104	100	6	I	4281.414	400	75	II
4248.518	75		I	4264.338	100 w		I	4282.043	2000	150	II
4248.729	30		I	4264.400		10	III	4283.094	200	2	I
4248.857	15		I	4264.575	20		I	4283.515	400	100	II
4249.163	10		I	4264.879	10		I	4284.071	8		I
4249.480	100		I	4264.935	15	5 w	II	4284.190	4		I
4249.680	250	50	II	4265.030	15	3 w	II	4284.421	4		I
4250.312	1200	75	I	4265.489	50	6 w	II	4284.512	20	6	II
4251.075	15		I	4265.941	4 w		I	4284.974	300	75	II
4251.278	40		I	4266.426	15		I	4285.187	25	15	II
4251.414	25 w		I	4267.224	15		I	4285.403	10		I
4251.516	5 w		I	4267.518	200	15	II	4285.942	20		I
4251.579	15	4	II	4267.652	8		I	4286.182	10		I
4252.023	25		I	4267.716	20	3	II	4286.215	200	30	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4286.700	75	20	II	4302.108	10		I	4318.294	20	30	II
4287.080	100		I	4302.211	20	6	II	4318.416 i	700	6	I
4287.396	8		I	4303.093	20		I	4319.085	200	30	II
4287.682	25	8	II	4303.223	4		I	4320.124	300	100	II
4287.958	40	6	II	4303.380	30	3 h	II	4320.449	100	40	II
4288.050	100	12	II	4303.820	8		I	4320.582	300	50	II
4288.476	200	1	I	4303.991	40	2 h	I	4320.732	100		I
4288.659	200	2	I	4304.417	40	1	I	4320.972	50		I
4289.209	10		I	4304.954	100		I	4321.718	12		I
4289.408	15		I	4305.324	10	4	II	4321.987	20	4	II
4289.653	100	1	I	4305.493	8		I	4322.568	8 w		I
4290.388	100	6	I	4305.556	10		I	4322.735	10	4	III
4290.945	15		I	4305.906	15	2	II	4322.954	5		I
4291.378	4	2	II	4306.368	200	40	II	4323.031	15	6	II
4291.810 i	400	3	I	4307.176 i	700	10	I	4323.561	4		I
4292.305	30		I	4308.124	200	4	I	4324.254	12		I
4292.465	4		I	4308.586	200		I	4324.436	8		I
4292.506	15	2	II	4309.104	8		I	4324.628	8		I
4292.968	4		I	4309.200	8	2	II	4324.900	15	2	II
4293.070	2	3	II	4309.548	10		I	4324.953	4		I
4293.429	15		I	4309.899	20		I	4325.009	4		I
4293.772	50		I	4309.993	300	50	II	4325.278	125	3	I
4294.019	8		I	4310.637	12	6	I	4326.167	8		I
4294.719	100		I	4310.962	15		I	4326.332	4		I
4295.043	75	100	II	4311.062	50		I	4326.514	12		I
4295.124	5	2	II	4311.233	10		I	4326.676	12		I
4295.229	10		I	4311.315	5		I	4327.031	40		I
4295.580	75		I	4311.584	200	3	I	4327.087	200	20	II
4295.810	40 w		I	4311.627	100		I	4327.124	40		I
4296.355	10		I	4311.796	200	3	I	4327.223	50	5	II
4296.574	15	5 w	II	4312.994	1000	12	I	4327.441	10		I
4296.888	10	5	II	4313.304	40	15	II	4327.540	10		I
4296.962	10 w		I	4313.422	10		I	4327.708	75		I
4297.304	400	10	I	4313.476	2	2	II	4327.979	12		I
4297.632	10		I	4313.611	12 w		I	4328.275	8	4	II
4297.939	40		I	4313.781	12		I	4328.678	50	30	II
4298.125	30		I	4314.023	15		I	4328.909	400		I
4298.182	6		I	4314.323	150		I	4329.086	5	4	II
4298.562	8	2	II	4314.801	8		I	4329.211	8		I
4298.836	120	40	II	4314.945	5 w		I	4329.487	100	30	II
4299.436	5	1	II	4315.254 i	400		I	4330.211	75		I
4299.631	100		I	4315.573	4		I	4330.403	50	2 w	I
4299.839 i	600	5	I	4315.709	12	4	II	4330.844 i	300	2	I
4300.140	5	4	II	4315.953	30	20	II	4331.200	1	5 w	II
4300.269	8		I	4316.109	50		I	4331.332	200		I
4300.789	50	20	II	4316.367	20		I	4331.918	100	40	II
4301.278	20	4	II	4317.221	10	6	II	4332.331	125		I
4301.570	10		I	4317.533	2 h		I	4333.262	20		I
4301.862	10	5 w	II	4317.663	4		I	4333.560	12		I
4302.049	10 w		I	4317.844	75	2	I	4333.640	12		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4333.933	200	100	II	4351.013	8 w	2	II	4366.960	60	20	II
4334.249	20	4	I	4351.062	2 w		I	4367.283	50		I
4334.737	8		I	4351.274	50		I	4367.419	75		I
4334.924	8		I	4351.481	75	35	II	4367.732	4		I
4335.320	100	10	II	4351.511	20		I	4367.916	8		I
4335.700	800	75	I	4351.895	4		I	4368.339	15		I
4336.464	50	10	II	4352.114	4		I	4368.682	4		I
4336.973	12		I	4352.166	8	4	II	4368.995	10		I
4337.275	900	125	I	4352.611	100		I	4369.059	4	10	II
4337.840	2	2	II	4352.670	600	75	II	4369.304	250	40	II
4338.098	350	2	I	4352.819	15	2	II	4369.494	200		I
4338.370	2	2	II	4353.389	100	75	II	4369.598	8		I
4338.778	5	2 w	II	4353.435	500		I	4369.867	200		I
4339.011	8		I	4354.100	5 h	1	I	4370.249	12		I
4339.381	20		I	4354.481	400	4	I	4370.469	8		I
4339.442	4		I	4355.001	8		I	4370.625	4		I
4339.867	125	2	I	4355.322	120	75	II	4371.136	20		I
4340.456	4		I	4355.521	200		I	4371.338	20	2	II
4340.894	400		I	4356.034	75		I	4371.745	8	2 w	II
4341.024	75	125	II	4356.340	8		I	4372.149	8		I
4342.050	20		I	4356.546	12		I	4372.648	12 s		I
4342.256 i	300	75	II	4356.596	4		I	4372.802	8		I
4342.439	500	3	I	4357.063	8	1	II	4373.042	200	4	I
4342.662	40		I	4357.614	125	30	II	4373.900	200	75	II
4342.952	4		I	4357.840	8		I	4374.124 i	600	8	I
4343.014	20		I	4358.330	400	4	I	4374.784	500	100	II
4343.038	4		I	4358.537	30	20	II	4375.012	8		I
4343.378	30		I	4358.807	8	15	II	4375.068	50	2	I
4343.610	50	20	II	4359.119	4	8	II	4375.280	4		I
4343.944	125	30	II	4359.365	600	8	I	4375.398	4		I
4344.322	300	75	II	4359.717	40		I	4375.592	25	25	II
4345.049	30	20	II	4360.163	100	2	I	4375.837	40		I
4345.178	15		I	4360.706	20		I	4376.257	20		I
4345.400	8		I	4361.298	150	100	II	4376.529	200		I
4345.637	75 h	2	I	4361.794	30	30	II	4377.312	75	100	II
4345.690	10		I	4362.298	5	4	II	4377.474	8		I
4345.844	100		I	4362.358	12		I	4377.655	12		I
4346.432	500	4	I	4362.460	75		I	4377.897	4		I
4346.791	4 h		I	4362.707	8		I	4378.177 i	500	3	I
4347.225	100	100	II	4362.770	75		I	4378.829	25	20	II
4347.636	20		I	4363.104	8		I	4379.008	10		I
4348.296	8	12	II	4363.423	20		I	4379.589	8	3 w	II
4348.591	400	2	I	4363.492	10		I	4379.946	25 w	18	II
4349.071	400	2	I	4364.033	30		I	4380.289	125		I
4349.407	20	1 h	II	4364.182	4	4	II	4380.704	20 h	2	I
4349.614	15	2	II	4364.488	40 w		I	4380.864	2		I
4350.270	75		I	4365.016	50		I	4381.054	4		I
4350.382	8		I	4365.472	8		I	4381.405	350	10	II
4350.651	4		I	4365.528	8		I	4381.860 i	900	150	I
4350.823	30	30	III	4365.930 i	600	10	I	4382.898	50		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4383.860	40		I	4401.582 i	400	20	I	4420.752	5	3 w	II
4384.015	8	2 h	II	4402.260	75	2 h	I	4420.794	200		I
4384.129	8	2 h	II	4402.448	4		I	4421.160	4		II
4384.646	300	2	I	4402.605	12		I	4421.546	200	6	II
4385.234	4		I	4402.738	8	3	II	4421.833	4	4	II
4385.640	6		I	4402.927 i	400	2	I	4422.059	350	3	I
4385.754	20		I	4403.428	12 w		I	4422.789	10	10	II
4386.116	8	3	II	4403.714	25		I	4422.894	40		I
4386.267	20		I	4404.132	75		I	4423.266	30	2	II
4386.483	12		I	4405.711	15	5	II	4423.723	200		I
4386.714	8		I	4405.847	4		I	4423.930	40	30	II
4387.022	75		II	4405.988	4		I	4424.237	20		I
4387.102	75	20	II	4406.421	20	10 w	II	4424.546	15		I
4387.214	4		I	4406.771	5	2	II	4424.837	200		I
4387.473	4		I	4406.903	12		I	4425.117	5	4	II
4387.741	125	175	II	4407.276	12		I	4425.449	100		I
4388.100	40		I	4407.500	4		I	4425.984	100	125	II
4388.561	4		I	4407.893	4		I	4426.189	12	2	II
4388.663	4		I	4408.474	200	40	II	4426.519	12		I
4388.792	2		I	4408.883 i	600	5	I	4426.834	4		I
4388.975	75	1	I	4409.015		3	II	4427.645	125	50	II
4389.482	8		I	4409.740	8		I	4428.547	150	12	I
4389.668	15		I	4409.901	50		I	4428.887	125		I
4389.916	8		I	4410.410	10		I	4429.261	20	7	II
4390.167	15		I	4410.477	125	125	II	4429.618	50	4	I
4391.110 i	3000	400	II	4411.145	20 w		I	4429.815	40		I
4391.530	50		I	4411.250	8		I	4429.969	8		I
4391.938	10		I	4411.606	50	10	II	4430.149	30		I
4392.478	75 h	2	I	4412.556	600		I	4432.249	200	4	I
4392.977	400		I	4412.741	800	400	II	4432.963 i	600	150	II
4393.761	400	4	I	4412.909	400		I	4433.482	150		I
4394.260	8		I	4413.369	40	100	II	4434.067	50	2	II
4394.448	15		I	4413.634	50	1	I	4434.321	30	10	II
4394.551	15		I	4414.525	400	4	I	4434.825	75	5	II
4394.900	250	100	II	4414.778	20		I	4435.290	30		I
4395.513	4		I	4415.530	40 w		I	4436.057	125	40	II
4395.675	4		I	4416.236	400	100	II	4436.284	150	40	II
4396.145	50		I	4416.842	200 h	2	I	4436.549	150	100	II
4396.480	250	75	II	4417.215	4		I	4436.984	100		I
4397.014	50		I	4417.358	8		I	4437.435	75		I
4397.295	2	1	I	4417.504	12		I	4437.718	25	2	II
4397.914	400	125	II	4417.762	4		I	4438.739	200	30	I
4398.245	10 w		I	4417.980	12		I	4439.117	400	150	II
4398.642	4		I	4418.417	40	3 h	II	4439.848	20		I
4399.096	300	150	II	4418.666	40	30	II	4440.276	400 w		I
4399.403	60	10	I	4419.015	40	20	II	4440.577	300	60	II
4399.969	200		I	4419.309	5	2	II	4440.858	400	150	II
4400.386	40	15	II	4419.776	50	2	I	4441.601	300		I
4401.177	4		I	4420.135	40		I	4442.512	8		I
4401.215	20	2	II	4420.264	75	2	I	4443.070	200	30	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4443.649	75	5	I	4463.825	125		I	4485.783	150	40	II
4443.764	30		I	4464.120	15		I	4486.653	200	150	II
4443.916	15		I	4464.708	20 w		I	4486.897	200	2	I
4445.014	200	30	II	4464.852	20		I	4487.496	300	200	II
4445.308 i	300	2	I	4465.968	100	8	II	4488.317	150		I
4445.889	200	20	I	4465.341 i	300	250	II	4488.680	400	200	II
4446.442	50		I	4466.619	30	4	I	4489.506		10 w	III
4446.576	40		I	4467.396	4		I	4489.696	200		I
4446.775		30 w	III	4467.747	20	6	II	4490.209	15	15	II
4447.124		15 w	III	4468.327	150	2	I	4490.678	50		I
4447.221	100		I	4469.185	30		I	4491.065	6		I
4447.834	400	100	II	4469.530	400	3	I	4491.374	12	10	II
4448.545	50	10	II	4470.010	2	4	II	4491.712	8	20	II
4449.431	12	1	I	4470.984	150		I	4491.890	5	10	II
4449.884	6		I	4471.774	20	30	II	4492.126	40		I
4450.773	200	2	I	4471.884	6		I	4492.237	25	40	II
4451.052	10	15	II	4471.985	10	1	I	4492.579	15		I
4451.347	50		I	4472.250	200	40	II	4492.693	20		I
4451.729	20		I	4472.618	15		I	4493.334 i	1200	30	I
4452.564	200	2	I	4472.839	40		I	4494.071	8	3	I
4453.187	15	2	II	4474.071	300	125	II	4494.705	20		I
4453.614	10		I	4474.397	4		I	4494.965	20	15	II
4453.856	4		I	4474.845	200		I	4495.244	20	30	II
4454.144	30		I	4475.219	250	20	I	4495.490	20	2	II
4454.510	30	4	II	4475.760	40		I	4495.604	10		I
4454.748	8		I	4476.903	10	2	II	4496.318	200	200	II
4455.020	20	75	II	4477.040	4	2	II	4496.646	20		I
4455.278	20	10	II	4477.218	8		I	4496.749		2 w	II
4455.730	20	6	II	4477.471	4		I	4497.921	200	3	I
4455.859	80		I	4477.608	2		I	4498.151	10	1	I
4456.480	10		I	4478.413	30		I	4498.957	800	20	I
4456.678	10	25	II	4478.587	40		I	4499.399	150 w		I
4456.715	100		I	4478.782	10		I	4499.993	500	200	I
4457.071		15	II	4479.052	12		I	4500.578	30 h	2	I
4457.219	100		I	4479.164	20	20	II	4501.112	40	1	I
4458.002 i	600	20	I	4479.643	200		I	4501.284	4		I
4458.737	75		I	4480.284	10		I	4502.378	10		I
4459.531	80		I	4480.557	8		I	4503.008	8		I
4459.967	8		I	4480.818	300	75	II	4503.208	10		I
4460.196	8		I	4481.155		15	III	4504.277	20	1	I
4460.346	5	3 w	I	4481.192	15		I	4504.641	50	1	I
4461.083		100	II	4481.641	20	20	II	4505.221	400	15	I
4461.238	600		I	4482.169 i	300		I	4506.493	200	4	I
4461.508	50		I	4482.771	8		I	4507.434	30	1	I
4461.715	50	80	II	4482.903	2		I	4508.037	80		I
4462.490	4		I	4483.350	250	2	I	4508.146	30	12	II
4462.741	5		I	4484.054	75	100	II	4508.622	40	12	II
4463.067	8	10	II	4484.270	15	2	II	4508.841	4	3	II
4463.197	8	2	II	4484.614	6	1	I	4509.593	4	2	II
4463.674	75		I	4484.966	4		I	4509.971	20	2	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4510.526 i	800	500	II	4534.122	250	250	II	4554.425	10		I
4511.293	5		I	4534.407	10		I	4554.583	2		I
4511.872	4		I	4535.254 i	300	8	I	4554.687	2		I
4512.496	250	125	II	4535.987	30		I	4554.815	2		II
4513.232	200	2	I	4536.267	5		I	4555.523	10	200	II
4513.688	300	25	I	4536.425	5	50	II	4555.700		200	III
4514.047	20		I	4536.762	5		I	4555.813 i	500	4	I
4514.550	10		I	4536.872	5		I	4556.217	6		I
4515.121	300	6	I	4537.085	200	300	II	4556.366	8		I
4515.644	10		I	4537.760	4		I	4556.802	6	3	II
4515.981	250	200	II	4538.116	2		I	4557.056	2		I
4516.542	20		I	4538.279	1	1	II	4557.557	6		I
4517.040	50	4	II	4538.837	18	50	II	4558.349	150	2	I
4517.458	6		I	4539.232	6		I	4559.059	20	1	I
4517.658	10		I	4539.736	3		I	4559.313	10		I
4517.899	6		I	4540.408	75	200	II	4559.662	5		I
4518.170		200 w	III	4541.003	300		I	4559.799	2	2	II
4518.356	15		I	4541.359	3		I	4560.069	2	2	II
4518.641	40	30	II	4541.523	4		I	4560.166	3		I
4519.260	200	2	I	4541.621	4	35	II	4560.396	7		I
4519.750	150	12	II	4542.430	3	6	II	4560.668	6	3	II
4520.034	2	3	II	4542.750	4		I	4561.361	500	7	I
4520.919		30	II	4543.212	25	75	II	4562.088	100	3	I
4521.219	500	250	I	4543.421	30		I	4562.472	5	20 h	II
4521.732	40		I	4543.667	2		I	4563.282	300	500	II
4522.315	30		I	4543.865	6		I	4563.662	300	40	I
4522.784	50	100	II	4544.523	250	200	II	4564.186	20	60	II
4523.472	12		I	4544.896	10	4	II	4564.845	30		I
4524.143	30	1	I	4545.362	2		I	4565.797	25		I
4524.600	4	2	II	4545.452	2		I	4566.245	2	4	II
4524.854	30	40	II	4545.839		25	II	4566.660	25	35	II
4525.102	50	100	II	4545.917	350	4	I	4566.959	3		I
4525.444	10		I	4546.144	5	12	II	4567.249	160 h	2	I
4525.758	8		I	4546.700	25	20	II	4568.142	30		I
4526.044	15	10	II	4546.843	8		I	4568.525	12		I
4526.921	12		I	4547.098	70		I	4569.051	12	2	II
4527.182	3	5 w	II	4547.268	100		I	4569.155	10		I
4527.728	18	35	II	4547.938	2		I	4569.719	50		I
4528.034	30		I	4548.344	100	2	I	4570.972 i	500		I
4528.419	12	1	II	4548.983	10		I	4571.203	40		I
4528.977	12	15	II	4549.852	6		I	4571.533	12		I
4529.497	30	75	II	4550.184	3		I	4572.656	15		I
4529.933	10		I	4550.419	8	10	II	4572.953	4	1	II
4530.320	160	5	I	4550.451	8		I	4573.259	6		I
4530.648	5	4	II	4551.490	160	75	II	4573.709	200		I
4531.196	10		I	4551.731	2		I	4574.039	100		I
4531.706	100	200	II	4551.834	6		I	4574.308	50		I
4532.261	175	300	II	4552.158	250	3	I	4575.267	15	2	II
4533.080	150		I	4553.021	250	200	II	4575.507	50	5	I
4533.292	150	250	II	4553.850	50	75	II	4576.496	30 w		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4576.737	20		I	4599.718	15		I	4623.551	4		I
4577.126	10		I	4600.885	25 h	2	I	4623.897	15	100	II
4577.587	20		I	4601.383	8		I	4624.141	15	75	II
4577.841	40 d		I	4601.564	3		I	4624.310	15		I
4578.834	15		I	4601.969	4	5	II	4624.689	12		I
4579.019	15	2	II	4602.904	75	75	II	4625.044	30	125	II
4579.331	25	2	I	4603.160	175		I	4625.286	15		I
4579.839	40		I	4603.944	4	6	II	4625.503	18		I
4580.402	12		I	4604.133	2	3	II	4626.139	1	3	II
4580.765	10	2	II	4604.668	5	5	II	4626.648	8	35	II
4581.195	160	3	I	4605.233	6	25	II	4627.092	4	1	II
4581.582	50	10	II	4605.433	1		I	4627.299	125	1	I
4582.441	10	8	II	4605.839	7		I	4627.641	6	20	II
4582.536	4		I	4606.308	2	5 h	II	4627.876	5		I
4582.782	4	4	II	4606.515	100	75	II	4628.215	125	1	I
4583.080	6		I	4607.399	40		I	4628.568	30	20	II
4583.668	15	12	II	4607.683	10		I	4629.031	8	25	II
4583.886	10		I	4607.953	125	1	I	4629.355	20	50	II
4584.371	50	75	II	4608.630	75		I	4629.771	25	30	II
4584.662	20		I	4609.382	125	200	II	4630.351	5	40	II
4585.138	12 w		I	4609.872	75	150	II	4630.639	4	100 w	II
4585.414	1		I	4610.648	125	3	I	4631.035	8		I
4586.063	20	2	II	4611.873	200	150	II	4631.156	3 w		I
4586.279	20	75	II	4612.183	3	2	II	4631.761 i	300	250	II
4586.620	20	25	II	4612.558	200	50	II	4632.520	4		I
4587.219	5	4	II	4613.484	5	50	II	4633.772	300		I
4587.763	18	15	II	4613.624	125		I	4633.827		75	II
4588.218		100	III	4614.000	4	20	II	4635.408	5		I
4588.427 i	400	5	I	4614.185	5		I	4636.458	4 w		I
4589.122	100	400	II	4614.288	2	1	II	4636.767	2		I
4589.665	250	125	II	4615.034	125	2	I	4637.192	20		I
4591.070	2 w		I	4615.338	70	2	I	4638.135	60 h	2	I
4591.418	4		I	4615.654	10	1	I	4638.687	100		I
4591.591	3		I	4615.892	12		I	4639.090	3	40	II
4592.122	4	3	II	4616.454	15		I	4639.526	75		I
4592.283	5		I	4617.303	10		I	4639.709	100	200	II
4592.673	400	30	I	4617.916	12		I	4640.048	500	200	II
4593.286	20	100	II	4618.316	9		I	4641.232	250	150	II
4593.501		30	III	4618.932	7		I	4641.618	4 w		I
4593.649	150	20	I	4619.520	400	300	II	4642.048	15	20	II
4593.975	10	20	II	4620.248	50		I	4642.273	1		I
4595.420 i	600	30	I	4620.454	35		I	4642.590	1		I
4596.312	125 w	2	I	4620.721	12	12	II	4642.860	2 w		I
4596.986	2 w	2 w	II	4621.168	200	3	I	4643.563	80		I
4597.273	2 w		I	4621.660	10 w	2	I	4644.350	3	6	II
4597.904	4 s		I	4621.867	3		I	4644.712	200	3	I
4598.058	2		I	4622.110	20	4	I	4645.495	10	20	II
4598.438	20	1	I	4622.767	9		I	4646.151	4	4	II
4598.942	7		I	4623.119	10		I	4646.688	250	2	I
4599.353	5	4	II	4623.416	4	3	I	4647.256	200	2	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4647.938	20	5	II	4669.353	30	2 w	I	4694.090	400	500	II
4648.169	2		I	4669.684	20	1	I	4694.486	10		I
4648.366	8		I	4669.975	400	15	I	4694.898		125	III
4648.445	10		I	4670.930	75	2	I	4695.038	400		I
4648.865	4	51	II	4671.531	1		I	4695.457	175	4	I
4649.517	5		I	4671.735	2		I	4695.821	8	4	II
4649.977	60		I	4671.901	1	1	I	4696.685	30		I
4650.235	150		I	4672.443	75	10	II	4696.808	20 h	1	I
4650.627	15		I	4673.052	70		I	4697.190	8		I
4650.820	50	50	II	4673.661 i	600	20	I	4697.396		2	II
4650.934	50	30	II	4674.230	3		I	4697.597	9		I
4651.101	20		I	4674.774	10	3	II	4698.240	100	10	I
4651.555	500	300	II	4675.050	3		I	4698.764	50	100	II
4651.985	100	30	II	4675.373	80		I	4699.104	10	8	II
4652.407	3	2	II	4676.058	350	600 w	II	4699.466	5	5	II
4652.819	10	6	II	4676.489	10		I	4699.664	80	5	I
4653.080	3	21	II	4676.970	75	8	II	4700.141	200	200	II
4654.013	15		I	4678.234	100	15	II	4700.771	100		I
4655.032	50	2	I	4678.617	10	10	II	4700.955	20	20	II
4655.200	150	3	I	4679.015	10	10	II	4701.440	12 w		I
4655.724	1	3	II	4679.529	3 h		I	4701.854	40		I
4656.178	20	1	I	4679.599	6 w		I	4702.315	50	30	II
4656.552	20		I	4679.710	2	3	II	4702.603	10	3	II
4656.730	8	10	II	4680.244	150	1	I	4702.772	5		I
4657.336	6		I	4680.396	20		I	4703.202	25		I
4658.128	2		I	4680.647	250	40	I	4703.990 i	500	8	I
4658.385	30		I	4681.188	100	20	II	4704.499	5	4	II
4658.516	30	12	II	4682.242	175	5	I	4704.658	10	10	II
4658.720	2	10	II	4682.733	20		I	4704.933	3		I
4659.566	150	2	I	4683.385	250		I	4705.294	10	6	I
4660.392	100		I	4684.113	15	18	II	4705.765	400	500	II
4661.125	8		I	4684.373	10	1	I	4706.253	100	200	II
4661.405	12	100	II	4684.641	8		I	4706.572	20		I
4661.581	6		I	4684.813	3		I	4706.682	4		I
4661.716	3		I	4685.087	6		I	4707.041	15		I
4661.948	4		I	4685.511	20	30	II	4707.583	3	5	II
4662.215	2	2	II	4685.973		5	II	4707.786	20		I
4662.332	2		I	4686.194 i	400	3	I	4708.100	40	30	II
4662.593	7		I	4686.579	20	25	II	4708.287	175	80	I
4663.202 i	200	3	I	4688.303	15	15	II	4708.884	2		I
4664.308	2		I	4688.465	250		I	4709.354	6		I
4664.540	2	3	II	4689.200	200 d	300	II	4710.636	5		I
4664.796	6		I	4690.352	20	200	II	4710.987	20		I
4664.972	20		I	4690.642	120	100	I	4711.130	2	8	II
4665.711	20		I	4691.068	100	300	II	4711.411	40		I
4666.009	125	150	II	4691.637	150	4	I	4711.999	15		I
4666.518	75		I	4691.880	20	2	I	4712.457	500	125	I
4666.793	400	6	I	4692.486	2		I	4712.842	150	2	I
4668.172 i	700	10	I	4693.111	2	3 w	II	4713.798	20	10	II
4668.944	3		I	4693.535	3		I	4714.126	10	3	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4714.672	20		I	4734.758	4	3	II	4753.807	3	5	II
4714.860	4	10	II	4735.237	2	6	II	4754.199	3	6	II
4715.432	125	100	II	4735.346	6		I	4754.379	2		I
4716.014	100	30	II	4735.470	3		I	4754.933	8		I
4716.594	4	5	II	4735.723	2	6	II	4755.371	3		I
4716.859	12	2	II	4735.989	70		I	4755.630	1	3	II
4717.381	10		I	4736.228	10		I	4755.910	1		I
4718.049	25		I	4736.394	12	75	II	4756.545	25		I
4718.606	200	300	II	4736.515	10		I	4756.687	50	30	II
4719.252	12	7	II	4736.930	4		I	4756.880	1	2	II
4719.451	3		I	4737.644	20	75	II	4757.135	10	2	I
4719.694	20		I	4737.908	60		I	4757.405	12		I
4719.977	70	250	II	4738.460	10		I	4758.123	350 d	10	I
4720.155	18		I	4738.845	9		I	4758.741	12		I
4720.449	70		I	4739.109	15		I	4759.589	40	30	II
4720.781	40		I	4739.673	150	3	I	4759.679	40		I
4720.977	10	1	I	4739.875	25	75	II	4760.047	8	20	II
4721.274	150	1	I	4740.529	400	600	II	4761.111	400	500	II
4721.876		10	II	4740.934	100		I	4761.863	25	40	II
4722.088	250	5	I	4741.311	100	50	I	4762.518	10	8	II
4722.484	20		I	4742.118	75		I	4763.749	15	18	II
4722.954		10	III	4742.258	75	125	II	4763.900	2	2	II
4723.044		8	III	4742.564	100	2	I	4764.346	300	175	II
4723.441	400	400	II	4743.030	2		I	4765.603	100	100	I
4723.782	600	250	I	4743.127	3	3	II	4766.600 i	200	2	I
4724.133	5	7	II	4743.680	200	125	II	4766.946	12	20	II
4724.758	200	175	II	4744.276	3		I	4767.493	3	4	II
4725.345	7	7	I	4744.476	2	3	II	4768.066	50	20	II
4725.763	8 w		I	4744.652	5		I	4768.160	3	5	II
4725.944	15	15	II	4744.812	6		I	4768.760	10	15	II
4726.319	30	8	II	4745.315	100 d	3	I	4769.398		4	II
4726.468	125	60	II	4746.115	8		I	4769.540	25		I
4726.912	8	8	II	4746.370	10		I	4769.870	2		I
4727.443	5		I	4746.921	20	3	I	4770.416	50	2	I
4727.844	60	2	I	4747.408	7		I	4770.590	25		I
4728.136	125	5	I	4747.614	20	3	II	4770.775	8	40	II
4728.570	15		I	4747.981	2		I	4771.339	8	1	I
4729.112	250	150	I	4748.109	3		I	4771.504	4		I
4729.867	125	150	II	4748.406	20		I	4771.970	2	2	II
4730.087	20		I	4748.583	20	25	II	4773.100	30	20	II
4730.653	50		I	4749.188	200	10	I	4773.250	100		I
4730.876	6	4	II	4749.955	160	6	I	4774.270	100	500	II
4731.173	10	5	II	4750.500	2	1	I	4774.844	5		I
4731.614	3 w		I	4750.750	2	1	I	4775.072	4	8	II
4732.091	15		I	4751.110	2		I	4775.332	150	20	I
4732.659	20	100	II	4751.341	10	10	II	4775.798	150	1	I
4733.017	12	40	II	4751.861	10	10	II	4776.334	15		I
4733.511	2		I	4752.414 i	500	500	II	4776.786	20	75	II
4734.049	80		I	4753.240	3		I	4777.191	200	10	I
4734.629	4	3	II	4753.590	3		I	4777.649	10	40	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4778.297	300	10	I	4799.764	10	9	II	4822.016	30	100	III
4778.900	18	50	II	4800.178	100	75	II	4822.859	300	10	I
4779.596	100	50	I	4801.045	25	2	I	4823.195	75	75	II
4779.719	50		I	4801.334	7		I	4823.607	250	20	I
4780.439	100 h	2	I	4802.045	5 s		I	4823.995	200	10	I
4780.765	75	30	III	4802.428	3	4	II	4824.645	30	50	II
4781.288	25		I	4802.675	12	2	I	4825.042	25		I
4781.537	75		I	4803.488	75	500	II	4825.170	4		I
4781.623	20	25	II	4803.955	125	125	II	4825.553	6		I
4781.867	20		I	4804.531	3		I	4826.012	25	2	I
4782.230	6 w		I	4805.248	20	1	I	4826.378	10	30	II
4782.360	7		I	4805.575	18	20	II	4826.707	300	4	I
4782.761	180	125	II	4806.447	8		I	4827.580	2		I
4783.642	30	20	II	4806.680	20		I	4828.470	10	40	II
4783.870	150	40	I	4807.102	10	15	II	4828.645	15		I
4784.038	120		I	4808.133 i	350	12	I	4828.945	4	2	II
4784.921	125	50	II	4808.741	5		I	4829.181	1	1	II
4785.264	15	3	II	4809.619	300	4	I	4829.411	4	1	II
4785.755	15	4	II	4810.515	10	1	I	4829.809	50		I
4786.528	150	2	I	4810.889	3		I	4829.884	15	40	II
4786.712	75		I	4811.040	5		I	4830.387	8		I
4787.142	100		I	4811.367	4	10	II	4831.121	350	20	I
4787.374	18	30	II	4811.877	18	30	II	4831.603	200	18	I
4787.812	6	25	II	4812.019	12	10	II	4832.161	4		I
4788.690	75		I	4812.377	100		I	4832.443	8		I
4789.387 i	300	8	I	4812.503		100	III	4832.799	200	150	II
4789.907	3	8	II	4813.003	100	2	I	4833.157	150	3	I
4790.078	10		I	4813.727	200	3	I	4833.667	20		I
4790.439	20	20	II	4813.893	300	5	I	4833.831	18	5	II
4791.343	12	1	I	4814.684	18		I	4834.087	35		I
4791.510	30	2	I	4815.050	50		I	4834.527	3		I
4791.966	18		I	4815.490	4	3	II	4834.651	2		I
4792.895	6	2	I	4816.865	75	50	II	4834.793	3 s	2	I
4793.248	100		I	4817.018	75		I	4835.075	7		I
4793.648	5	20	II	4817.333	7	25	II	4835.310	2		I
4793.898	10		I	4817.450	7		I	4835.962	3		I
4794.174	2	4	II	4817.844	8	3	II	4836.071	3		I
4794.466	3		I	4818.110	3		I	4836.191	5	5	II
4795.619	10	4	II	4818.300	6		I	4836.699	5	5	II
4795.911	150	5	I	4818.650	300	400	II	4836.920	2	1	II
4796.253	20		I	4818.890	15		I	4837.259	9		I
4796.499	1	4	II	4819.021	10	10	II	4837.413	10		I
4796.641	2		I	4819.205	75		I	4837.699	10	30	II
4796.884	8		I	4819.553	50	1	I	4837.968	9		I
4797.497	125	80	I	4819.928	20 h	1	I	4838.067	4		I
4798.128	3		I	4820.477	75	1	I	4838.362	25	125	II
4798.603	8		I	4820.900	200	250	II	4838.570	5		I
4798.734	7		I	4821.289	30	75	II	4839.717	40	10	II
4799.000	2	1	II	4821.597	150		I	4840.481	125	100	II
4799.130	1	2	II	4821.850	5		I	4840.843 i	400	10	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4841.362		40	III	4861.708	50		I	4884.675	5	25	II
4842.171	60	5	I	4863.172 i	1000	500	II	4885.101	3		I
4842.561	2	3	II	4864.150	3		I	4885.286	4		I
4842.769	2		I	4864.421	15 w		I	4885.564	5	8	II
4843.041	20		I	4864.727	15 w		I	4885.782	3		I
4843.921	300		I	4865.477 i	350	20	I	4885.992	4	10	II
4844.171	200	300	II	4865.977	15	2	I	4886.135	5		I
4844.566	50	75	II	4866.594	18	8	II	4886.367	2		I
4844.757	12	30	II	4867.482	12		I	4886.870	10		I
4844.923	12		I	4867.740	2		I	4887.094	10	1	I
4845.163	100	1	I	4868.273	50	175	II	4887.435	1		I
4845.666	2		I	4868.533	30		I	4888.150	1	1	II
4845.929	25	25	II	4868.620	10		I	4888.375	3	4	II
4846.290	4 w	3	II	4868.875	100	7	I	4888.493	3	3	II
4846.347	20		I	4869.673	3		I	4888.731	3		I
4847.327	80	2	I	4870.133	2		I	4888.809	2		I
4847.915	2	6	II	4870.251	5		I	4889.099	3 w		I
4848.360	250	5	I	4870.953	4		I	4889.496	30	3 h	I
4849.043	75	400	II	4871.289	25		I	4889.861	18	15	II
4849.132	75		I	4871.540	1		I	4890.460	30		I
4849.424	10	40	II	4871.685	4		I	4891.035	30		I
4849.863	30		I	4872.028	8	2	II	4891.653	2		I
4850.017	10	12	II	4872.239	5		I	4891.934	3	8	II
4850.441	600	200	II	4872.913	300	60	I	4892.030	4		I
4851.671	7		I	4873.360	2	5	II	4892.283	6		I
4851.907	4	20	II	4874.370	200		I	4892.764	50	1	I
4852.856	200	9	I	4875.326	2		I	4893.451	80	12	I
4853.608	12		I	4875.678	2		I	4893.706	10		I
4853.807	2	2	II	4876.080	2	2	II	4893.925	2		I
4854.493	4		I	4876.243	20		I	4894.374	3	10	II
4854.636	2	3	II	4876.497	75	3	I	4894.526	2		I
4854.874	2		I	4876.998	125	500	II	4894.955 i	350	10	I
4855.367	10		I	4877.250	5		I	4895.660	25	50	II
4855.524	3		I	4877.505	2		I	4896.087	2		I
4855.700	1		I	4877.817	40	50	II	4896.258	2	3	II
4856.020	2		I	4878.012	75		I	4897.121	21		I
4856.276	10	4	II	4878.733 i	200	8	I	4897.591	15		I
4856.557	3		I	4879.147	18	20	II	4897.930	15	18	II
4856.963	5	4	II	4879.339	40	75	II	4898.451	300	300	II
4857.170	4	10	II	4879.500	5		I	4898.797	100	150	II
4857.534	50	2	I	4879.703	6	4	II	4899.230	200	701	II
4857.960	10		I	4880.197	40	60	II	4899.325	75		I
4858.091	40	150	II	4880.891	40 d		I	4899.932	8		II
4858.328	300	200	II	4881.210	50	3 w	I	4900.169	4	3	II
4860.057	8		I	4881.591	7		I	4900.740	3		I
4860.174	3		I	4881.861	30		I	4900.872	10	2	I
4860.265	3	70	III	4882.448	50	100	II	4901.344	2		I
4860.423	10	10	II	4882.891	3		I	4901.482	2		I
4860.728	3		I	4883.235	7	1	I	4901.606	5		I
4861.216	150	7	I	4884.533	30 d		I	4902.030	250	3	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4902.340	5	2	II	4923.700	5		I	4939.272	10	1	I
4902.610	40	2	I	4924.192	75		I	4939.642 i	350	100	I
4902.796	75	25	I	4924.252	20		I	4940.661	1		I
4903.063	20	3	I	4924.421	100	75	II	4940.910	10		I
4903.688	2		I	4924.807	9		I	4941.042	6	4	II
4903.812	2		I	4924.900	5		I	4941.420	12		I
4904.110	3		I	4925.006	60	150	II	4941.902	6	2	I
4904.371	3		I	4925.426	75	75	II	4942.614	1	3	I
4904.692	50	1	I	4925.800	25	25	II	4942.839	9	15	II
4905.254	2		I	4925.948	100	2	I	4943.071	140	5	I
4905.461	2		I	4926.254	25		I	4943.668	6	500	III
4905.600	4	6	II	4926.687	5		I	4944.150	1		I
4906.100	2	4	II	4926.946	5	20	II	4944.512	2		I
4906.698	8	2	II	4927.306	12		I	4944.778	4		I
4907.044	40		I	4927.600		20	III	4945.210	3	2	II
4907.208	150	4	I	4927.777	140		I	4945.471	140	3	I
4907.616	3	5	II	4928.240	6	10	II	4945.856	5	20	II
4908.017	4 w	6	II	4928.457	3	50	II	4946.111	3	2	I
4908.470	50		I	4928.668	10		I	4946.666	75	100	II
4908.997	4		I	4929.089	100	2	I	4947.022	2		I
4909.215	10	1	I	4929.371	5	12	II	4947.581	125	10	II
4909.694	7		I	4929.985	125	300	II	4948.107	4		I
4909.844	20		I	4930.530	2		I	4948.560	1		I
4910.162	150		I	4931.059	5		I	4948.972	3		I
4910.323	2	10 w	III	4931.150	1	1	II	4949.082	2		I
4910.800	175	2	I	4931.385	10	1	I	4949.221	2		I
4911.144	30	50	II	4931.970	1		I	4949.991	5	8	II
4911.390	150	75	II	4932.260	1		I	4950.248	75		I
4911.940	6		I	4932.344	4	2	II	4950.640	250	200	II
4912.045	18		I	4932.540	25	250	II	4951.397	5	10	II
4912.524	300	200	II	4933.018	6		I	4951.642	1		I
4913.479	20		I	4933.486	7		I	4951.839	5	12	II
4914.118	75	250	II	4933.558	4	75	III	4952.008	1		I
4915.418	50	1	I	4933.603	7		I	4952.350	1	1	I
4915.812	18		I	4933.850	100	80	II	4952.460	1		I
4916.132	8		I	4934.328	5		I	4952.700	12	2	II
4916.395	2 w		I	4934.539	10	40	II	4953.542	25	7	I
4917.470	10	100	III	4934.777	1		I	4953.948	20		I
4917.824	20		I	4934.963	1		I	4954.574	150	200	II
4917.983	2		I	4935.174	4	2	II	4954.669	150	200	II
4918.146	3	4	II	4935.430	1		I	4955.150	3		I
4918.376	3		I	4935.630	1		I	4955.320	4		I
4918.663	2		I	4935.928	12	1	I	4955.450	3		I
4919.760	1		I	4936.769	300	200	I	4955.726	4		I
4919.816 i	600	800	II	4937.363	4 w	4	II	4955.956	3	5	II
4920.534	200	10	II	4937.835	125	3	I	4956.659	20		I
4920.600	20		I	4938.202	7		I	4956.833	8	20	II
4921.615	400	200	II	4938.495	12		I	4957.302	30		I
4922.949	150	150	II	4938.590	6		I	4957.460	5		I
4923.425	4	6	II	4939.062	10	1	I	4958.102	75		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
4958.735	20	7	II	4978.230	15		I	4999.388	10		I
4958.820	2		I	4978.706	5		I	4999.948	150	200	II
4958.989	1	2	I	4978.986	8		I	5000.249	100		I
4959.353	20		I	4979.146	4	6	II	5000.732	10		I
4959.440	1	5	I	4979.558	15	2	I	5001.452	10	600 h	II
4959.548	3		I	4980.189	600		I	5002.097 i	400		I
4959.763	1	1	I	4980.768	50		I	5002.478	3		I
4960.461	200	60	II	4980.957	160	30	II	5002.578	5	10	II
4961.396	20		I	4981.241	15	5	II	5002.897	10		I
4961.742	200	5	I	4981.878	8		I	5003.377	5		I
4962.075	40	1	I	4982.480	300		I	5003.496		5	II
4962.478	3		I	4983.535	50	4	I	5003.599	75	10	I
4962.947	100	20	II	4984.668	8		I	5003.861	10	5	I
4963.204	100	80	II	4985.385	300	6	I	5004.018	8		I
4963.560	1	2	I	4985.950	100	4	I	5004.133	200	3	I
4963.771	100 w	40	I	4986.321	10		I	5005.081		400 h	III
4964.121	175	300	II	4987.152	250	700	II	5005.353	5		I
4964.250	10		I	4987.556	100		I	5005.990	12		I
4964.986	20		I	4988.250	1		I	5006.408	10		I
4965.742	250	4	I	4988.500	1		I	5006.820	2	4	II
4967.067	10	5	II	4988.620	2		I	5006.960	4		I
4967.341	9		I	4988.770	2		I	5007.377	7	30	II
4967.666	10		I	4989.310	200	3	I	5007.858	5		I
4968.400	4	2	II	4990.034	15	12	II	5008.194	75	200	II
4968.757	150	20	II	4990.460	4	3	II	5009.244	15		I
4969.132	30	20	II	4990.590	2		I	5009.453	10	8	I
4969.925	5		I	4991.200	10	1	I	5009.955	100	100	II
4970.060	300	125	II	4991.603	2		I	5010.423	35		I
4970.865	6	5	I	4991.910	1	3	II	5010.952	75		I
4971.190	4	2	I	4992.129	15		I	5011.484	75		I
4971.558	3		I	4992.384	5		I	5011.779	2		I
4972.184	300 d	200	I	4992.646	15		I	5011.870	1		I
4972.628	20	30	II	4993.140	1	2	I	5012.269	10		I
4972.763	50		I	4993.760	50		I	5012.730	1	2	II
4973.081	10	10	II	4993.908	12	200 w	II	5012.850	2		I
4973.401	125	200	II	4994.112	20		I	5013.170	12		I
4973.765	5	5	II	4994.568	10		I	5013.610	25	40	II
4974.299	4		I	4994.954	10 w	3	I	5014.192	12		I
4974.440	5		I	4995.301	10		I	5014.463	10		I
4974.673	5		I	4995.638	5		I	5014.769	30	20	II
4974.996	2	6	II	4995.799	6		I	5015.286	10		I
4975.100	30		I	4995.977	6		I	5015.903	400	300	II
4975.540	8 w	1	I	4996.238	5		I	5016.538	75		I
4975.685	10		I	4996.540	18		I	5017.255 i	500	500	II
4975.955	300	125	I	4996.882	5	4	I	5017.512	100		I
4976.603	160	100	I	4997.333	10	1	II	5017.755	20		I
4977.396	30		I	4997.674	100	75	II	5017.883	15		I
4977.531	4	1	I	4997.817	200	100	II	5018.055	100		I
4977.663	25		I	4999.106	15	18	II	5018.740	6		I
4978.032	10	40	II	4999.250	10		I	5018.880	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5019.337	200	300	II	5037.578	9		I	5058.370	100		I
5019.810	300	2	I	5037.703	2		I	5058.567	200	400	II
5020.550	100	200	II	5038.312	50	3	I	5058.904	6		I
5021.260	125	2	I	5038.420	12		I	5059.155	7		I
5021.755	12	40	II	5039.241	200	15	I	5059.400	2		I
5022.016	250		I	5039.538	75		I	5059.865	200	8	I
5022.176	20		I	5039.985	3		I	5061.226	300	400	II
5023.053	20	100	II	5040.569	20	8	II	5061.660	300	2	I
5023.130	15		I	5040.692	20		I	5062.501	15		I
5023.490	40		I	5041.124	100	4	I	5062.862		100	III
5023.716	200	1	I	5041.603	50		I	5062.939	250		I
5024.113	20	1	I	5042.194	10	18	II	5063.518	150	2	I
5024.320	1		I	5042.608	4	4	II	5064.031	150		I
5024.606	50	1	I	5043.108	5	6	II	5064.346	75	100	II
5025.135	3	5	II	5043.522	100	5	I	5064.613	160	3	I
5025.855	8	2	II	5044.060	2	2 h	II	5064.935	200	4	I
5026.100	2	5	II	5044.728	400	4	I	5065.194	200	4	I
5026.164	20 d		I	5044.958		300	III	5066.137	150	5	I
5026.231	2	5	II	5045.253	200	5	I	5066.788	200		I
5026.490	2		I	5045.528	1	2 h	II	5066.841		100	III
5026.980	5		I	5045.780	2	2	II	5067.150	50		I
5027.042	4		I	5046.362	100	3	I	5067.974 i	900	15	I
5027.120	2		I	5047.051	160	2	I	5068.853	15		I
5027.300	1	2	II	5047.431	100	100	II	5068.951	5	2	II
5027.670	20	3	I	5048.010	6	2	II	5069.085	10		I
5028.656 i	400	400	II	5048.946	35		I	5069.332	150	3	I
5029.013	150		I	5049.796 i	400	40	I	5069.850	1	1	II
5029.634	75	200	II	5050.795	200	5	I	5070.020	2		I
5029.903	300		I	5051.091	20		I	5070.452	10	1	I
5030.540	2	2	I	5051.356	12	75	II	5070.788	35	1	I
5030.630	3		I	5051.892	200	3	I	5070.941	1	2	II
5031.148	20		I	5052.177	7 w	18	II	5071.752	20	4	I
5031.324	10	10	II	5052.588	20 s		I	5071.870	3		I
5031.815	15		I	5052.850	5	2	II	5072.306	4	15	II
5031.938	6	3	II	5053.200	2		I	5072.634	30	125	II
5032.105	8		I	5053.324	3	5	II	5072.892	10		I
5032.376	5		I	5053.749	5		I	5073.095	10	75	II
5032.790	2		I	5053.881	3		I	5073.600	8	5	II
5033.016	5	1	I	5054.037	5		I	5073.987	25	12	II
5033.326	10		I	5054.630	3		I	5074.651	15		I
5033.900	15	30	II	5055.358	400	300	II	5075.467	75	175	II
5034.297	35	1	I	5055.754	7		I	5075.949	10		I
5034.650	2		I	5056.205	10		I	5076.144	4		I
5035.281		18	III	5056.324	5	10	II	5076.237	3	5	II
5035.327	30		I	5056.860	50	2	I	5076.582	12	50	II
5035.460	5		I	5057.080	2 w		I	5076.810	2		I
5035.916	2		I	5057.134	2		I	5077.195	2		I
5036.214	3		I	5057.604	1	2	II	5077.504	3		I
5036.734	50		I	5057.857	1	3	II	5077.670	2		I
5037.296	10	3	I	5057.990	75		I	5078.856	10		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5079.139	25	30	II	5099.752	2		I	5117.091		25	III
5079.932	25	4	I	5100.197	3	10	II	5117.295	100		I
5080.447	15	10	II	5100.617	200	2	I	5118.181	7		I
5080.770	1		I	5100.731		10	III	5118.284	5	3	II
5081.100	1	2	II	5101.120	175	2	I	5119.659	3	8	II
5081.450	150		I	5101.480	4		I	5119.860	10	1	I
5082.009	4		I	5101.789	8	1	I	5120.702	2 w	1	I
5082.032	2	8	II	5102.061	1	3	II	5120.980	1		I
5082.079	4		I	5102.402	5		I	5121.323	15		I
5082.622	30	2	I	5102.720	10	10	II	5121.600	2		I
5083.028	1		I	5103.769	25	150	II	5121.920	1 w		I
5083.160	1		I	5103.900	4		I	5122.226	2		I
5083.579	2		I	5104.262	2		I	5122.488	50	50	II
5084.033	5		I	5104.568	25	25	II	5122.893	5	30	II
5084.428	5		I	5105.127	2		I	5123.140	12		I
5084.520		600	III	5105.232	1		I	5123.196		75	III
5084.799	35		I	5105.544	5	5	II	5123.241	12		I
5084.990	150		I	5105.775	3	5	II	5124.243	15		I
5085.246	12	600	III	5106.015	2		I	5124.433	2	18	II
5085.844	10		I	5106.317	10	75	II	5124.677	4		I
5086.174	50		I	5106.668	18		I	5125.017	4 w		I
5086.829	15	2	II	5107.237	4	6	II	5125.493	125	5	I
5087.484	10	60	II	5107.803	3		I	5125.820	10		I
5087.722	1		I	5107.960	1		I	5125.950	150	2	I
5087.830	1		I	5108.404	2	800	III	5126.430	2	1	II
5088.311	10	3	II	5108.573	3		I	5126.651	2		I
5088.705	5	1	I	5109.008	3		I	5126.764	1		I
5089.215	30	50	II	5109.470	1		I	5126.885	2	15 w	II
5090.044	100	3	I	5109.737	30	2	I	5127.051	1	2	II
5090.554	50		I	5110.048	10		I	5128.080	2	2	II
5090.753	75	100	II	5110.222	6		I	5128.478	125	3	I
5091.343	1		I	5110.567	15		I	5128.716	1		I
5091.619	2		I	5110.859	150	250	II	5129.193	10		I
5092.253	1	1	I	5111.063	40		I	5129.549	15		I
5093.091	12	15	II	5111.280	100		I	5129.658	3		I
5093.283	5		I	5111.568	5	2	II	5129.843	15	40	II
5094.118	180	100	II	5111.667	4		I	5129.975	2		I
5094.545	5	2	II	5111.890	1		I	5130.230	30	2	I
5094.687	5		I	5112.753	4		I	5130.481	2		I
5095.062	350	175	II	5113.051	3		I	5130.796	10		I
5095.417	4	10	II	5113.293	25		I	5131.062	75	300	II
5095.628	2		I	5113.376	30	50	II	5131.476	4	12	II
5096.480	200	8	I	5113.890	1	2	II	5131.701	4		I
5096.788	5	5	II	5114.066	3		I	5131.994	15		I
5097.638	2		I	5115.044 i	250		I	5132.233	10	4	II
5098.046	200	125	II	5115.646	2	20 w	III	5132.488	2		I
5098.639	18	20	II	5116.035	25 h		I	5132.754	5		I
5098.916	40		I	5116.292	50	2	I	5132.864	2		I
5099.017	30		I	5116.612	7		I	5133.120	50	2	I
5099.390	2		I	5116.861	5		I	5133.734	5		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5134.026	2	1	II	5159.141	2	6	II	5177.082		15	III
5134.753	150	2	I	5159.450	8		I	5177.479	30		I
5135.228	2	4	II	5159.625	30		I	5177.627	150	2	I
5135.420	2		I	5159.744	15	4	I	5178.351	30		I
5135.587	3		I	5160.683	100	100	II	5178.478	75	2	I
5136.126	18	2	I	5160.715	500		I	5179.137	8	1	I
5136.390	2	1	I	5161.040	10		I	5179.350	12	1	I
5137.010	1		I	5161.282	8	2	I	5179.908	2		I
5137.480	7		I	5161.545	300	4	I	5179.992	2		I
5137.714	5		I	5162.364	20		I	5180.144	5		I
5138.090	2		I	5162.559	20	2	I	5180.732	75	2	I
5138.957	6		I	5162.691	10		I	5181.468	6	1	I
5140.116	5		I	5163.412		50	III	5181.567	6		I
5140.766	200		I	5163.456	300		I	5181.681	6		I
5141.268	5		I	5164.115	20		I	5182.010	30	40	II
5141.620	1		I	5164.201	8	1	I	5182.533	200	350	II
5141.960	1		I	5164.405	30 ^w	2	I	5183.103	20	5	I
5142.140	2		I	5164.978	15		I	5183.346	10	2	II
5142.627	3		I	5165.065	20		I	5183.989	200	200	II
5143.276	150	50	II	5165.607	40	5	I	5184.444	100		I
5143.918	200		I	5166.249	18		I	5184.725	125	50	II
5145.044	100		I	5166.662	40		I	5185.207	75	300	III
5145.660	3		I	5166.876	5	75	II	5185.895	12		I
5146.064	50		I	5166.910	30		I	5186.180	6 ^w		I
5147.140	5	2	II	5167.874	5	2	II	5186.417	75	10	I
5147.481	5	6	II	5168.010	5		I	5187.117		8	II
5148.221	75	300 ^h	II	5168.170	1	5	II	5187.160	75	10	II
5148.925	2		I	5168.402	25		I	5187.342	150		I
5149.220	50		I	5168.593	100		I	5187.455	120	30	I
5149.813	25		I	5168.920	75		I	5187.777	4		I
5150.714	20		I	5169.152	15	18	II	5187.948	8		I
5151.621	400	50	II	5169.680	5	1	I	5188.363	75	75	II
5151.871	10	15	II	5170.232	200	10	II	5188.718	5	5	I
5151.980	5		I	5170.900	1		I	5189.017	20		I
5152.440	1	1	II	5172.224	10		I	5189.676	100	250	II
5152.700	2		I	5172.477	20	4	I	5190.220	2		I
5152.965	2		I	5172.927	10	15	II	5190.380	3		I
5153.249	3		I	5173.260	5	2	II	5190.875	200	200	II
5153.529	15	30	II	5173.390	5	1	II	5191.719	2		I
5154.243 i	400	15	I	5173.684	100	1	I	5191.985	5		I
5154.897	15	12	II	5173.847	50		I	5192.183	2		I
5155.076	8		I	5174.241	75	75	II	5192.741	12		I
5155.345	2	3	II	5174.369	50		I	5192.977	2		I
5155.917	7	8	II	5174.582	1	2	II	5193.083	2	3	II
5156.268	7	1	I	5174.795	25		I	5193.180	2		I
5156.620	8	1	I	5175.055	3	20	II	5193.417	8		I
5157.006	2	2	II	5175.326	100	2	I	5193.566	10		I
5157.450	25		I	5175.914	100	3	I	5193.640	4		I
5157.568	2	3	II	5176.420	50		I	5193.835	75	75	II
5158.604 i	700	20	I	5176.961 i	400	15	I	5193.950	75		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5194.203	5 w	5	II	5212.344	18		I	5237.042	5		I
5194.457	250		I	5212.676	10		I	5237.235	7		I
5195.285	4	5	II	5213.349	300	3	I	5237.350	3		I
5195.815	400	3	I	5214.153	100	150	II	5237.621	70	300	II
5196.017	10	10	II	5214.814		400 w	III	5237.903	175	400	II
5196.441	8		I	5215.001	3		I	5238.808	300	3	I
5196.558	3		I	5215.518	2		I	5239.543	300	6	I
5196.864	2	3	II	5215.756	3		I	5240.183	300	300	II
5197.232	100		I	5216.584	300	250	II	5240.760	10	1	I
5197.580	4		I	5217.276	10		I	5241.183	25 w		I
5197.695	4	6	II	5218.522	150	150	II	5241.857	50	15	II
5197.992	1	2	II	5219.101	500	18	I	5242.080	100	125	II
5198.066	3		I	5219.960	12	10	II	5242.667	12		I
5198.807	400	200	II	5220.303	20		I	5243.104	3	1	I
5199.158	800	12	I	5220.699	100		I	5243.741	50		I
5199.295	75		I	5220.924	150	1	I	5243.835	30		I
5200.028	7	6	II	5221.215	4	5	II	5244.106	20	40	II
5200.205	2		I	5221.442	1	4	II	5244.603	40		I
5200.410	8	10	II	5221.617	3		I	5245.341	4		I
5201.325	10		I	5222.264	12	1	I	5245.696	7		I
5201.559	10	1	I	5222.752	10	1	I	5246.238	8	8	II
5202.016	50	1	I	5224.109	10	4	II	5247.193	300 d		I
5202.730	3		I	5224.714	5		I	5247.650	400	450	II
5203.081	2	6	II	5225.079	4	4	II	5248.474	20	5	II
5203.225	4		I	5225.583	30	30	II	5248.864	2	2	II
5203.844	150	4	I	5225.785	5		I	5248.967	2		I
5204.516	4		I	5225.961	3	4	II	5249.682	8	3	II
5204.993	50	18	II	5226.074	8		I	5249.880	2	2	II
5205.152	200		I	5226.534	25		I	5250.172	5		I
5205.549	25		I	5226.706	2		I	5250.866	15		I
5205.770	175	200	II	5227.634	8	20	II	5251.175	10		I
5206.086	20		I	5228.216	200	3	I	5251.352	15		I
5206.228	10		I	5228.987	60	2	I	5251.779	5		I
5206.492	100	100	II	5229.783	12		I	5251.918	3	5	II
5206.653	75	75	II	5230.001	3		I	5252.160	12		I
5206.791	50		I	5230.376	5	5	II	5252.278	3	3	II
5207.067	12		I	5231.160 i	900	20	I	5252.571	3		I
5207.474	20 s		I	5231.780	20 w	2	I	5252.760	20	100	II
5207.794	100	2	I	5232.015	200	80	II	5253.450	160	80	II
5208.090	4	1	I	5232.319	75		I	5253.682	10		I
5208.540	3		I	5233.209	350	400	II	5254.254	150	1	I
5208.754	2	3	II	5233.789	8		I	5254.897	2		I
5209.713	200	3	I	5234.111	75		I	5255.573	35		I
5210.172	6		I	5234.241	50	2	I	5255.958	30	125	II
5210.238	8		I	5234.808	8		I	5256.840	2		I
5210.400	7		I	5235.562	12		I	5257.046	10		I
5210.566	7	5	II	5235.709	2		I	5258.361 i	300	25	I
5210.848	10		I	5236.428	18	20	II	5259.137	10	1	I
5211.234	400		I	5236.749	15	15	II	5259.595	10	2	II
5211.587	30	18	II	5236.948	8		I	5259.788	70	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5260.101	200	3	I	5282.773	9	1	I	5306.710	3 h		I
5260.868	10	25	II	5283.191	3		I	5306.990	75		I
5261.184	10		I	5283.326	3		I	5307.459	300	400	II
5261.477	100	2	I	5283.668	50		I	5308.148	10	20	II
5262.014	4		I	5284.536	60	100	II	5308.320	15		I
5262.604	75		I	5285.149	3		I	5308.430	30	30	II
5263.114	5	8	II	5286.135	3		I	5308.750	4 w		I
5263.472	12		I	5286.502	10		I	5309.612	75	75	II
5263.898	12		I	5287.169	8 h		I	5309.724	50		I
5264.110	2		I	5287.955	6		I	5310.254	350	300	II
5264.323	10		I	5288.960	3		I	5310.865	30	25	II
5264.961	40	100	II	5289.613	50		I	5311.171	8		I
5265.742	10		I	5289.894	75	50	II	5312.001	400	20	I
5266.701	200	5	I	5290.475	10		I	5312.531	300	10	I
5267.021	40	4	I	5290.651	8	3	I	5312.901	300	7	I
5267.346	12	25	II	5291.124	2	3	II	5313.604	20	75	II
5267.690	4		I	5291.377	10		I	5314.203	30	1	I
5268.736	10	10	II	5291.812	300		I	5314.414	10	10	II
5268.940	10	12	II	5291.895		40	III	5314.607	10 w		I
5269.364		12	II	5292.341	10		I	5315.230	100	2	I
5269.784	50		I	5292.928	12	40	II	5315.618	2	1	II
5270.742	3	12	II	5293.122	15		I	5315.754		2	II
5270.823	8		I	5293.441	2		I	5315.828	4		I
5271.005	8		I	5294.071	15		I	5316.323	1	1	I
5271.597	8	12	II	5294.391	200	3	I	5316.793	10	2 w	II
5272.641	50	100	II	5294.745	75 w	3	I	5317.494	300	6	I
5272.930	50	3	I	5295.089	40		I	5318.111	75		I
5273.126	125	2	I	5295.605	2	4	II	5318.418	125	100	II
5273.517	5		I	5295.652	125 w		I	5319.514	7		I
5274.113	150	3	I	5296.272	200	4	I	5319.771	7 w		I
5274.384	75	2	I	5296.683	5	15	II	5320.097	301	2	I
5274.943	8		I	5296.812	50		I	5320.493	2	3	II
5275.449	10	5	II	5297.416	75	2	I	5320.768	50	25	I
5275.778	7	4	I	5297.743	250	10	I	5320.977	3	5	II
5276.049	3		I	5298.277	200	2	I	5321.282	20	20	II
5276.404	75	50	II	5298.50	50	1	I	5321.657	2		I
5277.179	100	200	II	5299.464	6		I	5322.429	10	30 w	II
5277.500 i	400	400	II	5300.519	250	2	I	5322.866		5	II
5278.178	10	4	II	5301.405	100	400	II	5322.894	150		I
5278.368	8	3	II	5302.046	8 d		I	5323.397	25	1	I
5278.706	8		I	5303.054	75	75	II	5323.859	10		I
5279.191	30	1	I	5303.171	50		I	5324.057	8	10	II
5280.078	100	125	II	5303.330	30		I	5324.642	40		I
5280.333	75	5	I	5303.480	200		I	5325.142	300	600	II
5280.492	15		I	5303.873	5		I	5325.426	125		I
5281.066	150		I	5304.626	100	200	II	5326.274	200	4	I
5281.940	10		I	5305.570	100	200	II	5326.976 i	400	30	I
5282.168	8		I	5305.736	30		I	5328.333	6	12	II
5282.389	75	2	I	5306.280	25		I	5328.677	2		I
5282.538	6	1	I	5306.584	3 h		I	5328.826	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5329.376	75	150 w	II	5349.002	75	1	I	5371.980	5		I
5329.461	40		I	5349.698	3		I	5372.445	18	10	I
5329.747	75	40	II	5350.208	10		I	5372.696	200	2	I
5330.067	150	2	I	5350.490		6	II	5372.945	20	20	I
5330.503	4		I	5350.536	15		I	5373.205	6	15	II
5330.855	25		I	5351.133	20	6	I	5373.396	10		I
5331.204	2	2 w	II	5351.838	75	2	I	5374.827	400	20	I
5331.474	5		I	5351.970	10		I	5375.354	200	200	II
5331.743	30	1	I	5352.309	12	2	II	5375.773	300	400	II
5332.229	10		I	5353.017	125	18	I	5376.062		400	III
5332.590	1		I	5353.705	12 s		I	5376.776	200	50	II
5333.172	10	10	II	5353.985	15	30	II	5377.360	4		I
5333.404	20		I	5354.612	15		I	5377.976	10		I
5333.652	10	2	II	5354.730	2	3 w	II	5378.170	30	1	I
5333.806	9		I	5355.643	125	2	I	5378.840	100	12	I
5334.134	15	1	I	5356.153	8	4	II	5379.121	200	3	I
5334.293	4		I	5356.463	9	8	II	5379.391		2	II
5334.530	3		I	5356.673	8		I	5379.672	4	4	II
5334.938	2		I	5357.684	6		I	5379.878	4		I
5335.373	10	1	I	5357.756	6		I	5380.207	10	25	II
5335.604	9	1	I	5358.101	2		I	5381.347	40 w	1	I
5336.304	6 w		I	5358.712	175	10	I	5381.521	15		I
5336.790	30		I	5359.244	4		I	5382.204	30 w	1	I
5337.020	200		I	5359.436	2		I	5382.930	250	150	II
5337.083		100	III	5359.839	100	2	I	5384.038	100	20	I
5337.714	2		I	5360.159	250	3	I	5384.302	75	4	I
5338.222	40		I	5360.686	3		I	5385.727	8	10	II
5338.357	30		I	5361.014	10	8	II	5386.128	15		I
5338.632	15		I	5361.155	40		I	5386.432		20	II
5339.618	6		I	5361.415	50	200	II	5386.611 i	300	10	I
5339.921	40	15	II	5361.930	10		I	5386.778		12	II
5340.494	125	7	I	5362.258	20	20	II	5387.151	15		I
5341.198	25	1	I	5362.572	125		I	5387.319	10		I
5341.719	8 w		I	5363.095	10		I	5387.815	75	2	I
5342.331	5 w	2	II	5363.593	75	75	II	5388.056	150	4	I
5342.552	6		I	5363.898	6		I	5388.909	15	18	II
5342.694	4		I	5364.181	10	50	II	5389.130	10	12	II
5342.798	3		I	5364.396	6	10	II	5389.451	25	30	II
5343.276		30	III	5364.635	15		I	5390.174	12	20	II
5343.581 i	500	30	I	5365.490	10	3	II	5390.464	500	350	II
5344.240	20	40	II	5366.712	20	1	I	5391.083	40	20	I
5344.566	7	30	II	5367.212	8 w		I	5391.639	2		I
5345.307	300	350	II	5368.284	3		I	5392.580	400	250	II
5346.384	75	50	II	5368.468	10		I	5392.874	3		I
5346.771	12		I	5369.190	50	125	II	5393.118	2	40	II
5347.041	75	350	II	5369.290	200		I	5393.967	300	3	I
5347.428	12		I	5369.450	100		I	5394.765	400	8	I
5347.54	8		I	5369.919	20 h		I	5395.214	5		I
5347.973	100	2	I	5370.720	50		I	5396.103	50		I
5348.309	15		I	5371.133	20 i		I	5396.424	4		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5396.543	5	10	II	5422.725	5		I	5444.987	2		I
5397.454	5		I	5422.901	5		I	5445.162	1		I
5397.888	18		I	5423.475	30		I	5445.282	1		I
5398.217	60		I	5424.045	180		I	5446.018	5	20	II
5398.710	125	1	I	5424.118		200	III	5446.329	2		I
5398.913	200	20	I	5424.729	20		I	5446.807	3		I
5399.174	200	3	I	5425.678 i	250	500	II	5447.003		150 w	III
5399.615	100	1	I	5426.165	6		I	5447.297	15	2	II
5400.144	125	3	I	5426.399	25		I	5448.269	10		I
5400.783	9	3	I	5426.612	4		I	5448.958	5		I
5401.552	15		I	5427.477	2		I	5449.470	150	300	II
5402.280	10	1	I	5427.616	5		I	5449.872	6	18	II
5403.210	300	3	I	5427.758	1		I	5450.136	2		I
5403.660	4		I	5427.895	10	15	II	5450.508	4		I
5404.706	5		I	5428.041	5	6	II	5450.664	5	1	I
5405.214	8	3	I	5428.191	1		I	5450.874	1		I
5406.331	10	20	II	5429.106	40	1	I	5451.075	5		I
5406.758	25		I	5430.118	3	1	I	5452.219 i	250	10	I
5407.063	1	3	I	5430.591	6		I	5452.308		4	II
5407.654 i	200	18	I	5431.112 i	300	40	I	5452.790	4		I
5408.759	6		I	5431.593	5		I	5453.068	2		I
5408.858	5		I	5431.752	5	12	II	5453.294	2	2	II
5409.295	1		I	5432.558	1	2	II	5453.548	6	1	I
5410.292	9		I	5432.763	18	18	II	5453.808	1		I
5410.761	180	8	I	5433.126	4		I	5453.967	2		I
5411.302	2		I	5433.294	10	12	II	5454.596	1		I
5411.610	1		I	5433.689	75	100	II	5454.899	2		I
5411.828	1		I	5433.870	5		I	5455.141	40	3	I
5412.056	2	80 w	III	5434.149	125		I	5456.245	10	2	II
5412.690	2		I	5435.119	100	200	II	5456.645	2		I
5412.812	10	25	II	5435.881	400	500	II	5456.965	1		I
5413.253	1		I	5436.220	5		I	5457.285	30	2	I
5413.806	15	25	II	5436.484	40	150	II	5458.089	5	75	II
5413.935	10		I	5437.380	200	250	II	5458.244	4		I
5414.065	5		I	5438.124	40	1	I	5458.401	2		I
5414.538	15	20	II	5438.660	2	1	I	5458.620	1		I
5415.462	300	700	II	5439.002	2	1	I	5458.787	1	600	III
5417.486 i	200	18	I	5439.848	50	3	I	5459.174	5		I
5417.818	50		I	5440.260	2		I	5460.116	2		I
5418.076	5		I	5440.597	75		I	5460.351	2	2	II
5418.210	6	1	I	5441.033	15		I	5460.744	6		I
5419.118	50	2	I	5441.208	75		I	5461.015	1		I
5419.484	2		I	5441.283		12	II	5461.155	4	3	II
5419.653	2	3	II	5442.383	7		I	5461.737	75	250	II
5420.227	4		I	5443.113	300	20	II	5462.340	30		I
5420.439	2		I	5443.566	4	8	II	5462.610	100	250	II
5421.221	6	10	II	5443.839	6		I	5463.309	15	2	I
5421.667	30		I	5444.401	1		I	5463.768	10	2	II
5421.835	75	80	II	5444.473	3 s		I	5464.210	75	3	I
5422.089	5		I	5444.790	3	1	I	5464.754	4	4	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
5465.050	2 w	I	5488.629	75	75 II	5509.081	3	I
5465.321	9	I	5488.911	40	50 II	5509.994 i	300	20 I
5466.012	1	I	5489.069	40	I	5510.366	5	I
5466.252	5	2 II	5489.585	2	15 II	5510.480	5	I
5466.818	4	2 II	5490.045	2	I	5510.666	30	150 II
5467.155	12	2 II	5490.254	2	I	5511.029	15	I
5468.733	5	15 II	5491.276	4	I	5511.704	1	1 I
5469.190	5	1 I	5491.522	5	20 II	5512.152	12	3 II
5469.584	1	I	5492.041	2	10 II	5512.687	10	4 II
5470.142	20	2 I	5492.071	5	I	5513.079	1	I
5470.757	100	3 I	5492.322		9 II	5513.384	1	I
5471.381	10	100 II	5492.385	75	8 I	5513.858	3	18 II
5471.771	1	I	5492.638	100	5 I	5514.106	2	I
5472.060	2	I	5493.190	75	2 I	5514.874	160	5 I
5472.534	5	I	5493.587	3	I	5515.824	2	I
5472.694	2	I	5493.925		2 w II	5516.113	1	I
5473.405	10	18 II	5494.321	75	I	5516.494	9	I
5473.840	2	I	5494.543	50	75 II	5516.742	1	I
5474.747	50	I	5495.815	25	75 II	5517.437	1	I
5474.865	75	90 II	5496.133	80	2 I	5517.602	1	I
5475.758	2	I	5497.338	1	3 II	5517.784	5	12 II
5476.485	6	I	5497.749	5	15 II	5518.156	1	I
5477.047	12	25 II	5497.996	5	I	5518.269	2	3 II
5477.53	12	I	5498.344	1	I	5518.990	160	25 II
5478.752	7	I	5499.255 i	250	20 I	5519.222	30	I
5479.074	75	5 I	5499.631	75	3 I	5520.240	2	I
5479.490	1	I	5500.021	5	150 w III	5520.311	2	18 II
5479.696	5	9 II	5500.226	9	I	5520.340	4	I
5480.141	1	I	5500.448	1	I	5520.725	10	2 I
5480.403	2	I	5501.279	75	2 I	5520.944	1	I
5480.863	40	30 II	5501.521	3	15 II	5521.747	100	5 I
5481.463	20	3 II	5501.695	2	1 I	5522.118	1	I
5481.952	5	I	5501.931	25	75 II	5522.598	2	I
5482.408	6	I	5502.434	2	I	5523.159	5	I
5482.490	6	I	5502.588	1	I	5523.279	1	I
5482.909	2	I	5502.704	2	I	5523.420	3	10 II
5483.143	5	4 II	5502.883	1	I	5523.548	1	I
5483.609	1	I	5503.028	3	I	5523.673	2	I
5484.125	75	250 II	5503.372	2	I	5524.217	40	175 II
5484.529	40	I	5503.598	1	I	5524.579	100	25 I
5484.964	10	I	5504.297	160	30 I	5525.142	10	I
5485.422	2	I	5504.961	2	5 II	5526.087	1	I
5485.714	1	1 I	5505.338	2	I	5526.293	2 w	I
5486.043	12	2 I	5505.930	2	I	5526.509	25	15 II
5486.156	10	I	5506.084	2	I	5527.281	75	2 I
5486.919	10	50 II	5506.903	50	2 I	5528.003	10	75 II
5487.493	10	I	5507.531	50	1 I	5528.221	75	I
5487.833	7	I	5507.932	35	40 II	5528.709	5	2 I
5487.964	5	I	5508.548	75	2 I	5529.085	30	2 I
5488.328	1	I	5508.886	2	I	5529.650	2	10 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5529.770	4	15	II	5551.728	6	2	I	5577.094	1		I
5530.063	15		I	5552.086	2		I	5577.228	1		I
5530.683	30	50	II	5552.608	50	2	I	5577.487	4	25	II
5531.565	7	1	I	5553.397	5	1	I	5577.600	5		I
5532.166	4	20	II	5554.499	10	1	I	5577.889	7	60	II
5532.308	8		I	5554.672	2		I	5578.457	2		I
5532.748	1 w		I	5555.092	1	1	I	5579.359 i	300	20	I
5533.126	15	25	II	5555.524	75	2	I	5580.062	20	2	I
5533.168	10		I	5555.817	5		I	5580.393	15	1	I
5533.584	1	1	I	5556.142	25	20	II	5580.747	75	4	I
5533.957	4		I	5557.041	200	12	I	5581.273	12	50	II
5534.418	2		I	5557.296	50	175	II	5581.666	3		I
5534.564	3	2	I	5557.908	8		I	5581.849	2		I
5535.215	2		I	5558.343 i	400	50	I	5581.953	1		I
5535.401	1		I	5558.820	40	2	I	5582.359	75	2	I
5535.680	1		I	5559.126	4	3	II	5582.671	20	2	I
5535.954	15		I	5559.884	60	3	I	5582.849	40		I
5536.326	10 l		I	5560.038		5	II	5583.058	2	4	II
5536.967	15		I	5560.532		8 w	II	5583.760	75	200	II
5537.120	75	150	II	5560.576	10 d		I	5584.150	10	10	II
5537.534	25		I	5561.177	2		I	5584.397	1		I
5537.819	2		I	5561.602	7		I	5585.086	3	4	II
5538.490	20	25	II	5561.846	1		I	5585.594	2	12	II
5538.597	50		I	5562.161	5		I	5585.850	3		I
5539.262 i	400	20	I	5562.638	2		I	5586.466	50 w	20	II
5539.902	200	500	II	5562.849	2		I	5587.027 i	500	30	I
5541.125	40 l		I	5563.359	5	2	II	5587.720	40	400	II
5541.565	15	1	I	5564.190	125	400 -	II	5587.847	15		I
5541.921	25	2	I	5564.338	40	100	II	5588.872	100		I
5542.743		50	III	5564.783	6		I	5589.303	4		I
5542.876	160	8	I	5564.993	20	75	II	5589.654	5	30	II
5543.358	2	4	II	5566.144	2		I	5590.208	18	2	I
5543.458	2		I	5566.702	2	3	II	5590.573	10		I
5544.245	2	4	II	5567.390	6	30	II	5591.325	7		I
5544.374	2	3	II	5568.001	300	250	II	5591.889	15	1	I
5545.041	3	4	II	5568.519	10		I	5592.310	5	10	II
5545.304	4	1	I	5568.828	9		I	5592.491	3	4	II
5545.791	6		I	5569.047	3		I	5592.794	5	3	II
5546.104	80	25	I	5569.241	1		I	5593.275	15	20	II
5546.469	4	10	II	5571.197	300	18	I	5593.615	100	200	II
5546.601	3		I	5572.097	40		I	5594.157	7		I
5547.125	25	2	I	5572.470	140	12	I	5594.572	7	50	II
5547.625	6	1	II	5573.354 i	350	20	I	5595.069	200	25	I
5548.176 i	300	40	I	5573.844	10	40	II	5595.607	30		I
5548.519	5	20	II	5574.440	1		I	5595.828	15		I
5549.322	2		I	5574.899	15	15	II	5595.949	50	2	I
5549.948	5		I	5575.303	2		I	5596.092	3	10	II
5550.654	3		I	5575.586	1		I	5596.812	4		I
5551.182	20		I	5575.981	40	2	I	5597.005	1 l		I
5551.357	125	300	II	5576.207	100	5	I	5597.358	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
5597.608	2	I	5618.595	5	I	5643.337	5	I
5598.070	2 w	I	5618.990	50	I	5643.928	7	I
5598.392	1	I	5619.702	10	I	5645.528	40	I
5599.285	15	30 II	5619.980	125	I	5645.670	75	100 I
5599.640	50	I	5620.925	12	30 II	5645.884	150	300 II
5599.787	2	3 II	5621.279	10	I	5646.448	30	I
5600.251	1	I	5621.783	10	3 II	5647.076	1	I
5600.341	3	I	5622.072	12	150 II	5647.697	12	I
5600.514	1	I	5623.548	30	I	5648.443	6	I
5601.125	2	4 II	5623.980	1	I	5648.849	40	50 II
5601.595	150	4 I	5624.145	3	5 II	5648.988	75	5 II
5602.241	7	I	5624.906	50	I	5649.261	15	8 II
5602.608	10	I	5626.055	12	50 II	5649.679	9	1 I
5602.854	75	2 I	5626.246	5	15 II	5650.004	5	I
5603.520	1	I	5626.405	3	I	5650.340	75	5 I
5603.746	9	I	5626.732	40	125 II	5650.800	1	1 I
5604.512	400	300 II	5627.492	12	2 I	5651.317	3	I
5605.213		50 III	5628.342	4	I	5651.443	1	2 II
5605.279	60	I	5628.594	4	20 II	5651.876	2	1 II
5606.379	75	I	5629.308	30	2 I	5652.159	1	5 II
5606.514	10	15 II	5629.848	20	3 I	5652.900	100	350 II
5606.795	75	2 I	5630.296	60	6 I	5654.010	100	100 II
5607.065	2	I	5630.410	20	40 II	5654.512	50	3 I
5607.184	12	I	5630.912	5	3 II	5655.739	3	3 I
5607.622	1 w	I	5631.098	1	3 I	5655.885	3	1 I
5608.080	4	6 II	5632.029	15	40 II	5656.298	51	1 I
5608.545	3	8 II	5632.121	20	I	5656.724	10	I
5608.748	6	I	5632.491	10	I	5657.177	20	40 II
5609.296	5	20 II	5632.781	25	I	5657.632	10	I
5609.576	75	3 I	5632.876	50	50 II	5657.926 i	100	12 I
5610.116	125	3 I	5633.293	75	2 I	5658.676	4	I
5610.249	100	3 I	5633.626	20	30 II	5659.194	4	I
5610.673	160	8 I	5634.081	5	I	5659.468	1	I
5611.071	6 w	1 II	5634.210	5	10 II	5660.006	101	18 II
5612.073	100	10 I	5634.603	5	I	5660.652	18	1 I
5612.604	40	1 I	5634.845	4	2 II	5661.384	1	I
5613.646	5	1 I	5635.163	4	I	5661.685	1	I
5614.416	1	I	5635.877	75	2 I	5662.018	4	1 I
5614.500	2	2 II	5637.272	2	I	5662.376	6	I
5615.320 i	350	12 I	5637.606	1	1 I	5662.649	1	I
5615.684	75	200 II	5637.946	2	I	5663.027	50	1 h I
5616.083	2	I	5638.156	1	I	5663.360		5 w II
5616.323	5	I	5639.746 i	250	400 II	5663.964	5	I
5616.493	4	I	5640.064	40	50 II	5664.236	5	I
5616.678	20	I	5640.365	15	I	5664.619	50	10 II
5616.934	1	I	5640.718	18	15 II	5665.180	140	I
5617.279	12	2 II	5641.242	10	5 II	5665.619	125	300 II
5617.633	15	I	5641.560	30	1 I	5666.395	10	300 w II
5617.966	1	1 I	5641.728	125	4 I	5667.121	125	I
5618.143	4	4 w II	5643.104	12	1 I	5668.021	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5668.329	12	18	II	5694.040	6	1	I	5719.631	200	20	I
5668.897	3 w	5	II	5694.410	6		I	5720.197	400	100	I
5669.830	7		I	5694.760	1	1	II	5721.413	30	2	I
5670.245	2		I	5695.112	7	1	I	5721.688	2	3	II
5670.658	4	6	II	5695.685	1	2	I	5722.232	1 w		I
5671.054	15	1	I	5696.373	50	3	I	5722.734	1 w		I
5671.219	3	1	I	5697.072	6	1	II	5723.527	9	1	I
5671.482	5		I	5697.384	1 w	1	I	5724.235	75	4	I
5672.725	2	2	II	5698.280	50	2	I	5724.452	100	1	I
5672.812	2		I	5698.530	50	3	II	5725.027	50	75	II
5672.974	2		I	5699.194	4	6	II	5725.389 i	250	30	I
5673.127	1		I	5699.350	6	18	II	5725.603		50	III
5673.196	1	1	I	5700.453	200	75	II	5727.010	30	2	I
5673.828	50		I	5700.687	40	75	II	5727.700	75	3	II
5674.159	2	2	II	5700.902	150	300	II	5728.454	1	1	I
5674.454	6	1	I	5702.006	5		I	5729.105	5		I
5674.688	5		I	5702.638	15	1 w	I	5729.391	1		I
5674.980	120	25	I	5703.250	4		I	5729.985	75	5	I
5675.476	12		I	5703.916	15	2	II	5730.758	1	1	I
5676.754	1	2	II	5704.539	3		I	5731.464	4	12	II
5677.034	125	3	I	5705.164	2		I	5731.607	6		I
5678.324	2		I	5705.624	15		I	5732.037	5	10	II
5678.538	1	2	II	5706.128	3		I	5732.323	5		I
5678.598	1		I	5707.103 i	150	300	II	5732.987	200	500	II
5678.972	75	50 w	II	5708.650	15		I	5733.885	7		I
5680.187	4		I	5709.080	1		I	5734.152	6		I
5680.886	5		I	5709.674	1		I	5734.542	3	2	II
5681.229	10	20	II	5711.076	10		I	5734.872	1	1	II
5681.760	1	1	I	5711.989	15	2	I	5735.300	3	1	II
5682.002	1	1	I	5712.240	2		I	5736.033	75	5 w	I
5682.218	1		I	5712.575	15	20	II	5737.360	2	2	II
5682.414	2	8	II	5712.973	1		I	5737.644	1		I
5682.822	2		I	5713.141	3		I	5738.287	40	75	II
5683.465	6	1	II	5713.326	1		I	5738.960	15		I
5683.931	6	1	II	5713.504	1	2	II	5739.676	1		I
5684.136	1	1	I	5713.962	5		I	5739.824	1		I
5685.171	150	2	I	5714.883	1		I	5740.045	2		I
5685.810	1	1	I	5714.974	1		I	5740.190	1		I
5686.852	6	1	I	5715.431		700	III	5740.628	1		I
5687.326	25		I	5715.719	10		I	5740.862		500 w	III
5687.661	5	25	II	5715.934	1		I	5741.178	50	75	II
5688.900	12	20	II	5716.399	1		I	5741.837	50	2	I
5689.624	5		I	5716.800	6		I	5742.088	200	20	II
5690.104	10	5	II	5717.158	25	15	I	5742.651	7	10	II
5690.674	20		I	5717.512	9		I	5743.054	9		I
5691.073	15	20	II	5718.102	6		I	5743.281	1	2	II
5691.610	25		I	5718.387	2		I	5743.578	2		I
5692.131	7	2	II	5718.516	2		I	5744.699	1		I
5692.838	6	12	II	5718.855	6		I	5745.227	2		I
5693.544	2		I	5719.091	7		I	5745.678	40	300	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
5746.514	2 w	I	5768.626	5	I	5790.121	2	5 II
5747.201	30	1 I	5769.675	40	200 II	5790.591	31	I
5747.391	40	I	5770.131	50	100 II	5791.031	10	I
5747.545	7	15 II	5770.468	7	I	5791.320	1	I
5748.333	50	2 I	5770.836	10	I	5791.706	50	2 I
5748.755	150	4 I	5771.146	5	30 II	5792.433	150	I
5749.395	100	300 II	5771.759	50	1 I	5792.475		10 II
5749.616		60 III	5771.941	15	I	5792.983	10	I
5749.774	75	I	5772.547	6	5 I	5793.202	5	10 II
5750.262	15	15 II	5773.206	2	4 I	5794.377	15	75 II
5750.565	15	30 II	5773.951	150	4 I	5794.870	12	I
5751.168	2	5 II	5774.721	4	I	5795.967		30 II
5751.433	6	I	5774.976	2	I	5796.081	150	5 I
5751.612	9	I	5775.062	1	3 II	5796.424	75	125 II
5752.309	3	5 II	5775.616	5	1 I	5797.015	3	I
5752.581	2 w	I	5776.167	40	2 I	5797.319	50	2 I
5753.040	100	4 I	5776.573	2	I	5798.478	40	I
5753.992	1	I	5777.100	6	10 II	5798.761	6	1 I
5754.555	15	40 II	5777.397	75	2 I	5798.891		4 w II
5754.741	9	I	5777.837	5	I	5799.140	7	I
5754.838	3	I	5778.077	6	50 II	5799.434	2	I
5755.055	2	5 II	5778.470	4	2 I	5799.817	3 w	I
5755.717	10	I	5778.583	6	I	5800.125	1	I
5755.968	1	I	5779.411	10	1 I	5800.840	175	15 I
5757.108	10	18 II	5779.825	50	I	5801.561	6	I
5757.569	3	2 II	5780.149	1	I	5802.231	10	30 II
5757.654	5	4 II	5781.173	4	40 II	5802.377	5	I
5758.092	4 w	I	5781.649	75	2 I	5802.837	9	I
5758.486	2	I	5782.043	4	15 II	5803.201	4	8 II
5758.728	1	I	5782.284	125	2 I	5804.141 i	300	30 I
5758.919	4	8 II	5783.197	15	30 II	5804.604	5	2 I
5759.204	2	I	5783.550	6	I	5804.948	3	I
5759.601	2	I	5783.837	9	6 II	5805.475	2	I
5760.551 i	600	100 I	5784.072	1	2 II	5805.704	40	2 I
5761.230	5	I	5784.228	1	I	5806.254	140	80 I
5761.526	9	2 II	5784.394	1	2 II	5806.566	5	I
5761.772	9 w	I	5784.539	1	I	5807.682	40	I
5762.068	2 w	2 I	5784.862	40	100 II	5808.072	15	75 II
5762.267	1	3 II	5785.116	3	I	5808.642	15	5 I
5762.812	75	3 I	5785.474	2	41 II	5808.962	2	5 II
5763.540	80	30 I	5785.857	2	I	5809.401	5	5 II
5765.461	3	I	5786.199	1	I	5809.557	5	I
5765.958	1	4 II	5786.676	5	12 II	5809.976	2	I
5766.111	6	10 II	5787.532	6	12 II	5810.236	2	I
5766.476	1	2 II	5787.881	1	I	5810.448	2	I
5766.651	1	I	5788.018	2	I	5810.964	5	12 II
5767.134	1	I	5788.188	4	25 II	5811.370	1	2 II
5767.475	2	4 I	5788.550	1	I	5811.835	6	I
5767.785	75	4 I	5789.052	2	I	5812.094	1	1 II
5768.191	150	5 I	5789.644 i	200	12 I	5812.691	12	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5812.972	150	3	I	5833.546	2		I	5853.773	5	7	II
5813.575	4	10	II	5833.796	4		I	5854.119	100	3	I
5814.078	2	150 w	III	5834.105	2	3	II	5855.016	5	25	II
5814.354	2		I	5835.141	2		I	5855.497	75	3	II
5814.721	12		I	5835.282	1	2	II	5855.898	1		I
5815.433	175	300	II	5835.420	1		I	5856.090	4		I
5815.822	3		I	5835.871	10	18	II	5856.209	4		I
5816.168	5		I	5836.238	10		I	5856.359	12	20	II
5816.984	6	12	II	5836.642	2	2	II	5857.571	1	1	II
5817.300	6	5	II	5836.957	2		I	5857.690	1		I
5817.527	1		I	5837.500	6	12	II	5858.639	40		I
5817.733	151	20	II	5838.281	2		I	5858.750	50	1	I
5818.446	50	2	I	5838.545	1		I	5859.544	30		I
5819.118	7		I	5838.939	50	125	II	5859.669	140	300	II
5819.312	9		I	5839.494	40	2	I	5860.248	3		I
5819.601	30	2	I	5839.589	10		I	5860.468	5		I
5819.902	5		I	5839.844	30		I	5860.963	1		I
5820.079	7		I	5840.632	75	2	I	5861.184	2		I
5820.167	7	18	II	5841.204	1		I	5861.292	4		I
5820.370	30	125	II	5842.043	40		I	5861.983	1 h		I
5820.793	2		I	5842.352	1 h		I	5862.124	2		I
5822.034	9	1	I	5842.464	1		I	5863.716	125	3	I
5822.514	6	15	II	5842.836	2		I	5864.122	1		I
5822.792	75	2	I	5843.001	2	350	III	5864.870	7	18	II
5823.214	1		I	5843.252	5		I	5866.804	75	1	I
5823.558	1		I	5843.799	75		I	5867.338	4	8	II
5824.521	1 w	3	II	5844.778	30	2	I	5867.608	5	8	II
5824.887	50		I	5845.021	1		I	5867.831	5		I
5825.000	30		I	5845.916	50		I	5868.376	125	8	I
5825.341	1		I	5846.976	10	1	I	5869.153	6		I
5825.466	2		I	5847.928	1		I	5869.847	100	2	I
5825.667	3		I	5848.542	10	1	I	5870.036	10		I
5826.084	7		I	5849.064	6	20	II	5870.543	125	350	II
5826.271	100	4	I	5849.204	4		I	5871.178	100	2	I
5826.706	3		I	5849.496	4		I	5871.414	5	7	II
5827.338	3		I	5849.750	3		I	5872.299	5	8	II
5827.724	1	2	II	5849.994	1	8	II	5872.608	40	100	II
5828.071	2		I	5850.078	5		I	5872.884	40		I
5828.803	1	2 w	II	5850.254	1	1	I	5873.316	3		I
5829.105	20	2	I	5850.356	2	1	I	5873.748	2		I
5829.846	40	2	I	5850.736	5		I	5874.032	30		I
5830.492	6	50	II	5851.192	2		I	5874.336	30	10	II
5830.816	50	1	I	5851.383	1		I	5874.981	50	3	I
5831.114	1		I	5851.616	1		I	5875.272	4	2	II
5831.263	3	12	II	5851.828	1	2	II	5875.497	10	75	II
5831.452	1		I	5852.173	9	18	II	5876.176	1	2 w	II
5831.673	31		I	5852.484	40	1	I	5876.428	1		I
5831.911	1	1	I	5852.682 i	200	5	I	5876.655	1		I
5832.048	2		I	5853.056	20	50	II	5876.990	5	1	I
5832.368	125	50	I	5853.466	50		I	5877.527	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5877.667	1	1	II	5904.161	40	125	II	5928.862	10		I
5878.269	30	100	II	5904.709	2		I	5929.159	3		I
5878.922	12		I	5905.178	20		I	5929.487	50	50	II
5879.104	25	70	II	5905.576	100	2	I	5929.942	60		I
5879.450	2	2	II	5905.746	30		I	5930.293	3		I
5879.707	10	50	II	5906.323	20	10	II	5930.444	2		I
5881.409	5	8	II	5906.848	3	50	II	5930.963	3	10	II
5881.971	1		I	5907.089	1		I	5931.057	2	1	II
5882.274	4		I	5907.344	1	1	I	5932.155	25 d	15	II
5882.440	1		I	5907.824	1		I	5932.424	20		I
5882.682	1		I	5908.397	25		I	5932.698	1	3	II
5882.974	1		I	5908.939	125	50	I	5932.907	3		I
5883.520	2	600	III	5909.365	1	10	II	5933.401	4	3	II
5883.841	2		I	5909.592	1		I	5933.843	3	1	II
5884.031	10		I	5910.034	1 s		I	5934.429	50	2	I
5884.153	10	20	II	5910.227	5		I	5934.708	6		I
5885.702 i	120	25	I	5910.507	6	100	II	5935.715	1		I
5886.362	2	20	II	5911.233	60		I	5935.840	1		I
5886.526	50		I	5912.095	10	18 s	II	5936.175	3		I
5886.716	30	75	II	5912.351	1		I	5936.390	25		I
5887.430	21	1	II	5913.371	50	2	I	5936.601	3	50	II
5887.850	1	3	II	5914.388	50	400	II	5936.875	12		I
5888.254	15	30	II	5914.681	140	100	I	5937.169	40	2	I
5888.557	3		I	5916.150	2		I	5937.666	60	2	I
5891.453	70	18	I	5916.379	2	5	II	5937.926	12		I
5892.430	12	2	I	5916.732	50		I	5938.473	75		I
5892.787	1		I	5917.270	4		I	5938.600		50	II
5893.179	7		I	5917.942	2	3	II	5938.826 i	140	20	I
5893.466	25	125	II	5918.181	5	2 h	II	5939.816	10		I
5894.700	40	40	II	5918.944	75	2	I	5940.572	30		I
5895.298	75	12	I	5919.662	1	2	II	5940.960	15		I
5896.368	25	75	II	5920.363	2		I	5941.117	2		I
5896.634	8		I	5920.967	6	1	II	5941.808	10		I
5896.787	12		I	5921.412	1 w		I	5942.126	8	75	II
5897.103	1		I	5921.842	4	3	II	5942.364	40		I
5897.418	2		I	5922.825	50	2	I	5942.793	30	75	II
5897.934	1 w		I	5923.921	3		I	5943.479	20	2	I
5898.532	3		I	5924.055	3		I	5943.727	7	10	II
5899.404	30	75	II	5924.392	30	400	II	5944.069	10	50	II
5899.520	25		I	5924.517	10		I	5944.656	75	10	II
5899.843	75	3	I	5924.783	1		I	5945.471	2		I
5900.296	1 w	1	I	5925.404	50		I	5945.615	2	10	II
5900.826	4	2 w	II	5925.894	100	300	II	5946.240	20		I
5901.620	1		I	5926.240	100	3	I	5946.839	2	1	II
5901.777	2	3	II	5926.659	1		I	5947.338	1		I
5901.968	15	50	II	5926.763	1	2	II	5947.482	1	1	II
5902.596	30	8	II	5926.928	4	3	II	5948.034	1	2	II
5903.346	3	1	II	5927.944	3	25	II	5948.395	3		I
5903.493	5		I	5928.246	3		I	5948.578	1	3	II
5903.916	3		I	5928.655	3		I	5948.810	20	2	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
5949.376	30	1	I	5966.209	2	1	I	5991.032	120	15	I
5949.679	1	1 w	II	5967.531	10	1	I	5991.717	2	3	II
5950.156	2		I	5969.098	1 w		I	5992.243	1		I
5950.434	7	3	I	5969.754	50	3	I	5993.272	6	25	II
5950.642	3		I	5970.458	12	1	I	5993.516	10		I
5950.778	20	3	I	5970.945	1	3	II	5994.156	200	20	I
5951.108	1		I	5971.088	1		I	5995.234	20	2	I
5951.314	1		I	5971.370	1	1	II	5995.690	4		I
5951.508	1		I	5971.756	1		I	5996.100	5	1	II
5951.855	1		I	5971.844	1		I	5996.646	25	1	I
5952.144	1		I	5972.470	10	18	II	5997.036	1		I
5952.342	3	15	II	5972.820	7	75	II	5997.156	1	3	II
5952.623	1		I	5973.665 i	250	25	I	5997.349	1		I
5952.819	1	2	II	5975.066 i	250		I	5997.641	1		I
5953.262	6		I	5975.400		25	III	5998.210	1		I
5953.594	25	2	I	5976.109	12	3	II	5998.672	6	12	II
5954.590	10	2	II	5976.220	3		I	5999.274	1		I
5954.762	3	1	I	5976.445	1	2	II	5999.539	6		I
5954.889	4	1	I	5976.803	1		I	5999.915	2	1	II
5955.150	2		I	5977.089	2		I	6000.791	40		I
5955.580	50	3	I	5977.220	1	4 w	II	6000.950	3	25	II
5955.960	6	30	II	5977.560	3		I	6001.224	60	4	I
5956.277	30		I	5978.095	7	30	II	6001.658	3		I
5957.108	4	30	II	5978.432	1		I	6001.739	4	1	II
5957.493	6		I	5978.920	2		I	6001.922	1		I
5957.611	30		I	5979.195	1	1	II	6002.198	2		I
5958.084	4	20	II	5979.326	1		I	6002.374	3	4	II
5958.446	2	1	II	5979.632	1	1	II	6002.474	1		I
5958.773	10	1	I	5980.574	1		I	6002.896	2		I
5959.712	40	2	I	5981.048	1		I	6003.166	3		I
5960.387	20	100	II	5981.397	2	10	II	6003.599	1		I
5960.804	25	1	I	5981.908	20	40	II	6003.937	1		I
5961.229	1		I	5982.118	40		I	6004.254	1		I
5961.983	30	100	II	5982.670	2 w	2	II	6004.450	1 h	1	II
5962.066	20		I	5983.169	1		I	6005.184	50	3	I
5962.188	20	40	II	5983.403	6	15	II	6005.604	2		I
5962.574	1		I	5984.009	6	50	II	6005.810	2	2	II
5962.764	1		I	5984.996	2		I	6006.102	1		I
5962.991	1		I	5985.211	5	12	II	6006.296	1	1	II
5963.184	1	1	I	5985.688	4		I	6007.073 i	180		I
5963.322	2		I	5986.276	25	1	I	6007.502	4	2	II
5963.664	2	1	I	5986.966	2		I	6008.049	1		I
5963.956	5		I	5987.474	3		I	6008.442	2		I
5963.999	5	1	I	5988.006	2		I	6009.123	5	15	II
5964.498	10		I	5988.302	2		I	6010.176	90	3	I
5964.687	1		I	5989.072	150	400	II	6010.592	7		I
5964.957	1		I	5989.754	10		I	6011.215	7		I
5965.468	1		I	5989.895	4	18	II	6011.354	10	75	II
5965.754	6		I	5990.285	6	50	II	6011.534	25		I
5965.838	8	1	II	5990.801	2	20	II	6011.991	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6012.343	6	1	II	6036.760	8		I	6063.048	3	12	II
6012.749	1	1 w	II	6037.698 i	140	10	I	6065.348	2		I
6013.427	2		I	6038.677	75	2	I	6065.765	40	2	I
6014.058	6	1	II	6039.214	6	1	II	6066.487	30	300	II
6014.304	3	1	II	6039.647	1	1	II	6067.063	30	125	II
6014.748	1		I	6039.911	1	1	II	6067.505	1		I
6015.432	75	300	II	6040.129	1	10 w	II	6068.020	1	1	II
6016.364	12		I	6040.452	3		I	6068.682	1		I
6016.980	1		I	6040.865	2		I	6069.015	40	2	I
6017.262	2	1	II	6041.083	1		I	6069.828	4		I
6017.864	8	2	II	6041.353	2		I	6070.020	1	2	II
6019.005	30	175	II	6041.607	2	3	II	6070.315	10		I
6019.640	8		I	6042.583	40	1	I	6070.872	2	3 w	II
6019.818	2		I	6042.967	40	125	II	6071.535	3		I
6020.266	4		I	6043.648	1 w		I	6071.968	6	1 w	II
6020.507	4		I	6044.421	75	200	II	6072.788	5		I
6021.036 i	140	12	I	6045.274	1		I	6073.093	50	100	II
6021.415	30	150	II	6045.452	1	2	II	6073.504	1		I
6022.200	2 w	12 w	II	6046.606	8 w		I	6073.982	2		I
6022.360	3		I	6046.991	1		I	6075.081	1 w		I
6022.681	2		I	6047.258	1		I	6075.392	1		I
6023.228	25	2	I	6047.777	3		I	6076.188	2	4	II
6023.644	1		I	6048.165	1	1	II	6077.118	50	2	I
6024.669	2		I	6049.051 i	100	8	I	6077.340	4	15	II
6024.921	2		I	6049.766	8	25	II	6077.532	2		I
6025.352	1		I	6049.910	3	10	II	6077.868	75	6	I
6025.794	30	1	I	6050.973	30	2	I	6078.418	75	3	I
6026.041	6		I	6052.025	4		I	6078.976	4	12	II
6027.047	2 w		I	6052.428	4		I	6079.212	80	3	I
6027.217	1		I	6053.370	300	8	I	6079.446	20		I
6027.461	1	2	II	6053.973	1		I	6080.537	1		I
6027.934	1	2	II	6054.301	1		I	6080.885	2		I
6028.254	25	30	II	6054.543	1	4	II	6081.723	1		I
6028.618	1		I	6055.293	4		I	6083.225	4	1	I
6028.865	6	15	II	6055.581	20	2	I	6083.512	1		I
6029.224	30		I	6055.922	2		I	6084.102	3		I
6029.654	8		I	6056.338	1		I	6084.486	1		I
6030.442	50	2	I	6056.862	2	1	II	6085.260	20	75	II
6031.907	6	40	II	6057.153	2		I	6085.375 i	100	50	I
6032.356	50	40	II	6057.484	1	1	II	6085.948	6	5	II
6032.864	40		I	6057.838	1		I	6086.446	2		I
6033.408	40	2	I	6058.172	12	30	II	6087.253	75	400	II
6033.941	8	30	II	6058.597	7	25	II	6088.031 i	125	7	I
6034.195	1		I	6059.121	6		I	6088.805	6		I
6034.534	10	25	II	6059.532	1	2	II	6089.082	2		I
6034.844	2		I	6059.840	6		I	6089.451	1		I
6035.188	50	2	I	6059.941	1	4	II	6090.101	10	50	II
6035.596	1		I	6060.959	2		I	6090.434	3		I
6035.861	2		I	6061.499	25	75	I	6090.797	4	8	II
6036.079	1	3	II	6062.592	6	20	II	6091.228	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6091.450	1		I	6119.060	2	125 w	III	6148.358	1		I
6092.019	3	6	II	6119.690	40		I	6149.411	1	1	II
6093.018	3		I	6120.547	100	350	II	6150.134	1		I
6093.224	3		I	6120.820	5		I	6150.334	3		I
6093.804	2		I	6121.397	75	8	I	6150.691	20	2	I
6094.042	3	3	I	6122.305	4	10	II	6151.993 i	125	20	I
6094.518	1		I	6122.693	1 w	1	II	6152.930	1		I
6095.038	3	1	II	6123.169	1	2	II	6153.418	1		I
6095.204	1		I	6123.830	25		I	6154.071	75	12	II
6095.417	1		I	6124.063	5		I	6154.510	50	3	I
6095.968	1		I	6124.473	75	2	I	6155.578	75	4	I
6096.300	1		I	6125.372	1		I	6156.087	5		I
6096.646	1		I	6125.729	40	125	II	6156.614	1	1	II
6096.871	1		I	6127.390	5		I	6157.080	40	2	I
6097.178	10	20	II	6127.590	8		I	6157.494	1	1	II
6098.111	75	10	II	6128.121	2		I	6159.051	1	2	II
6099.075	75	300	II	6128.321	4		I	6159.629	1		I
6099.977	6		I	6128.433	4		I	6159.843	1	4	II
6100.391	1		I	6129.528	25	1	I	6160.183	1		I
6100.695	1		I	6130.108	1	5	II	6161.355	50	4	I
6100.966	1		I	6130.445	5		I	6161.764	3	1	II
6101.727	75	3	I	6130.738	6	1	I	6162.157	1	3	II
6102.595 i	90	10	I	6131.382	1		I	6162.455	1		I
6103.631	20	50	II	6131.657	3	1	I	6162.965	8	1	II
6104.567	100	200	II	6131.946	4	10	II	6163.243	1	5	II
6105.277	3		I	6132.215	3	7	II	6163.717	6	1	II
6105.948	1		I	6132.413	2		I	6163.875	1	1	II
6106.489	1		I	6132.856	7	1	II	6164.480	75	3	I
6106.614	1	3	I	6133.053	30		I	6165.249	1 w	2	II
6106.840	12		I	6133.803	8		I	6165.539	11	1	II
6107.524	50	4	I	6134.772	3	81	II	6165.612	1		I
6108.271	8		I	6135.590	4		I	6165.826	2		I
6108.396	12	100	II	6135.971	3		I	6166.525	4		I
6108.891	1	1	II	6137.006	3		I	6166.702	1		I
6109.208	6		I	6137.923	25	25	II	6167.198	1 w		I
6109.690	3		I	6138.642	30	50	II	6167.906	2	5	II
6110.314	2		I	6139.320	1	1	I	6168.241	1		I
6110.654	1		I	6140.200		10 w	III	6168.483	1	2	II
6111.377	1		I	6140.752	6		I	6168.580	1		I
6111.775	1		I	6141.626	1		I	6168.821	1		I
6111.992	1	1	II	6144.282	1 s	3 s	II	6169.823	500	30	I
6112.827	125	250	II	6144.418	1	1	II	6170.676	20		I
6113.952	6	20	II	6144.755	8		I	6170.733	1		I
6114.536	50	3	I	6145.278	25	50	II	6171.451	1		I
6114.909	3		I	6145.814	1	1	II	6171.892	1		I
6116.159	50		I	6147.443	1		I	6172.026	1	2	II
6117.309	2		I	6147.625	1		I	6172.563	1		I
6117.726	1		I	6147.938	1		I	6173.009	1		I
6118.046	2		I	6148.160		2 w	II	6173.389	1 d		I
6118.758	1		I	6148.202	1		I	6173.868	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6174.486	1	1	II	6208.688	30	2	I	6234.849	200	5	I
6174.763	1		I	6208.954	2	1	I	6235.789	2	4	II
6175.379	1		I	6209.947	6		I	6237.090	3		I
6175.574	1	1	II	6210.904	1	1	II	6237.697	2		I
6175.948	4		I	6211.651	10	1000	II	6237.958	2		I
6176.165	1		I	6212.720	30	1	I	6238.080	6		I
6176.469	1		I	6213.292	1		I	6239.076	3	20	II
6176.678	1		I	6213.638	3	3	II	6239.279	1		I
6178.435	100	2	I	6213.934	2	3	II	6239.528	1	1	II
6178.903	5	2	II	6214.084	1		I	6239.743	1		I
6179.152	3		I	6214.527	3		I	6240.299	4		I
6179.845	25	100	II	6215.151	11		I	6240.597	2		I
6180.707	75	3	I	6215.687	1	1	II	6240.945	50	2	I
6181.529	5 w		I	6215.963	2		I	6241.393	4	8	II
6182.622 i	400	50	I	6216.262	1		I	6241.668	2	2	II
6184.419	10	100 w	II	6216.434	1	1	II	6241.860	2		I
6184.495	2		I	6216.716	1	1	II	6242.690		500 w	III
6184.773	100	50	I	6216.853	1	1	II	6243.350	12		I
6185.758	5		I	6217.575	5	2	I	6244.363	1		I
6186.139	1		I	6218.067	1		I	6245.033	8	18	II
6186.360	3		I	6218.191	1	1	II	6245.595	7	15	II
6186.742	1		I	6218.344	1		I	6246.150	10		I
6187.125	1	2	II	6218.570	1	1	II	6246.913	4	4	II
6188.122	160		I	6219.772	6		I	6247.105	3	2	II
6189.133	10		I	6220.012	75	2	I	6248.107	8	20	II
6189.414	10	50	II	6221.046	7		I	6249.125	1 w		I
6190.742	6 w		I	6221.313	75		I	6250.213	1		I
6191.905 i	100	15	I	6221.565	6	150	II	6250.478	12	1	I
6192.578	1		I	6222.538	1		I	6250.880	1		I
6193.164	3	1	II	6222.762	3		I	6251.416	2	15	II
6193.860	50	200	II	6223.268	1	2 h	II	6251.630	1		I
6195.313	10	1	I	6223.510	10	20	II	6251.747	1		I
6196.170	2		I	6224.528 i	100	10	I	6251.944	2		I
6196.388	12		I	6226.374	50	2	I	6252.298	2		I
6196.959	1		I	6226.623	3	5	II	6252.854	1		I
6198.235	80	20	I	6226.930	1	4	II	6253.512	1		I
6199.042	2	3	II	6227.162	1		I	6254.106	1	1	II
6199.432	1	1	II	6227.792	1		I	6254.763	3	1	II
6200.432	100	75	II	6227.935	1		I	6255.015	1	1	II
6201.506	1		I	6228.982	2	1	I	6255.329	1		I
6201.844	1	2 h	II	6229.599	2	3	II	6255.514	1		I
6202.066	1		I	6230.262	1		I	6255.799	1		I
6203.501	100	15	I	6230.899	1	1	II	6256.096	1	3	II
6204.117	6	15	II	6231.122	4	10	II	6256.329	1		I
6204.761	3	6	II	6231.378	10	50	II	6256.922	1	3	II
6205.011	4		I	6232.088	12	1	I	6257.424 i	100	3	I
6205.260	4	8	II	6232.976	20	40	II	6258.597	30	75	II
6205.862	40	1	I	6233.850	1		I	6259.949	1	1	II
6207.221 i	160	20	I	6234.197	6		I	6260.214	2		I
6207.729	30	2	I	6234.294	3	15	II	6261.060	40	125	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6261.418 i	180	18	I	6297.461	1		I	6328.778	6	5	I
6262.869	1		I	6297.766	2		I	6329.514	1		I
6263.378	1		I	6298.894	7	1	I	6330.120	1		I
6264.715	10	1	I	6299.421	1	1	II	6330.804	1	6	II
6265.586	6		I	6300.923	30	2	I	6331.415	30	2	I
6266.170	100	50	II	6301.408	90	3	I	6332.171	1		I
6266.600	4		I	6302.468	3		I	6332.505	10	30	II
6267.701	1		I	6303.248	40	4	I	6333.931	1		I
6268.188	3 w		I	6304.252	30	125	II	6334.268	1		I
6268.767	2 w		I	6305.277	20	2	II	6334.688	1		I
6269.166	1		I	6306.684	1	2	II	6335.022	3		I
6269.580	3		I	6306.896	1	1 h	II	6335.170		600	III
6270.312	2		I	6307.214	1 w	1	II	6335.713	2		I
6270.574	1		I	6307.859	2	1	II	6336.078	3		I
6271.529	12		I	6308.714	2		I	6336.411	3		I
6272.071	25		I	6309.430	4	20	II	6337.611	40	3	I
6274.110	100	150	II	6309.739	1		I	6338.372	1		I
6275.068	2		I	6310.817	30	2	I	6338.640	1	2	II
6276.152	20		I	6311.269	2	6	II	6338.908	1	12	II
6277.227	20	30	II	6311.458	2		I	6339.328	3		I
6278.102	1		I	6311.834	1		I	6339.450	6 c	50 i	II
6279.156	30	125	II	6311.941	1		I	6339.668	40		I
6279.973	4		I	6312.280	1	1	II	6341.885	1		I
6280.880	1	1	II	6312.640	15 w	20	II	6342.860 i	300	30	I
6281.161	1	1	II	6314.261	3		I	6343.171	2	3	II
6281.529	1		I	6315.543	2	18	II	6344.126	1		I
6281.944	1	2 w	II	6315.776	10		I	6345.367	1		I
6283.124	1		I	6315.992	3 w		I	6346.116	20	2	I
6283.656	1		I	6317.184	25		I	6346.651	1		I
6283.783	1		I	6318.302	3		I	6347.085	3	1	II
6285.279	30	125	II	6318.699	3	4	II	6348.122	4	1	II
6286.036	8	2	I	6319.158	5		I	6348.567	6	175	II
6286.706	1		I	6319.240	3		I	6348.738	40		I
6286.923	1		I	6319.738	1		I	6349.736	1	2	II
6287.252	10		I	6320.096	1	1	II	6350.432	1		I
6287.562	2		I	6320.460	1	2	II	6350.888	2		I
6288.426	1	1	II	6320.793	1		I	6351.390	1		I
6289.283	1		I	6321.166	4	5	II	6351.645	1		I
6289.486	10	60	II	6321.823	5		I	6352.143	1		I
6290.398	3		I	6322.191	1	4 w	II	6352.505	2		I
6291.191	30	3	I	6322.861	3		I	6353.308	2	5	II
6291.623	3	1 h	II	6323.838	4	20	II	6353.620	1		I
6292.056	6		I	6324.388	6		I	6354.256	1		I
6292.890	15	1	I	6324.590	3	30	II	6355.278	2		I
6293.242	25	2	I	6325.010	1		I	6355.626	25	2	I
6295.156	2		I	6325.432	2	15	II	6355.905	40	3	I
6295.877	2		I	6325.602	3		I	6356.214	3	15	II
6296.537	1	1	II	6326.372	60	4	II	6356.888	1		I
6296.668	1	2 h	II	6327.279 i	180		I	6357.016	1		I
6297.026	2	3	II	6328.254	1	2	II	6357.321	1 w		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6357.683	1		I	6386.381	3	20	II	6414.687	5	2	II
6357.790	1		I	6386.750	1 w		I	6415.535	9		I
6358.611	40	200	II	6387.068	4		I	6416.103	15	100	II
6359.126	30 c	75	II	6387.389	50		I	6416.313	1		I
6359.668	25		I	6387.490		20	III	6416.575	1 w		I
6360.084	1		I	6387.851	10	12	II	6416.913	2		I
6360.448	1		I	6388.154	1	3	II	6417.172	1	1	II
6360.778	1		I	6388.416	15	1	I	6417.563	1		I
6360.917	1	3	II	6388.768	10	10	II	6417.891	3		I
6361.111	1		I	6388.812	40		I	6418.683	1		I
6362.241	15	4	I	6389.382	40	4	I	6419.154	1		I
6363.012	1		I	6390.119	9		I	6419.518	1	1	II
6363.261	3	6	II	6390.546	1		I	6419.820	2		I
6364.242	1		I	6390.797	1		I	6420.059	1		I
6364.409	2		I	6391.159	6	2	II	6420.930	2	3	II
6364.636	3		I	6392.359	12	2	II	6421.346	30	2	I
6364.783	3		I	6393.181	1		I	6421.415	2		I
6365.429	1		I	6394.027	30	1	I	6421.703	1		I
6365.958	1		I	6394.563	1		I	6422.092	30	1	I
6366.287	1		I	6395.604	1	1	II	6422.502	1		I
6367.633	1 s		I	6395.874	1	1	II	6422.923	2		I
6368.960		4	II	6396.734	2	1	II	6423.393	1	1	II
6369.130	20	4	I	6396.949	15		I	6424.801	30	300	II
6370.785	3		I	6397.436	5		I	6426.741	1	1	II
6371.058	1		I	6398.436	4		I	6427.006	1	5	II
6371.929	30	3	I	6399.568	5	5	II	6427.485	4	1 h	II
6372.439	4		I	6399.797	2	4	II	6428.374	1		I
6373.642	1 h		I	6399.963	5		I	6428.504	1	2 w	II
6374.246	1		I	6400.691	10		I	6428.761	4		I
6374.510		50 w	III	6401.727	3	30	II	6429.313	1		I
6374.874	1 w		I	6402.240	1	2	II	6429.683	1	2	II
6376.931 i	350	30	I	6402.931	9	18	II	6430.229	10	15	II
6377.485	4	50	II	6403.850	2		I	6430.478	1		I
6377.938	3	4	II	6404.387	2	15	II	6430.615	1 w		I
6378.482	1	1	II	6404.612	2		I	6431.424	1		I
6378.748	6	15	II	6405.072	3		I	6431.692	2		I
6379.157	5	12	II	6405.326	1		I	6432.175	1		I
6379.657	6		I	6405.860	1	4 w	II	6432.928	3	3	II
6379.812	5	15	II	6406.128	5		I	6433.594	1 h		I
6380.280	1		I	6406.441	75	3	I	6433.956	1	1	II
6380.465	1	1	II	6407.549	2		I	6434.616	1		I
6381.358	6		I	6408.595	15	20	II	6434.819	1	1	II
6381.751	3		I	6409.114	1	1	II	6435.065	1		I
6381.957	3	15	II	6409.542	1		I	6436.278	1 h	1	II
6382.790	1		I	6409.847	1 w		I	6436.437	1		I
6383.220	5	20	II	6410.969	4	8	II	6436.634	2	1	II
6383.325	5	20	II	6411.900 i	250	20	I	6437.752	50	3	I
6384.077	2	4	II	6412.645	1	1	II	6438.297	2 w		I
6385.046	3	3	II	6413.615 i	200	15	I	6438.378	5		I
6385.455	1		I	6414.108	7	3	II	6438.664	1	1	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6438.902	15		I	6477.290	1		I	6503.868	1		I
6439.026	20	50	II	6477.694	1		I	6503.972	1		I
6439.726	1	2	II	6478.612	1		I	6504.214	3		I
6440.334	2		I	6478.725	1		I	6504.422	2 w		I
6441.262	5		I	6478.945	2	12	II	6505.040	1	1	II
6442.941	1	2	II	6479.530	2		I	6505.700	1 w		I
6443.064	1		I	6479.950	2		I	6505.930	1		I
6443.812	9	2	I	6480.432	1		I	6506.972	50	3	I
6444.106	1		I	6480.611	5	15	II	6507.544	6	1 w	II
6444.750	1		I	6481.293	12	10	II	6507.929	3		I
6444.921	1	2	II	6481.826	1		I	6508.356	5	2	II
6445.625	4		I	6482.492	1		I	6509.044	50	2	I
6446.124	5		I	6482.908	1		I	6509.848	1		I
6446.756	50	3	I	6483.616	3 w		I	6510.250	3		I
6447.961	1		I	6483.740	2		I	6510.684	2		I
6448.294	1		I	6484.067	3		I	6510.992	4	20	II
6448.704	3	15	II	6484.799	2		I	6511.239	3	3	II
6449.994	50	3	I	6485.119	1		I	6511.348	5	25	II
6450.338	15	6	II	6485.369	2	8	II	6512.364	75	3	I
6450.934	30	3	I	6486.840	1		I	6513.029	3		I
6452.030	5	2	II	6486.974	1		I	6513.452	1	1	I
6452.938	7	1	I	6487.099	1		I	6514.492	1		I
6453.327	2		I	6487.477	9		I	6514.683	2		I
6453.530	1		I	6488.879	9		I	6515.130	1		I
6454.594	1 s		I	6490.582		10	II	6515.847	2		I
6455.249	7	1	I	6490.738 i	120	8	I	6516.127	3		I
6457.283 i	500	70	I	6491.234	1	2	II	6516.824	1		I
6459.103	2		I	6491.399	2		I	6517.256	1		I
6459.509	1		I	6493.192	75	2	I	6517.355	1	3	II
6460.016	1		I	6494.236	1	1	II	6517.921	1		I
6460.474	3	100 w	III	6495.243	5		I	6518.036	1	4	II
6461.063	7	125	II	6495.601	1		I	6518.426	5	6	II
6462.620	400	200	II	6495.902	1		I	6518.945	2	3	II
6464.839	1		I	6496.011	3		I	6520.008	1		I
6465.572	6		I	6496.680	2	1	II	6520.522	1		I
6466.346	6	1	I	6496.947	2		I	6520.944	4	12	II
6466.708	7	1	I	6497.483	7		I	6522.037	40	8	II
6467.144	4		I	6497.765	1		I	6522.492	9		I
6467.674	6		I	6497.993	1		I	6523.569	2		I
6467.915	6		I	6498.188	1	2 w	II	6523.902	1	1	II
6468.100	1	3	II	6498.348	1		I	6524.483	6	1	I
6471.216	20	150	II	6498.762	4 w		I	6525.053	1		I
6471.939	3		I	6499.143	1 w		I	6525.458	1		I
6472.965	2	3	II	6499.642	1		I	6525.856	1		I
6473.412	2	1	II	6499.846	1 w	2 w	II	6526.571	5	1	II
6474.793	40	4	II	6500.312	1	1	II	6526.898	6	1	I
6475.904	2	6	II	6500.648	10	1	I	6527.324	1	1	II
6476.353	1 w		I	6501.404	1 w		I	6527.710	1		I
6476.657	1		I	6501.988	25	2	II	6527.936	1	1	II
6476.791	1 w		I	6503.503	15	125	II	6528.555	1	2	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6529.089	1	1 w	II	6556.961	2 w	2	II	6583.907 i	200	18	I
6529.156	1		I	6558.564	2	5	II	6584.226	5		I
6529.591	5		I	6558.881	10		I	6584.369	10	2 w	II
6529.764	4	40	II	6559.088	5	10	II	6584.598	15	1	I
6530.129	7		I	6559.205	12		I	6585.676	10	1	I
6531.342 i	400	40	I	6559.735	2		I	6585.992	3	12	II
6531.758	2	10	II	6560.066	8	10	II	6586.592	2		I
6532.209	12		I	6561.223	1	2	II	6587.266	1	1	II
6532.238		40	III	6561.446	1		I	6588.540 i	200	25	I
6533.401	1		I	6561.536	1		I	6591.176	40	25	I
6533.581	1		I	6562.100	6		I	6591.485 i	100	7	I
6533.774	1		I	6562.622	2		I	6591.794	2	3	II
6534.235	1	1	II	6563.103	2		I	6592.214	1		I
6534.590	6	2	II	6563.649	1		I	6593.466	40		I
6535.484	1		I	6563.919	2		I	6593.604	7	8	II
6535.644	2	5	II	6564.434	30		I	6593.940 i	200	20	I
6536.130	7	1	I	6565.053	10		I	6594.421	4		I
6536.448	1	1	II	6566.174	3		I	6594.869	2	2	II
6537.167	5		I	6566.918	2		I	6595.450	4		I
6537.599	10	2	I	6567.142	1 w		I	6596.090	2	2	II
6538.290	7		I	6567.584	1		I	6596.949	6		I
6539.178	1		I	6567.842	1		I	6597.371	5		I
6539.366	1		I	6568.396	2		I	6597.999	1		I
6539.607	1	1	II	6568.666	1		I	6598.253	1		I
6539.837	1		I	6569.058	4		I	6599.135	2 w		I
6540.112	3	1	II	6569.614	25	30	II	6599.287		600	III
6540.530	3	1	I	6570.926	1 w		I	6600.086	1		I
6541.054	2	1	II	6571.327	2	3	II	6600.716	5		I
6541.764	2		I	6572.005	4 s		I	6601.098	3	5	II
6542.035	6		I	6572.650	1		I	6601.421	1		I
6542.499	5	1	II	6572.878	6	30	II	6601.525	1	1	II
6543.116	1		I	6573.457	5	8	II	6602.752	9	1	I
6543.538	2		I	6573.964	5	9	II	6603.026	2		I
6544.054	1		I	6574.547	1 w		I	6603.613	6		I
6544.572	5	10	II	6575.118	1	1	II	6604.093	5	20	II
6545.706	20	2	I	6576.115	25		I	6605.436	30	100	II
6546.636	1	2	II	6576.803		4	II	6606.071	2		I
6546.751	1	1	II	6577.210	50	3	I	6606.583	4		I
6547.516	1		I	6577.664	75	125	II	6606.774	4		I
6548.512	3		I	6578.492	1		I	6607.113	1		I
6548.932	2 w		I	6578.903	2		I	6607.378	1	5	II
6549.556	1	3	II	6579.462	5		I	6607.926	1	1	II
6549.654	1		I	6579.863	2	1	II	6608.440	5	1 h	II
6549.800	1		I	6580.213	9	1	I	6608.765	1		I
6550.186	6		I	6581.267	2		I	6609.021	2		I
6551.269	1 w	1	II	6582.383	1		I	6609.347	1		I
6551.707	30	2	I	6582.579	1		I	6609.659	1		I
6552.962	1 w		I	6583.180	2	1	II	6610.286	3 s	5	II
6554.161 i	100	3	I	6583.332	2		I	6611.197	6	20	II
6555.523	1 w	1	II	6583.558	15	15	II	6611.816	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6612.415	1		I	6642.789	1		I	6672.735	2		I
6612.780	1		I	6643.099	2		I	6672.931	1		I
6613.376	30	1	I	6643.389	3	30	II	6673.559	20	3	I
6615.071	4		I	6644.027	5		I	6674.680	30	2	I
6615.327	3	2	II	6644.676	30	150	II	6675.453	2	5	II
6615.469	4	8	II	6645.731	2	2 w	II	6676.275	1		I
6616.081	1		I	6646.552	20	100	II	6677.051	1		I
6617.081	10	75	II	6647.696	4	8	II	6677.597	1	4	II
6617.515	10		I	6648.496	25	40	II	6678.708 i	30	3	I
6618.168	40	2	I	6648.954	30		I	6679.207	3	18	II
6619.970	20	50	II	6650.551	5		I	6679.607	1 w		I
6620.397	4	1	I	6651.003	2	2	II	6680.059	6		I
6620.861	1		I	6651.133	1	2	II	6680.618	1		I
6621.145	2		I	6651.329	1		I	6680.918	1	1	II
6622.106	1		I	6652.022	1	1	II	6681.457	3		I
6622.263	3	4	II	6652.403	1	1	II	6682.269	1		I
6623.227	2		I	6652.627	1		I	6682.549	4		I
6623.452	1		I	6652.966	1		I	6682.801	1		I
6623.603	1		I	6653.803	2	10 w	II	6683.353	25		I
6623.735	1	1	II	6654.363	15		I	6684.027	15		I
6624.253	1 w	1	II	6655.055	2		I	6684.661	1		I
6624.789	1		I	6655.485	5		I	6685.386	1		I
6626.115	3		I	6655.913	5		I	6685.657	1		I
6626.571	1 w		I	6656.856	2	1	II	6685.959	1	4	II
6627.509	1		I	6657.235	1		I	6686.192	2		I
6628.163	3	5	II	6657.861	1		I	6686.615	1 w		I
6628.671	2 w		I	6658.677 i	50	4	I	6687.124	3	2	II
6629.229	2		I	6659.428	1	2	II	6687.503	12	2	II
6630.733	1		I	6660.449	4	7	II	6689.147	1	2	II
6631.137	2		I	6662.269 i	250	30	I	6689.443	1		I
6631.545	2		I	6662.601		7	II	6689.761	1		I
6631.787	1	2	II	6663.671	7		I	6689.899	1	2	II
6632.075	2 w		I	6664.939	5	8	II	6690.249	1	1 h	II
6633.450	5	15	II	6665.606	1		I	6690.889	2		I
6634.033	1		I	6666.443	1		I	6691.347	1		I
6634.220	1 w		I	6666.818	1		I	6692.123	1	4	II
6634.763	2		I	6666.956	1		I	6692.707	10	20	II
6635.348	2		I	6667.257	1	2	II	6693.187	4		I
6635.814	1	2	II	6667.521	3	2	II	6693.995	10		I
6636.267	3		I	6667.783	2	2	II	6694.473	7		I
6637.325	10	1	I	6668.131	2	2	II	6694.653	1	4	II
6638.918	100	3	I	6668.394	2		I	6695.158	2		I
6639.709	3		I	6668.812	9		I	6695.759	1		I
6640.119	1	1 h	II	6668.911	5		I	6696.135	20	2	I
6640.367	1		I	6669.433	2		I	6697.701	10	5	I
6640.985	2		I	6669.723	1		I	6698.010	10	2	I
6641.419	2		I	6669.909	1		I	6698.585	2		I
6641.645	2		I	6670.400	1		I	6698.930	1		I
6641.910	1 w		I	6671.487	1		I	6699.335	2 s	3	II
6642.324	6		I	6671.649	1		I	6699.643	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6699.937	1		I	6727.459 i	200	40	I	6760.888	8	20	II
6700.485	3	18	II	6728.121	20 h		I	6761.757	1		I
6700.749	51		I	6728.771	15		I	6762.481	2		I
6701.345	2		I	6729.918	4		I	6763.313	2		I
6701.851	1		I	6730.500	4 w	3	II	6763.550	1		I
6703.333	3	5	II	6731.038	2	2	II	6764.353	1		I
6703.888	4	8	II	6731.659	5	1	II	6765.693	80	40	II
6704.042	8	30	II	6732.204	1	2	II	6766.330	4	7	I
6704.742	1		I	6732.637	9	1	I	6766.831	1		I
6705.129	2		I	6733.747	100	10	II	6767.528	1		I
6705.410	1		I	6734.652	2		I	6767.943	2	4	II
6706.051	2		I	6735.122	5		I	6768.162	1	1	II
6706.422	1		I	6735.357	5		I	6768.530	1 w		I
6706.808	2		I	6737.226	1		I	6769.367	3	15	II
6707.735	1	1	II	6737.283	2		I	6770.105	15	50	II
6707.883	1		I	6737.627	3	5 w	II	6771.331	1	2	II
6708.091	1 w	1	II	6738.170	25		I	6772.172	100	3	I
6708.267	1		I	6739.109	1 w		I	6773.087	20	2	I
6708.372	1		I	6739.935	2		I	6773.756	2		I
6708.818	4	1	II	6741.900	5		I	6774.081	1		I
6710.525	5	1	II	6742.488	3	5	II	6774.387	2		I
6710.861	2		I	6742.866	80	2	I	6775.086	2		I
6711.226	20	2	I	6743.356	1		I	6775.381	1	1	II
6711.469	1		I	6744.030	1 w	1	II	6775.825	1 w		I
6711.811	2		I	6744.682	2		I	6776.218	5		I
6711.975	1		I	6745.153	2		I	6778.312	80	2	I
6712.179	2		I	6745.521	1		I	6778.807	1		I
6712.802	1		I	6746.112	3	1	II	6779.325	1		I
6713.585	5		I	6746.940	2		I	6779.461	1		I
6713.960	100	2	I	6747.164	1		I	6780.078		15	III
6714.469	1		I	6747.945	1		I	6780.126	90	2	I
6714.663	2		I	6748.295	1		I	6780.408	140	4	I
6715.167	3	18	II	6748.571	1	2	II	6780.885	2		I
6715.493	5		I	6749.295	3		I	6781.322	2		I
6716.201	1		I	6749.841	1		I	6782.041	1 w		I
6716.937	2		I	6751.412	10		I	6782.574	1 w		I
6717.381	5		I	6753.637	9		I	6783.088	1 h		I
6719.181	100	1	I	6754.243	7		I	6783.417	1		I
6720.143	1 w	1	I	6754.600	2		I	6783.920	1 w		I
6720.652	1		I	6754.884	1		I	6784.191	1		I
6721.067	2		I	6755.486	1		I	6784.786	5		I
6721.589	1 w		I	6756.453 i	250	80	I	6785.590	1		I
6721.947	2		I	6757.098	20		I	6786.353	2	5	II
6722.125	2	5	II	6757.307	1	3	II	6787.730	80	2	I
6722.791	1		I	6758.197	25	2	I	6788.835	80	2	I
6723.095	1		I	6758.703	1		I	6789.693	1		I
6724.143	1	3	II	6759.413	2	3 w	II	6791.226	80		I
6724.667	1	1	II	6759.822	1	1	I	6792.451	1		I
6725.349	1	1	II	6760.312	1		I	6792.886	2		I
6726.307	9		I	6760.661	3		I	6793.711	1		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
6794.281	2 w	I	6823.505	20	I	6862.856	5	I
6795.026	6	I	6823.862	1 w	I	6866.146	3	I
6795.782	5	I	6824.060	1	I	6866.359	10	I
6796.772	6	12 II	6824.678	100	2 I	6866.758	9	I
6798.481	9	1 I	6825.397	1	I	6868.449	30	I
6798.728	3	I	6826.298	2	I	6868.617	2	2 II
6799.334	2	I	6827.252	1	I	6869.241	2	4 II
6800.452	5	1 II	6827.511	2	I	6870.100	2 w	I
6801.044	1	10 w III	6827.744	1	I	6870.209	2 w	1 II
6801.476	1	I	6828.187	1	I	6870.722	5	I
6802.106	1	I	6828.615	1	I	6870.961	7	I
6802.416	1	I	6829.036 i	150	10 I	6871.240	1	I
6802.772	5	I	6829.288	4	I	6871.464	1	I
6803.287	2	I	6829.926	2	I	6872.220	1	I
6804.000	1	I	6831.228	1	I	6873.031	1 w	II
6804.726	7	12 II	6832.211	2 w	I	6874.086	7	I
6805.461	3	I	6832.884	10	3 II	6874.749	15	I
6805.735	3	I	6833.319	1	I	6876.288	4	I
6806.564	1	I	6834.281	1	I	6877.869	4	2 II
6807.034	1 w	I	6834.925 i	75	1 I	6878.041	20	I
6807.305	5	I	6835.272	1	I	6878.379	2	I
6807.807	1	I	6835.395	1	I	6880.190		2 w III
6808.336	1	I	6835.616	1	I	6882.807	50	I
6808.532	1	I	6835.897	2	I	6883.102	5	I
6809.083	10	I	6836.200	1	I	6883.332	50	I
6809.300	6	I	6836.846	1	I	6883.822	4	I
6809.491	2	I	6837.069	2	I	6886.399	50	I
6809.655	7	I	6837.482	2	I	6888.145	6	I
6810.537	15	20 II	6838.893	1	I	6888.699	4	I
6811.479	1	2 w II	6839.271	3	I	6888.829	16	I
6811.949	2	I	6840.632	1	I	6889.299	100	10 II
6812.496	25	I	6841.681	1	I	6892.244	40	I
6812.767	15	25 II	6842.717	1 w	I	6893.614	2	I
6813.528	1	I	6845.853	1	I	6894.222	8	I
6813.604	1	I	6846.449	5	I	6895.184	2 w	I
6814.602	1	I	6846.935	2	I	6895.717	2	I
6814.916	1	1 I	6847.400	2	I	6897.263	2 h	I
6815.594	5	I	6849.600	1	I	6898.102	8	1 I
6816.245	2	I	6850.536	4	5 II	6898.981	2	I
6816.496	3	I	6850.683	2	I	6900.755	12	I
6816.808	1	I	6851.212	1	2 II	6902.155	5	I
6817.383	1	I	6852.150	2	1 II	6902.230	5	I
6817.830	1 w	I	6852.353	3	I	6902.918	2	I
6818.688	1	1 II	6853.528	10	I	6903.061	5	3 II
6819.539	1	I	6854.114	30	1 I	6904.548	6 s	I
6819.789	2	I	6854.497	4 l	1 II	6905.822	2	I
6820.428	1	I	6855.307	12	I	6906.684	2	I
6821.502	1 w	I	6855.682	6	1 I	6907.353	6	1 h II
6822.298	1 w	I	6858.438	1 h	I	6908.971	4	I
6822.808	1	I	6861.146	3	I	6909.214	4	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
6909.848	100	15	I	6963.910	2		I	7020.493	10		I
6910.629	2		I	6964.239	2		I	7021.273	40		I
6910.825	1		I	6965.941	40		I	7021.874	2		I
6911.226 i	400		I	6969.281	10		I	7022.675	2		I
6911.630	3 w		I	6969.411	2		I	7023.145	15		I
6911.705	2		I	6972.989	2		I	7023.516	30		I
6913.040	2		I	6975.461	2	1	II	7026.454	4		I
6914.688	4		I	6976.035	2		I	7028.017	10		I
6914.972	2	1	II	6977.438	4		I	7030.866	4		I
6916.135	75		I	6977.724	4		I	7031.194	2		I
6916.856	4		I	6978.208	6		I	7031.302	4		I
6920.037	30		I	6980.161	2	1	II	7031.500	2		I
6921.424	10	2	II	6981.070	20	1	I	7032.175	2		I
6923.089	2		I	6982.598	4		I	7032.918	6		I
6924.637	4		I	6985.461	25	3	II	7033.046	4		I
6925.467	4		I	6986.019	30		I	7033.348	12		I
6926.059	2		I	6986.937	20	4	II	7033.632	2		I
6928.951	15		I	6987.774	4		I	7035.361	2		I
6932.440	2		I	6988.490	2		I	7036.281	75		I
6932.986	4 w		I	6988.816	2 w		I	7037.593	2		I
6934.245	100		I	6989.072	6 w		I	7037.826	2		I
6936.647	20		I	6989.656 i	900	4	I	7038.151	2		I
6937.064	15	2	I	6990.103	20		I	7038.706	4		I
6940.314	4		I	6990.434	10	20	II	7044.963	6		I
6941.557	15		I	6990.806	40		I	7045.800	25	20	II
6942.530	30		I	6992.691	30	2	I	7046.547	2		I
6943.014	4		I	6993.037	25	50	II	7049.814	2		I
6943.611 i	600	3	I	6993.983	4		I	7051.787	4		I
6943.874	2		I	6994.731	6		I	7052.114	1		I
6943.966	2		I	6995.141	4		I	7053.620	5	7	II
6944.050	2		I	6995.892	2		I	7054.413	20		I
6944.384	2 w		I	6996.197	2		I	7055.288	8		I
6944.573	2		I	6996.766	2		I	7055.892	6		I
6944.787	2		I	6997.397	4		I	7056.610	4	2	II
6945.483	75		I	6998.246	4		I	7058.489	30		I
6946.198	10		I	6998.890		3 w	III	7059.524	12		I
6946.579	20		I	6999.093	4		I	7060.042	40		I
6947.899	2		I	6999.621	15		I	7060.655	100	4	I
6948.203	75		I	7000.803	300	2	I	7060.863	2		I
6950.238	4		I	7001.256	4		I	7061.386	10		I
6951.588	2		I	7002.880	50		I	7062.391	2		I
6952.953	20	3	I	7006.091	2		I	7063.830	6		I
6954.656	40		I	7007.092	20		I	7064.448	250		I
6955.319	6		I	7008.042	2		I	7066.281	12		I
6955.488	4	2	II	7013.247	2		I	7067.507	10		I
6956.304	4	1 w	II	7014.506	2 w		I	7070.200	1		I
6958.767	150		I	7014.965	40		I	7070.953	10		I
6959.461	4		I	7015.308	25		I	7071.095	15		I
6962.292	15		I	7018.568	200		I	7071.476	15		I
6962.838	8		I	7019.013	2		I	7072.392	100		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
7073.129	4 w		I	7128.442	6		I	7166.477	3	2 w	II
7073.615	6		I	7129.719	6 s		I	7166.809	5	1 h	II
7074.248	6		I	7129.886	4		I	7167.199	10		I
7074.986	5		I	7130.180	25		I	7167.674	1 w		I
7075.333	400	40	II	7130.287	60		I	7168.903	500		I
7075.766	6		I	7130.717	20		I	7169.284	2		I
7075.817	4		I	7131.357	90	1	I	7169.372	2		I
7077.383	30 w		I	7132.615	50		I	7169.697	1		I
7078.236	8		I	7133.172	6		I	7170.350	7		I
7078.986	6		I	7133.899	4		I	7172.986	3		I
7081.444	6		I	7134.474	2		I	7173.374	120		I
7081.816	4		I	7135.825	8		I	7176.188	8	2 h	II
7082.113	4		I	7138.120	3		I	7176.725	30	6	II
7082.977	2		I	7138.595	3		I	7177.276	5		I
7083.294	2 h		I	7138.900	2 w		I	7178.546	3		I
7083.568	6		I	7139.354	2		I	7179.052	5	1	II
7084.169	500		I	7139.854	18	2	II	7179.726	10		I
7084.459	2		I	7140.447	20	3	II	7180.314	2		I
7084.585	8		I	7141.290	3		I	7180.946	3		I
7084.637	6		I	7142.318	25		I	7181.890	3		I
7084.986	12		I	7145.372	1		I	7182.183	4		I
7087.279	350		I	7145.769	3	1	II	7185.683	6		I
7088.327	6		I	7146.378	1		I	7186.397	2		I
7088.819	20		I	7147.130	1		I	7186.630	1		I
7089.337	250	15	II	7147.403	4		I	7187.425	1		I
7090.360	4		I	7148.552	100		I	7188.545	10		I
7097.019	2		I	7150.278	90		I	7189.745	6		I
7097.150	1		I	7150.680	5		I	7190.084	1 w		I
7100.516	50	4	II	7151.153	2 w		I	7190.513	3		I
7102.593	2		I	7151.510	3		I	7191.141	250	50	II
7104.909	6		I	7153.583	25		I	7192.003	5 w		I
7105.635	2		I	7154.757	25		I	7194.922	5		I
7109.082	8		I	7154.944	25		I	7195.948	10	1	I
7109.182	10		I	7155.381	3	1	II	7196.577	2		I
7109.346	8		I	7156.937	80		I	7198.098	3		I
7109.546	8		I	7157.050	1	5 w	II	7199.527	3		I
7109.847	5		I	7157.690	12		I	7200.045	120		I
7111.039	8		I	7157.953	3		I	7201.041	5		I
7112.900	3		I	7158.260	2 w		I	7201.805	12		I
7113.979	12		I	7159.932	90		I	7202.887	4		I
7114.394	20		I	7160.398	1 w		I	7203.357	2		I
7121.691	6		I	7160.753	4		I	7206.475	80		I
7124.560	180		I	7161.239	5		I	7206.664	2		I
7125.014	2		I	7161.744	4		I	7207.017	4		I
7125.821	20		I	7162.602	1		I	7207.381	6		I
7126.038	4 w		I	7163.204	2		I	7208.006	600		I
7126.342	4		I	7163.266	2		I	7208.422	3		I
7126.818	20		I	7164.442	2		I	7208.507	3		I
7127.648	4		I	7165.161	2		I	7208.811	1		I
7127.802	8		I	7165.989	8	2	II	7209.478	2		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
7209.709	8 w		I	7250.580	15	3	II	7293.363	3		I
7212.693	180		I	7253.669	18		I	7294.300	4		I
7213.192	2		I	7255.352	20		I	7296.257	15		I
7214.552	2		I	7256.011	2		I	7298.137	30		I
7215.644	2		I	7256.804	2		I	7300.037	2		I
7215.924	1		I	7256.986	15		I	7300.632	1		I
7216.156	5	1	II	7257.191	5		I	7301.330	3		I
7216.657	4		I	7258.173	30		I	7302.158	7		I
7217.515	2		I	7258.657	5		I	7302.420	6		I
7217.655	3		I	7259.009	2		I	7305.188	2		I
7217.753	40	5	II	7259.488	2		I	7305.401	75	10	II
7218.054	180	2	I	7260.240	3		I	7305.487	2		I
7219.153	70		I	7260.533	2		I	7305.617	2		I
7220.592	4		I	7260.859	2		I	7308.511	10	2	II
7220.976	15		I	7261.199	2		I	7308.636	10		I
7222.290	2		II	7262.175	1		I	7309.244	8		I
7223.018	9	1	I	7262.728	2		I	7310.224	4		I
7225.105	12		I	7264.102	5		I	7311.007	41		I
7225.782	8		I	7267.074	5		I	7311.514	10		I
7226.201	3		I	7268.822	5		I	7312.001	1		I
7228.787	6		I	7269.040	2		I	7312.245	2		I
7230.863	80		I	7270.552	10		I	7314.465	2		I
7231.991	4		I	7270.960	2		I	7315.067	15		I
7232.933	2		I	7272.522	8		I	7315.604	15		I
7233.388	15	2	II	7272.724	2		I	7316.115	7		I
7235.539	3		I	7274.273	5 w		I	7316.371	2		I
7235.886	5		I	7274.615	1		I	7320.030	3		I
7236.240	3		I	7275.824	4		I	7321.879	4 s		I
7236.359	2		I	7276.441	2		I	7323.206	12		I
7237.113	3		I	7277.001	5		I	7323.438	2		I
7237.229	2		I	7278.039	2 w		I	7323.844	5		I
7238.362	1		I	7279.130	2		I	7323.980	2		I
7239.254	6	1	II	7280.463	3		I	7324.810	120		I
7239.473	1		I	7282.708	8		I	7324.995	8		I
7240.177	12	3	II	7284.158	2		I	7328.284	120		I
7240.853	3		I	7284.286	2		I	7328.714	1		I
7240.972	2		I	7284.405	4		I	7329.498	25		I
7242.086	75		I	7284.901	120		I	7330.016	1		I
7243.337	12 s		I	7285.382	1 w		I	7331.106	2		I
7243.769	6		I	7285.734	2		I	7332.019	4		I
7244.688	80		I	7288.591	3		I	7335.571	25	4	II
7245.324	7		I	7288.770	3		I	7337.032	2 w		I
7245.498	3		I	7288.970	3	1	II	7337.552	2		I
7246.127	10		I	7289.185	2		I	7337.776	10	2	II
7246.332	2		I	7289.420	7		I	7338.599	3	1	II
7247.595	3		I	7290.998	4		I	7338.996	1		I
7247.974	7		I	7291.278	3		I	7339.400	3		I
7248.959	4		I	7292.008	2		I	7339.599	10		I
7249.834	5		I	7292.411	2		I	7341.146	140		I
7250.090	3		I	7292.661	9		I	7341.558	4		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
7341.906	2		I	7388.379	2		I	7435.010	4		I
7342.028	10		I	7388.553	2		I	7435.883	2		I
7342.297	9		I	7389.246	9	1 h	II	7437.693	5	2	II
7342.576	80		I	7390.081	5 w		I	7438.479	7	3	II
7343.369	1		I	7392.611	2		I	7439.077	9		I
7344.956	2		I	7393.438	200	100	II	7441.109	5		I
7345.518	2		I	7395.998	18	4	II	7442.032	4		I
7346.337	20	2	II	7396.886	5		I	7443.860	6		I
7347.043	20	3	II	7397.567	3		I	7444.345	1		I
7349.293	10		I	7398.559	6 w		I	7444.751	75		I
7350.442	6		I	7399.238	2		I	7445.735	10		I
7351.328	10		I	7399.378	2		I	7447.841	70		I
7351.384	1 w		I	7399.709	5		I	7449.599	10		I
7352.569	2	1	II	7400.051	4		I	7449.806	12		I
7353.008	18	5	II	7402.243	90		I	7450.177	18		I
7353.631	3	1	II	7403.536	2		I	7452.503	5		I
7354.594	2		I	7403.985	10		I	7453.176	3		I
7355.157	2		I	7404.245	7		I	7453.708	4 w		I
7355.729	1		I	7404.688	5		I	7454.077	5		I
7358.355	30	6	II	7406.277	1		I	7454.383	5 w		I
7359.066	10	2	II	7409.203	5		I	7455.200	75		I
7361.347	30		I	7410.961	4		I	7455.394	1		I
7362.190	10		I	7411.731	20	2	II	7456.481	3		I
7363.724	3		I	7411.979	10	2	II	7456.811	7		I
7365.209	4		I	7412.446	2		I	7457.638	7		I
7365.413	6		I	7414.035	10	4	II	7457.747	10		I
7368.583	2		I	7415.893	4	1 h	II	7460.301	4		I
7369.133	3		I	7417.111	1 w		I	7461.272	5		I
7369.555	2		I	7417.778	10		I	7461.481	2		I
7370.342	4		I	7418.431	2		I	7461.878	1	300 w	III
7370.821	15		I	7418.532	50		I	7463.979	6		I
7371.075	3		I	7419.376	5		I	7465.011	4		I
7372.093	5		I	7419.584	4		I	7465.227	4		I
7372.509	1		I	7420.512	2		I	7465.437	15		I
7372.603	1		I	7421.456	2		I	7467.492	12		I
7373.371	1		I	7421.822	2		I	7471.323	2		I
7374.467	1		I	7422.007	12		I	7471.599	2		I
7376.166	4		I	7422.432	3		I	7471.938	5		I
7376.877	100		I	7423.291	4		I	7473.419	5		I
7377.877	6		I	7423.797	12		I	7474.554	6		I
7379.562	3	2 w	II	7425.238	10		I	7475.661	3		I
7380.157	20	4	II	7428.941	350	3	I	7477.001	2		I
7380.685	1	1	II	7429.358	2		I	7477.343	3		I
7381.789	2		I	7429.455	2		I	7477.984	2		I
7383.714	120		I	7429.789	1		I	7479.179	1		I
7384.170	50		I	7430.252	160	1	I	7479.803	12	5	II
7385.501	300		I	7431.367	6		I	7480.638	4		I
7386.336	10		I	7431.676	3		I	7481.353	160	2	I
7386.915	9		I	7432.182	1		I	7482.618	5		I
7388.119	2 w		I	7433.342	2		I	7483.096	3		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
7483.363	1	3 II	7520.120	4	I	7568.587	1	I
7483.631	100	I	7520.572	3	I	7569.510	60	I
7484.491	2	I	7520.686	7	I	7569.645	20	I
7485.103	1	I	7521.629	6	1 II	7570.520	15	I
7485.243	3	I	7522.649	25	10 II	7571.019	8	I
7485.504	5	I	7523.133	50	I	7571.916	2 w	I
7487.714	8	1 I	7525.507	400	100 II	7572.453	8	I
7487.971	20	I	7526.005	1	I	7572.957	3	I
7488.171	1	I	7527.342	7	I	7573.328	12	I
7489.611	8	I	7527.800	10	1 I	7574.070	1	I
7490.104	6	I	7528.486	25	I	7574.445	5	I
7489.699	8	I	7528.466	30	4 II	7574.294	4	I
7490.380	2	I	7528.913	3	I	7577.261	6	I
7490.608	2 w	I	7529.322	3 w	I	7577.539	6	I
7492.958	1	I	7530.346	4 s	I	7578.256	2	I
7493.057	1	I	7531.123	30	I	7578.532	3	I
7493.426	5	I	7534.222	4	I	7579.436	2	I
7495.386	1	I	7535.850	2	I	7580.326	10	I
7495.560	5	I	7535.976	12	3 II	7580.675	12	I
7496.971	2	I	7536.409	75	5 II	7581.844	6	I
7497.523	2	I	7537.415	30	I	7583.407	12	I
7497.867	2	1 II	7538.247	2	I	7585.688	300	3 I
7498.991	6	I	7538.399	4	I	7585.778	200	I
7499.606	4	I	7540.574	3	I	7586.209	12	I
7500.567	2	I	7541.326	2 w	I	7586.974	10	I
7501.157	2	I	7542.597	3	I	7591.507	3	I
7501.913	1 w	I	7544.300	3	I	7591.732	2	I
7503.848	7	5 II	7545.643	2	I	7591.979	5	I
7504.204	2	I	7545.814	2	I	7593.380	3 w	I
7505.288	15	I	7546.154	3	I	7593.729	2	I
7505.491	2	I	7547.272	12	4 II	7596.553	1	I
7506.275	4	I	7549.308	120	I	7598.198	75	5 II
7507.383	3	I	7550.650	3	I	7598.742	10	1 h II
7507.731	3	I	7551.448	10	I	7599.313	3	I
7507.917	20	I	7551.973	3	I	7599.613	4	I
7508.475	30	I	7553.414	1	I	7601.872	3	I
7508.674	3	I	7553.978	7	I	7602.774	8	I
7508.789	5	I	7555.320	12	I	7603.228	7	I
7509.693	2	I	7555.860	2	I	7603.608	10	I
7511.014	25	I	7556.218	6	I	7606.300	3 w	I
7511.344	50	12 II	7556.866	8	I	7607.243	3	I
7511.787	40	I	7557.130	4	I	7607.388	10	I
7512.311	5	I	7557.727	12	I	7607.514	10	I
7513.555	6	I	7560.910	2	I	7607.812	75	I
7514.593	5	I	7562.954	2	I	7608.636	6	I
7514.883	8	1 I	7563.691	4	I	7610.067	3	I
7516.729	10	I	7565.308	1	I	7611.251	4	I
7516.993	4	I	7565.849	25	I	7612.403	5	I
7517.946	30	I	7566.527	75	5 II	7614.237	1 w	I
7518.782	20	I	7567.741	300	I	7614.773	15	3 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
7615.934	3	I	7664.918	2 w	I	7718.82	2	I
7616.669	12	I	7665.722	5	I	7719.23	5	I
7616.975	2	I	7666.566	10	I	7719.56	2	I
7620.056	75	1 I	7668.949	5	I	7720.38	5	1 I
7620.573	7	1 h II	7669.756	2	I	7721.20	50	1 I
7620.812	2	I	7672.253	10	I	7721.78	1	I
7623.042	2	I	7674.383	3	I	7722.16	3 w	I
7623.552	10	2 w II	7675.625	2	I	7723.64	2	I
7624.300	25	4 II	7676.217	50	8 II	7723.94	10	I
7625.110	20	I	7676.417	1	I	7724.37	2	I
7625.700	120	I	7678.124	60	I	7724.48	3	I
7625.900	7	I	7679.875	3	I	7726.15	1	I
7627.164	80	I	7682.044	5	I	7728.95	50	3 II
7627.386	2	I	7683.011	10	I	7729.50	4 s	I
7627.811	2	I	7683.666	3	I	7730.11	3	I
7629.709	4	I	7685.304	150	30 II	7730.46	4 s	I
7630.302	70	I	7685.493	2	I	7730.73	100	10 II
7630.519	20	I	7686.147	10	I	7732.67	2 w	I
7632.127	15	I	7686.682	2	I	7734.62	5	I
7633.773	12	I	7687.070	1 h	II	7737.47	6	I
7633.895	4	2 w II	7687.791	4 w	I	7737.79	2	I
7636.166	50	I	7690.642	1	I	7738.36	2 s	I
7637.385	20	I	7690.771	2	I	7740.87	5	I
7637.627	2	I	7691.167	1 w	I	7742.56	60	I
7637.759	5	1 h II	7691.768	20	I	7743.12	1	I
7638.780	30	I	7693.802	25	3 II	7743.23	2	I
7641.193	3	I	7697.917	18	I	7743.95	15	2 II
7641.594	3	I	7698.035	3	I	7744.23	2	I
7642.026	4	I	7698.916	5	I	7744.78	3	I
7642.868	4	I	7699.400	10	I	7745.12	2	I
7644.727	5	I	7699.659	8	I	7745.25	2	I
7644.957	10	3 II	7699.776	10	2 II	7745.81	5	I
7647.377	500	4 I	7699.868	5	I	7746.05	2	I
7648.240	1 w	I	7699.998	10	I	7747.41	4	I
7650.659	4	I	7701.104	30	10 II	7748.38	1	I
7651.007	12	I	7703.680	30	I	7748.88	3	I
7651.726	30	I	7705.696	3	I	7749.06	1	I
7652.313	25	I	7705.897	5	I	7749.30	6	I
7652.540	1	I	7706.45	2	I	7749.58	4	I
7653.827	120	I	7709.07	4	I	7749.88	2	I
7654.256	4	I	7709.57	50	8 II	7750.13	1	I
7654.699	40	I	7709.88	6	1 I	7751.43	4	I
7655.695	3	I	7710.27	60	I	7752.18	10	1 II
7657.064	2	I	7711.12	12	I	7752.44	2	I
7657.341	5	I	7712.39	5	I	7753.72	2	I
7657.913	3 w	I	7713.28	2	I	7754.01	2	I
7658.319	60	I	7713.93	30	I	7755.60	2	I
7660.028	7	I	7716.27	3	I	7757.49	1	I
7660.890	18	I	7716.95	3	I	7758.25	2	I
7661.615	4	I	7718.54	1	I	7759.87	3	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum			
7759.99	4	1	II	7798.36	90	I	7834.45	75	18	II	
7760.70	2		I	7798.94	6 w	I	7835.26	7	2	II	
7760.87	2		I	7799.62	5 w	I	7835.62	3		I	
7761.16	1		I	7800.02	3	I	7836.46	15		I	
7761.72	10		I	7800.46	1	I	7839.28	4		I	
7762.73	10		I	7801.11	2	I	7839.53	1		I	
7764.64	10	2	II	7801.74	3	I	7840.31	100		I	
7765.63	10		I	7801.94	1	I	7840.45	100		I	
7766.94	3		I	7802.81	6	I	7841.01	2		I	
7767.12	6		I	7803.16	1 w	I	7841.54	1		I	
7767.31	3		I	7803.78	2 s	I	7841.79	90		I	
7767.57	5		I	7804.14	12	I	7842.03	4		I	
7767.97	2		I	7804.53	18	I	7842.26	30		I	
7768.46	2		I	7806.02	3	I	7843.54	3		I	
7770.39	1		I	7807.02	3	I	7845.35	3		I	
7771.22	1		I	7807.62	1	1	II	7845.59	1		I
7771.95	30		I	7807.87	10	1	I	7846.86	1		I
7773.73	12	2	II	7808.06		2	III	7846.97	1		I
7774.88	1		I	7808.53	4	1	I	7847.54	250	2	I
7775.17	5		I	7809.23	3		I	7847.80	50		I
7775.44	10		I	7809.43	10	1	I	7848.45	60		I
7775.76	2		I	7809.53	2		I	7848.68	3		I
7776.66	10		I	7810.62	12		I	7849.64	70	8	II
7776.82	2 w		I	7810.85	1		I	7849.88	8		I
7777.26	2		I	7811.14	7	2	II	7851.01	1 w		I
7778.49	18		I	7811.58	4		I	7851.62	1		I
7779.05	4		I	7812.12	2		I	7853.28	7		I
7779.74	4		I	7813.46	15		I	7853.46	8	1	I
7780.82	3		I	7813.96	12		I	7854.92	6		I
7781.83	15		I	7815.01	1		I	7855.71	1		I
7782.32	120	2	I	7816.12	8		I	7856.37	5 w		I
7783.41	4		I	7816.46	2		I	7859.20	1		I
7784.21	12 w		I	7816.80	1		I	7860.28	2		I
7784.60	5		I	7817.77	350	4	I	7860.87	1		I
7784.78	2		I	7818.34	18	3	II	7862.34	5		I
7785.73	2		I	7818.65	2 w		I	7863.41	25	2	II
7786.42	6	1	I	7820.21	1		I	7864.01	12		I
7787.80	125	20	II	7822.38	12		I	7864.26	2		I
7788.00	1		I	7823.02	4		I	7864.38	3		I
7788.35	1		I	7823.46	8		I	7864.66	3		I
7788.50	1		I	7824.03	6		I	7865.08	4		I
7788.93	250	2	I	7824.81	2		I	7865.25	5		I
7789.91	4		I	7828.06	1		I	7865.51	1		I
7790.14	4		I	7828.48	3		I	7865.97	200		I
7790.50	2		I	7828.81	2		I	7866.72	1		I
7791.89	4		I	7829.26	3		I	7867.68	7		I
7792.79	1		I	7829.88	2		I	7868.40	75		I
7793.12	7		I	7830.69	3 w		I	7868.93	10		I
7794.10	5		I	7832.89	1		I	7869.77	2		I
7796.23	1		I	7833.77	10	2	I	7871.27	4	2	II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum	Wave-length	Intensity Lamp	Spark	Spec- trum
7872.26		4	III	7915.15	5		I	7951.75	5		I
7872.30	1		I	7916.80	10		I	7952.41	1	10	II
7872.60	3	5	II	7917.25	5		I	7952.76	2		I
7872.81	1		I	7918.28	1		I	7953.52	3		I
7874.10	6		I	7918.44	3		I	7954.60	20		I
7875.46	40	4	II	7919.45	1		I	7955.08	8		I
7877.07	10	2	II	7920.74	4	2	II	7956.69	5		I
7877.68	4		I	7921.13	1		I	7958.19	1		I
7877.87	1		I	7921.78	1		I	7959.31	2		I
7878.47	3		I	7922.25	5	1	II	7960.34	2		I
7878.71	4		I	7922.57	20		I	7961.16	10		I
7879.22	1		I	7922.81	2		I	7961.37	25		I
7879.42	2		I	7922.92	2		I	7961.98	25		I
7880.59	5		I	7924.25	3	3	II	7962.75	1		I
7880.77	6		I	7925.00	10		I	7963.45	1		I
7882.10	75		I	7925.77	10		I	7964.84	3		I
7882.35	4		I	7926.30	2		I	7965.71	3 s		I
7882.88	2		I	7926.73	1		I	7966.28	1		I
7883.61	2		I	7927.53	6		I	7966.84	3		I
7883.73	3		I	7927.68	4		I	7968.41	1		I
7883.96	2		I	7928.96	10	3	II	7969.78	1		I
7886.28	100		I	7929.38	2		I	7970.27	15		I
7886.39	5		I	7929.82	6		I	7971.56	3		I
7890.94	2 w		I	7929.94	3		I	7972.59	120		I
7891.58	2		I	7932.27	1		I	7972.87	6	4	II
7891.74	5		I	7932.82	6		I	7973.13	1		I
7892.74	4		I	7933.25	2		I	7973.51	3		I
7892.86	2		I	7933.90	1		I	7974.16	12		I
7893.28	12		I	7934.21	1		I	7976.18	5		I
7893.62	10		I	7934.88	1		I	7976.89	2		I
7894.78	6	2	II	7936.48	7	1	II	7977.62	2 w		I
7896.02	2		I	7937.13	10		I	7978.00	1		I
7896.43	18	3	II	7937.73	75		I	7978.26	1		I
7896.94	2		I	7937.95	2		I	7978.97	400		I
7897.23	6		I	7938.75	2		I	7979.52	3		I
7897.98	50	3	I	7939.69	1		I	7979.67	2		I
7898.44	1		I	7940.73	3		I	7979.89	2		I
7899.03	4		I	7941.27	2		I	7980.36	1		I
7899.62	75	1	I	7941.73	180	1	I	7981.23	10	3	II
7900.32	180	1	I	7942.66	1		I	7981.68	10	3	II
7901.42	3	1	II	7943.06	7		I	7982.27	5		I
7903.34	4		I	7943.38	2 w		I	7982.51	6		I
7904.28	8		I	7945.06	10	6	II	7983.71	3		I
7904.42	10		I	7946.10	4		I	7984.36	6	1	II
7905.70	2		I	7946.66	2		I	7984.84	3		I
7908.14	10		I	7946.90	2		I	7985.39	2		I
7911.28	1		I	7947.74	2	50 w	III	7986.99	1		I
7911.58	1		I	7948.58	2		I	7987.98	180		I
7912.40	1		I	7949.02	2		I	7988.52	1		I
7914.50	4		I	7951.12		20 w	III	7989.17	3		I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
7989.64	1	I	8027.09	2	I	8068.74	2	I
7991.38	40	I	8027.44	1	I	8069.64	1	I
7992.16	15	I	8027.73	2	I	8070.64	2	I
7992.93	3	I	8028.30	1	I	8071.84	2	I
7993.27	3	I	8029.39	1	I	8072.19	1	I
7993.68	40	I	8030.20	50	I	8073.59	4	I
7994.14	3	I	8030.42	1	I	8073.96	2	I
7994.75	1	I	8031.09	3	I	8074.53	1 ^w	I
7995.14	2	I	8031.98	1	I	8075.07	1	I
7996.20	1	I	8032.18	1	I	8075.65	90	I
7996.98	6	I	8032.43	180	15 I	8076.25	1	I
7998.73	2	I	8032.90	2	I	8076.99	3	I
7998.98	2	I	8035.62	125	I	8078.14	2	I
8000.04	75	I	8035.90	1	I	8079.64	6	I
8000.27	1	I	8036.83	10	I	8080.32	1	I
8000.86	1	I	8037.05	2	I	8082.68	4	I
8002.19	15	I	8037.71	2	I	8083.57	1	I
8003.44	1	I	8038.65	2	I	8084.31	1	I
8004.16	2 ^w	I	8044.74	2	I	8085.22	90	I
8004.52	1	I	8044.96	2	I	8086.29	2	I
8005.21	10	I	8045.19	2	I	8086.57	5	I
8006.46	6	I	8045.59	1	I	8087.50	3	I
8006.63	1	I	8046.32	2	I	8088.04	1	I
8007.36	1	I	8046.60	1	I	8088.72	2	I
8008.38	2	I	8046.79	1	I	8089.48	8	I
8008.97	1	I	8047.53	1	I	8089.93	2	I
8009.11	4	I	8048.18	20	I	8092.23	20	I
8009.65	3	I	8049.74	2	I	8093.60	80	I
8010.28	1	I	8050.08	1	I	8094.51	2	I
8010.70	15	I	8050.64	12	I	8095.02	1	I
8011.54	3	I	8051.12	2	I	8095.32	1	I
8012.42	1	I	8051.81	2 ^w	I	8095.80	3	I
8013.50	8	I	8052.48	1	I	8096.26	10	I
8013.99	1 ^w	I	8052.72	2	I	8097.18	1	I
8014.50	10	I	8053.49	2	I	8097.51	2	I
8015.65	4	I	8053.62	1	I	8097.68	1	I
8016.37	3	I	8054.52	8	3 II	8097.89	4	I
8017.00	1	I	8057.11	1	I	8100.29	4	I
8017.83	1	I	8057.98	18	I	8100.89	1	I
8019.52	2 ^w	I	8059.01	4	I	8101.67	1	I
8020.31	1	I	8060.03	6	I	8101.90	2	I
8020.76	1	I	8060.50	1	I	8102.15	1	I
8022.21	50	I	8060.75	1	I	8102.69	2	I
8022.33	50	I	8061.13	1	I	8104.76	2	I
8023.91	1	I	8062.63	180	15 I	8105.02	2	I
8024.25	40	I	8064.03	4	I	8105.16		10 III
8024.99	2	I	8064.39	1	I	8106.30	1	I
8025.73	20	I	8065.64	2	I	8106.58	2	I
8026.22	50	I	8066.83	100	I	8107.22	2	I
8026.44	4	I	8068.04	2	I	8107.54	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8108.94	2	I	8144.91	1	I	8183.85	8	I
8109.53	1	I	8145.51	5	I	8184.41	4	I
8109.82	1	I	8146.24	4	I	8185.60	2 _s	I
8110.80	2	I	8146.76	4	I	8186.24	2	I
8111.59	1 w	I	8148.00	2	I	8186.92	250	I
8111.80	1	I	8148.30	1	I	8187.51	2	I
8112.58	3	I	8148.93	1	I	8189.67	1	I
8112.83	3	I	8149.74	12	I	8189.98	2	I
8114.56	20	I	8150.36	18	I	8190.91	50	I
8115.05	2 h	I	8150.52	1	I	8191.08	4	I
8115.29	1	I	8150.72	3	I	8192.18	2	I
8115.91	1	I	8151.22	1	I	8192.51	3	I
8116.36	2	I	8152.40	20	II	8193.25	4	I
8116.47	2	I	8152.63	2	I	8194.41	50	I
8117.14	2	I	8153.01	1	I	8195.56	4	I
8117.58	3	I	8153.85	3	I	8195.95	4	I
8118.56	1	I	8154.20	5	I	8196.82	1	I
8121.08	5	I	8154.96	2	I	8198.46	4	I
8121.65	2 w	I	8155.58	2	I	8200.01	2 w	I
8122.36	25	I	8155.97	3	I	8200.68	2	I
8122.74	120	I	8157.57	100	I	8202.17	10	2 II
8123.68	3	I	8158.66	4	I	8203.21	200	I
8124.30	5	I	8159.75	200	I	8204.02	2	I
8125.16	1 w	I	8161.04	1	I	8205.13	10	I
8125.55	1	I	8161.54	1	I	8205.90	2	I
8125.91	2	I	8162.08	30	I	8206.94	4	I
8126.18	4	I	8163.15	50	10 II	8207.48	10	I
8126.48	3	I	8164.03	1	I	8208.70	1	I
8127.63	4	I	8165.16	3	I	8209.45	8	I
8128.57	1	I	8165.78	5	I	8209.75	2	I
8129.41	50	I	8166.47	20	2 II	8210.12	1	I
8129.72	10	I	8167.44	3	I	8210.54	1	I
8130.24	3	I	8168.00	2	I	8211.60	1	I
8131.52	2	I	8169.18	75	I	8212.25	1	I
8132.35	1	I	8169.55	50	I	8212.58	20	I
8133.53	1	I	8169.81	120	I	8212.79	2	I
8134.13	1	I	8171.67	2	I	8213.46	10	I
8134.29	1	I	8172.14	40	I	8214.15	20	I
8134.67	2	I	8173.76	1	I	8215.81	1	I
8134.84	1	I	8174.14	3	I	8217.23	40	I
8135.85	1	I	8174.72	1	I	8217.98	2	I
8137.33	2	I	8175.86	2	I	8219.26	1	I
8137.96	20	I	8175.94	2	I	8219.65	2	I
8138.46	180	I	8176.82	1	I	8220.12	5	I
8139.92	18	3 II	8177.20	5	I	8220.39	2	I
8140.56	3	I	8178.21	12	I	8220.50	3	I
8141.68	1	I	8180.30	1	I	8220.77	5	I
8143.16	300	25 II	8181.23	2 h	I	8221.21	2	I
8143.72	2	I	8181.32	4 w	I	8223.43	2	I
8144.04	2	I	8182.29	5	I	8224.08	2	1 II

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8224.97	4	I	8272.43	1	I	8316.61	4	I
8225.92	1	I	8273.63	2	I	8317.09	1	I
8226.53	2	I	8273.96	5	I	8318.53	1	I
8227.47	20	I	8275.63	300	II	8319.39	1	I
8227.68	10	I	8276.24	2	I	8320.86	250	I
8229.43	2	I	8276.75	3	I	8322.06	2 h	I
8231.41	20	I	8278.39	1	I	8322.91	3	I
8232.43	2	I	8279.52	1	I	8323.43	2	I
8233.47	1 w	I	8280.96	4	I	8324.04	1	I
8234.36	3	I	8282.24	6	I	8324.60	2	I
8234.95	5	I	8284.50	1 w	I	8325.38	1	I
8235.83	2	I	8285.56	3	I	8326.09	2	I
8236.33	3	I	8286.06	2	I	8326.98	3 w	I
8236.79	2	I	8287.11	8	I	8327.21	4 s	I
8237.75	6	I	8288.42	20	I	8328.03	2	I
8241.80	2	I	8290.08	1	I	8328.39	2	I
8242.37	1	I	8290.88	1	I	8329.01	4	I
8243.50	2	2 II	8291.57	1	I	8329.40	2	I
8243.85	1	I	8292.07	2	I	8330.47	500	I
8243.90	2	I	8292.53	50	I	8331.95	2	I
8245.08	2	I	8293.50	5	I	8332.47	5	I
8246.03	10	I	8294.47	1	I	8333.43	10	I
8247.83	5 w	I	8294.84	1	I	8333.79	2	I
8248.63	2	I	8295.03	4	I	8334.20	1	I
8249.08	2	I	8295.56	30	I	8334.62	1	I
8250.03	4	I	8297.20	5	I	8335.16	2	I
8251.18	2	I	8297.40	3	I	8335.71	10	I
8251.80	2 w	I	8297.88	2 w	I	8336.95	4	I
8252.39	80	5 I	8298.38	4	I	8338.46	2	I
8252.91	2 w	I	8300.05	3	I	8339.13	1	I
8253.62	25	I	8300.17	1	I	8339.41	3	I
8254.12	2 w	I	8300.74	2	I	8340.94	3	I
8254.75	75	I	8301.43	2	I	8341.49	30	I
8255.81	2	I	8302.60	3	2 II	8342.29	1	I
8256.83	1	I	8304.06	1	I	8342.70	2	I
8258.35	5 s	I	8304.43	15	3 II	8343.26	1	I
8258.69	1	I	8304.87	2	I	8343.58	1	I
8259.04	2 w	I	8307.29	1	I	8344.19	3	I
8259.51	15	I	8309.29	4	I	8345.88	15	I
8261.02	60	I	8309.61	3	I	8346.54	15	I
8261.99	4	I	8310.10	3	I	8347.86	3	I
8263.02	2	I	8310.61	3	I	8348.27	2	I
8263.93	25	5 II	8311.06	1	I	8349.24	1	I
8265.79	2	I	8311.64	20	I	8349.83	3 w	I
8267.43	2 s	I	8312.35	2	I	8350.82	1	I
8268.52	2	I	8313.29	1	I	8351.05	2	I
8269.24	2	I	8313.58	2	I	8351.14	2	I
8269.56	1 w	I	8314.07	2	I	8351.38	3	I
8270.44	2	I	8314.29	1	I	8351.83	3 w	I
8270.96	2 h	I	8315.44	1	I	8352.24	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8353.87	1	I	8396.81	1	I	8438.49	2	I
8355.14	5	I	8397.05	2	I	8438.80	4 w	I
8356.07	10	I	8398.17	25	I	8440.66	50 w	I
8357.53	4	I	8399.25	25	I	8441.47	1	I
8357.84	4	I	8399.70	2	I	8441.81	1	I
8358.11	2	I	8400.12	1	I	8442.49	2 w	I
8358.72	70	I	8401.14	1	I	8443.21	4 w	I
8359.36	1	I	8401.99	50	I	8445.49	150	I
8360.49	10	I	8403.79	150	II	8446.51	350	I
8361.08	1	I	8404.45	1	I	8447.97	4	I
8362.23	1	I	8405.78	3	I	8449.27	2 w	I
8364.78	2	I	8406.31	3	I	8450.36	1	I
8365.27	2	I	8406.67	4	I	8450.67	100	II
8366.08	75	I	8407.01	10	I	8452.38	2	I
8367.40	75	I	8407.69	3	I	8453.40	2	I
8367.70	1 w	I	8410.13	3	II	8454.91	5	I
8368.40	5	I	8410.54	4	I	8455.37	1	I
8369.34	70	I	8410.78	3	I	8455.97	1	I
8370.71	1	I	8411.27	2	I	8456.35	4	I
8371.65	2 w	I	8411.90	75	I	8458.12	1	I
8372.92	1	I	8412.96	10	II	8459.77	2	I
8373.16	2	I	8414.76	1	I	8460.12	3	I
8374.20	3	I	8414.94	2	I	8460.37	1	I
8374.77	5	I	8415.40	10	I	8460.48	2 w	I
8376.89	2	I	8416.72	25	I	8461.57	1	I
8377.32	2	I	8418.00	90	I	8462.01	2	I
8377.97	1 w	I	8418.66	1	I	8462.66	1	I
8379.22	10	I	8419.45	1	I	8463.35	1	I
8379.76	12	I	8419.65	2	I	8464.23	150	I
8380.42	1	I	8419.92	1	I	8464.71	4	I
8381.07	2 w	I	8421.22	300	I	8465.67	30	I
8382.21	1	I	8421.46	2	I	8466.36	2	I
8382.52	1	I	8423.54	1	I	8467.15	2	I
8383.07	4	I	8424.03	75	II	8467.73	2 w	I
8383.75	1	I	8426.38	25	I	8468.41	1	I
8384.29	1	I	8427.94	1 w	I	8468.95	4	I
8384.93	4	I	8428.66	1	I	8469.45	1	I
8385.73	30	I	8429.14	2	I	8469.95	2	I
8387.10	30	II	8430.61	4	I	8470.36	3	I
8387.76	5	I	8432.28	2	I	8471.81	150	I
8388.53	12	I	8432.48	5	I	8472.59	8	I
8389.01	1	I	8433.26	1	I	8473.64	1	I
8390.36	1	I	8433.87	3	I	8474.56	1	I
8390.93	4	I	8435.02	3	I	8475.40	3	I
8391.20	2	II	8435.31	2	I	8477.86	2	I
8392.40	4	I	8435.74	20	I	8478.37	300	I
8392.55	4	I	8436.05	2	I	8479.40	1	I
8393.87	5	I	8436.65	1	I	8481.74	2	I
8394.76	1	I	8437.54	1	I	8483.30	12	I
8395.50	2	I	8438.10	1	I	8484.68	1	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8486.56	3	I	8526.03	1	I	8556.60	2	I
8487.48	8	I	8526.60	2	I	8556.83	4	I
8488.60	1	I	8527.89	1	I	8557.31	2	I
8489.63	10	I	8528.50	1	I	8558.46	10	I
8490.46	2	I	8528.76	3	I	8559.79	2	I
8491.15	3	I	8529.23	1	I	8560.44	8	I
8491.36	1	I	8529.54	1	I	8561.37	2	I
8491.80	3	I	8529.63	1	I	8561.75	1	I
8492.91	1	I	8530.14	1	I	8562.33	3	I
8493.47	2	I	8530.89	8	I	8563.15	6	I
8494.88	15	I	8531.16	3	I	8564.14	8	I
8496.16	50	I	8531.45	6	I	8564.80	50	I
8496.34	75	I	8531.85	2	II	8565.28	1	I
8496.46	2	I	8532.07	2	I	8565.80	3	I
8496.73	5	I	8532.28	4	I	8567.61	3	I
8497.92	1	I	8532.89	4	I	8568.22	75	II
8498.22	3	I	8533.11	2	I	8569.93	1	I
8498.48	8	I	8534.02	3	I	8571.14	2	I
8500.01	8	I	8534.67	6	I	8571.43	1	I
8500.67	25	II	8535.12	1	I	8572.09	2	I
8501.43	12	I	8536.31	2 w	I	8572.49	1	I
8501.74	1	I	8537.37	1	I	8573.14	180	I
8503.29	1	I	8537.93	1	I	8574.10	8	I
8503.55	1	I	8538.80	1	I	8574.24	1	I
8504.32	4	I	8539.36	2	I	8575.34	30	I
8505.41	2	I	8539.78	100	I	8577.29	75	I
8505.82	1	I	8540.23	1	I	8579.36	2	I
8507.79	1	I	8541.21	1	I	8580.59	3	I
8508.23	4	I	8541.76	1	I	8581.25	1 w	I
8509.33	1	I	8541.87	1	I	8582.05	3	I
8510.62	200	I	8542.62	1	I	8582.59	2	I
8511.91	15	I	8543.44	1	I	8583.24	1	I
8512.59	12	II	8543.69	75	I	8584.01	1	I
8513.48	5	I	8544.58	75	I	8584.50	2	I
8513.63	1	I	8546.45	1	I	8585.21	1	I
8514.89	3	I	8547.42	2	I	8586.28	5	I
8515.61	1	I	8548.17	2	I	8587.64	18	II
8516.55	300	I	8548.74	2	I	8588.23	3	I
8517.41	1	I	8549.55	1	I	8588.44	6	I
8519.33	15	I	8550.20	1	I	8589.07	1	I
8520.10	2 w	I	8550.69	2	I	8589.71	2	I
8520.66	1	I	8551.41	1	I	8590.76	4	II
8521.45	6 w	II	8551.76	6	I	8591.21	6	I
8522.19	2	I	8552.27	1	I	8591.85	100	II
8522.60	2	I	8553.11	2	I	8593.12	75	I
8523.06	4	I	8553.24	1	I	8594.12	3	I
8523.83	4	I	8553.81	1	I	8595.01	2	I
8524.80	2	I	8553.92	2	I	8595.37	1	I
8525.37	2	I	8554.95	150	I	8595.98	1	I
8525.68	2	I	8556.32	60	I	8596.48	4	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8596.72	3	I	8633.93	2	I	8680.77	2	I
8597.05	3	I	8634.05	3	I	8681.33	2	I
8597.45	6	I	8635.17	1	I	8682.23	10	I
8598.87	1	I	8637.27	3	I	8682.47	4	I
8599.48	1	I	8638.36	20	I	8682.91	8	I
8599.79	5	30 II	8639.44	60	I	8683.50	4	I
8600.93	4	I	8640.58	2	I	8683.95	8	I
8602.10	3	I	8640.99	4	I	8685.74	12	I
8602.42	2	I	8641.31	1	I	8686.12	10	5 II
8603.12	1	I	8641.43	2	I	8686.64	15	3 II
8604.43	1	I	8643.31	1	I	8687.30	4	I
8604.53	1	I	8643.95	1	I	8687.85	25	I
8604.95	2	I	8645.31	60	I	8688.65	4	I
8605.50	6	I	8646.25	1	I	8689.19	10	I
8606.16	8	I	8647.65	1	I	8690.25	4	I
8607.73	5	I	8648.36	25	I	8691.35	10	I
8608.71	4	I	8649.15	1	I	8693.70	4	I
8609.39	3	I	8649.86	1	I	8694.20	4	I
8611.45	1	I	8650.44	1	I	8695.27	15	I
8611.78	2	I	8651.19	2	I	8695.95	4	I
8612.52	5	I	8653.89	4	I	8696.57	1	I
8612.87	1	I	8654.73	4	I	8698.63	15	I
8614.69	5	I	8655.89	50	I	8698.88	4	I
8616.23	40	I	8656.70	1	I	8699.23	4	I
8617.12	3	I	8657.53	4	I	8702.04	4	I
8618.61	3	I	8658.45	1	I	8703.35	4	3 II
8618.98	2	I	8659.35	10	I	8703.73	15	I
8620.19	4	I	8659.77	1	I	8704.88	8	I
8621.34	5	I	8660.67	1	I	8707.37	20	I
8621.84	1	I	8661.04	1	I	8708.46	2	I
8622.11	4 w	I	8661.48	2	I	8709.24	90	I
8622.87	4	I	8661.92	4	I	8710.43	8	I
8623.76	3	I	8662.27	4	I	8712.32	8	I
8624.41	5	I	8663.35	4	I	8712.82	4	I
8624.87	3	I	8665.50	160	I	8713.67	15	I
8625.79	2	I	8666.97	4	I	8714.25	8	I
8626.22	1	I	8667.47	16	I	8715.80	4	I
8626.76	1	I	8668.11	70	I	8716.22	2	I
8627.43	3	I	8670.08	4	I	8717.09	1	I
8628.06	4	I	8672.20	8	I	8717.76	15	I
8628.65	1	I	8673.20	8	I	8719.63	80	I
8629.15	8	II	8674.21	4	I	8721.67	80	5 II
8629.66	3	10 w III	8674.75	1	I	8722.47	15	I
8630.08	1 w	I	8675.40	10	I	8723.72	8	I
8630.31	3	I	8676.26	1	I	8724.44	12	I
8630.79	6	I	8676.58	4 w	I	8725.33	4	I
8631.35	10	I	8677.27	8	I	8727.44	4	I
8632.17	5	I	8678.25	4	I	8727.86	8	I
8633.22	4	I	8678.51	8	I	8728.51	2	I
8633.46	2	I	8679.46	10	I	8730.83	12	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8731.30	2	I	8777.35	8	I	8831.51	2	I
8732.42	140	I	8778.04	4	I	8832.13	2	I
8733.02	5	I	8778.25	8	I	8833.67	8	I
8734.03	4	I	8779.94	8	I	8834.48	2	I
8734.53	8	I	8781.10	8	I	8834.85	4	I
8735.20	8	I	8782.47	4	I	8836.12	25	I
8735.75	2	I	8782.72	8	I	8837.30	2 _s	I
8736.36	8	I	8784.15	4	I	8838.44	2	I
8737.14	4	I	8784.57	20	II	8839.11	1	I
8737.61	4	I	8785.47	1	I	8841.16	100	I
8738.16	2	I	8786.05	2	I	8841.87	2	I
8739.80	50	I	8788.02	4	I	8842.08	20	II
8743.27	15	I	8788.49	4	I	8843.53	5	I
8744.15	1	I	8789.59	4	I	8844.52	5	I
8744.60	8	I	8790.39	15	I	8844.67	2	I
8744.99	4	I	8792.05	50	I	8847.97	8	I
8745.51	4	I	8792.61	4	I	8849.30	30	I
8746.74	2	I	8793.33	1	I	8850.30	15	I
8748.03	300	I	8794.37	1 _w	I	8852.62	5	I
8749.16	100	I	8796.39	8	I	8854.89	15	I
8750.21	1	I	8798.15	15	I	8856.42	2 _w	I
8751.21	20	I	8798.42	8	I	8859.00	30	I
8752.47	2	I	8799.00	1	I	8859.40	15	I
8753.72	2	I	8799.31	1	I	8860.96	15	I
8754.32	8	I	8800.06	1	I	8861.57	1	I
8755.03	4	I	8800.42	4	I	8862.28	3	I
8755.58	2	I	8801.05	8	I	8862.73	8	I
8756.46	4	I	8802.45	1	I	8864.48	2	I
8757.22	1	I	8803.39	3	I	8865.57	25	I
8758.24	250	I	8804.57	25	I	8866.71	15	I
8759.27	8	I	8805.87	12	I	8868.00	8	I
8760.45	50	I	8806.23	4	I	8868.81	250	I
8761.67	8	I	8807.79	5 _w	I	8870.67	4	I
8762.31	1	I	8808.71	5 _w	I	8871.97	16	I
8762.99	2	I	8810.23	20	I	8872.22	1	I
8763.98	2	I	8814.91	2	I	8874.65	1	I
8764.81	2	I	8816.16	15	II	8875.23	30	I
8766.74	50	I	8817.74	4	I	8876.26	2	I
8768.20	12	I	8820.22	30	I	8877.42	1 _h	I
8769.86	4	I	8820.38	30	I	8878.35	4	I
8771.06	1	I	8820.99	1	I	8879.10	4	I
8771.78	8	I	8821.73	8	I	8880.72	1 _w	I
8772.39	8	I	8822.26	2	I	8881.91	4	I
8772.81	50	I	8822.58	1	I	8882.50	8	I
8773.53	8	I	8823.17	1	I	8883.17	1	I
8774.06	4	I	8824.18	3	I	8884.21	1 _h	I
8774.55	1	I	8826.27	4	I	8885.04	2	I
8775.58	140	I	8827.88	4	I	8886.06	2	I
8776.15	1	I	8829.67	25	I	8886.62	3	I
8777.01	8	I	8831.20	1	I	8887.70	3	I

Table 1. Wavelengths of Thorium Spectra - Continued

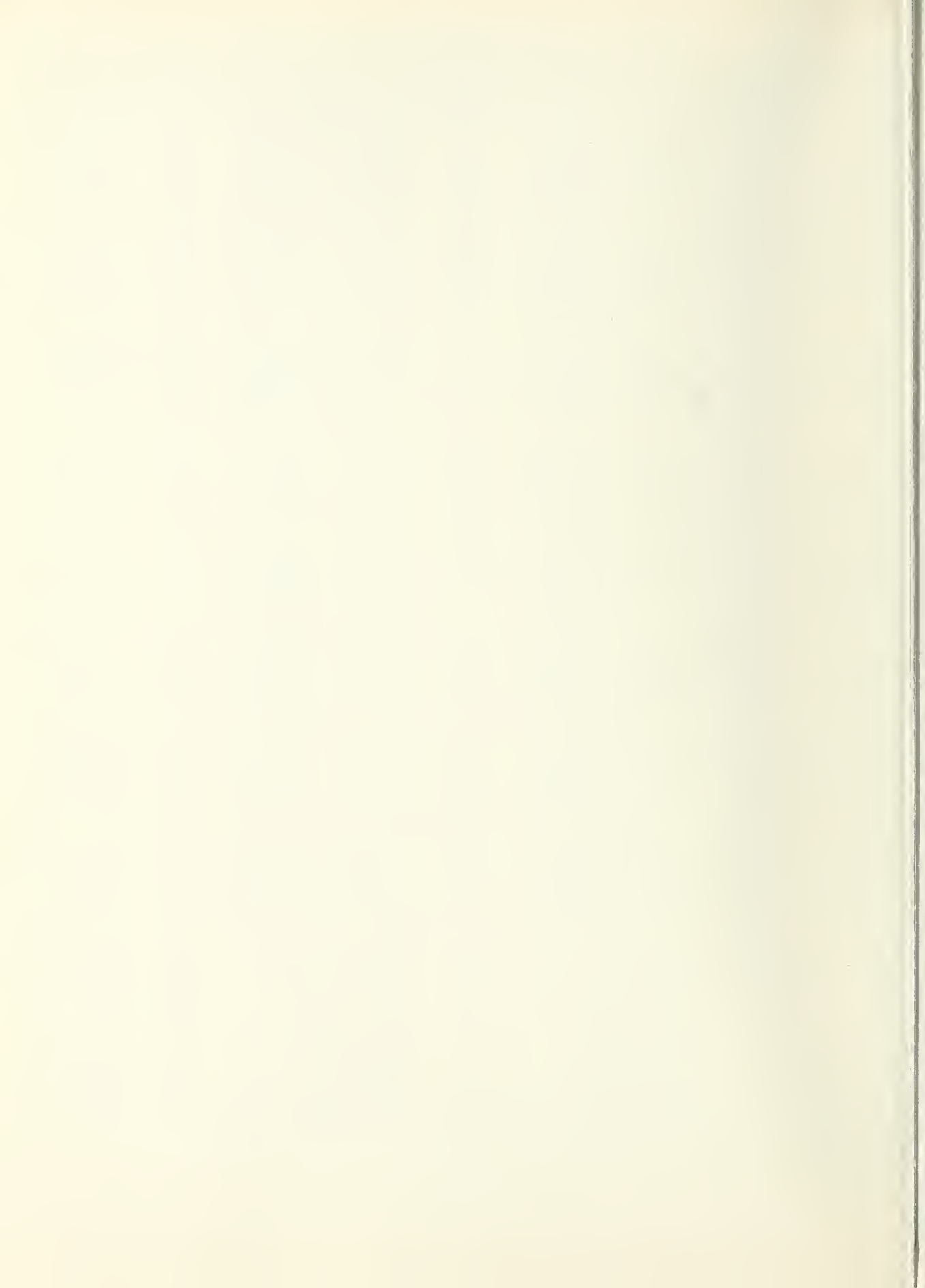
Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum
8888.23	1	I	8962.17	8	I	9069.55	2	I
8889.19	30	I	8962.87	8	I	9070.38	10 w	I
8889.98	1	I	8964.00	4	I	9072.26	10	5 II
8890.26	8	I	8966.98	2	I	9079.20	20	I
8892.97	15	I	8967.61	100	5 I	9082.50	5	I
8893.51	15	I	8969.85	20	I	9084.62	1	I
8894.42	2	I	8972.85	1	I	9089.55	1	I
8895.52	2	I	8973.73	1	I	9090.79	4	I
8897.08	4	I	8979.59	2	I	9094.70	5	I
8900.09	2	I	8979.69	1	I	9094.85	4	I
8900.91	4	I	8980.68	5	I	9101.04	2	I
8904.14	2 w	I	8981.11	2	I	9101.76	5	I
8904.82	1	I	8985.28	2	I	9119.60	4	1 II
8905.55	2	I	8985.82	2	I	9126.00	5	I
8907.00	15	I	8986.36	1	I	9129.10	1	I
8908.65	8	I	8987.37	15	I	9132.25	1	I
8910.28	4	I	8990.90	2	I	9134.68	5	I
8910.83	20	I	8992.04	1	I	9140.57	15	I
8912.77	15	I	8995.14	15	I	9141.70	1	I
8913.42	8	I	8997.87	4	I	9165.01	1	I
8914.10	2	I	8999.53	2	I	9165.90	8	I
8914.67	1	I	9004.50	2 w	I	9167.82	2	I
8915.32	4	I	9007.78	5	I	9170.79	2	I
8915.91	2	I	9009.87	8	I	9178.80	5	I
8916.48	4	I	9010.39	2	I	9180.24	10	I
8916.98	1	I	9011.40	1	I	9187.54	2	I
8917.33	1	I	9012.50	15	I	9193.60	2	I
8917.72	1	I	9013.97	1	I	9199.70	2	I
8918.66	1 w	I	9016.58	30	I	9201.72	2	I
8919.75	4	I	9026.59	1	I	9203.93	30	10 I
8922.53	2	I	9029.95	1	I	9208.58	2	I
8923.01	1	I	9031.80	8	I	9215.92	4	I
8924.22	4 w	I	9032.60	2 w	I	9221.44	2	I
8925.07	4	I	9034.23	4 w	I	9222.29	2	I
8927.70	8	I	9037.88	15	I	9227.53	10	I
8928.08	15	I	9038.69	5	5 II	9232.48	2	I
8930.00	1	I	9040.11	15	15 II	9233.24	2	2 II
8935.78	8	I	9042.37	1	I	9233.83	2	I
8940.31	1	I	9045.34	15	I	9243.74	1	I
8941.64	8	I	9046.15	10 w	I	9246.48	1	1 I
8942.62	1	I	9046.25	15 w	I	9252.84	1	2 II
8945.06	1	I	9046.34	5	I	9260.32	2	I
8947.99	1	I	9048.24	100	I	9266.22	25	5 I
8948.40	15	I	9050.24	15 w	I	9266.98	15	10 II
8949.11	25	I	9053.47	15	15 II	9267.68	10	8 II
8952.10	1	I	9061.80	1	I	9270.14	4	I
8955.82	15	I	9062.56	10	12 II	9276.28	10	1 I
8956.49	1	I	9063.93	15	I	9276.98	2 w	I
8957.97	20	5 II	9064.48	1	I	9277.75	1	I
8959.22	1	I	9066.10	12	10 II	9287.58	2	I

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum	Wave-length	Intensity Lamp Spark	Spec- trum			
9289.56	15	1	I	9497.20	20	3	I	9665.94	5 w	I	
9294.97	2		I	9500.30	2		I	9670.76	2	I	
9300.00	2		I	9501.42	1		I	9674.74	2	I	
9307.88	12	1	I	9505.38	10		I	9676.09	3	I	
9310.41	4		I	9507.63	2		I	9676.80	3	I	
9317.72	3		I	9509.20	1		I	9678.18	1	I	
9319.98	1 h		I	9510.96	1		I	9678.84	1 w	I	
9340.71	10		I	9517.18	2		I	9679.73	2 w	I	
9344.10	2		I	9519.65	2 w		I	9695.00	1	I	
9347.42	3		I	9528.50	2		I	9697.54	20	3	I
9355.95	2		I	9536.37	2		I	9701.44	1	I	
9357.25	1		I	9540.35	1		I	9702.22	4	I	
9360.95	10	5	II	9547.28	2		I	9705.69	2	I	
9362.59	4		II	9547.99	3		I	9705.82	2 w	I	
9362.73	1 h	2	II	9548.70	1		I	9710.64	2 w	I	
9365.20	2		I	9551.67	1		I	9715.14	1 w	I	
9379.69	1 w		I	9553.96	4		I	9716.07	2	I	
9383.23	10		I	9555.71	1		I	9725.47	30	I	
9388.92	8		I	9561.22	10	2	I	9743.55	6	I	
9390.60	5		I	9565.56	2		I	9744.70	10 w	I	
9399.10	40	20	I	9567.28	1		I	9746.44	25	6	I
9409.34	10		I	9567.79	1		I	9753.54	3	I	
9413.66	3		I	9570.33	1 h		I	9758.42	1	2	II
9414.10	2		I	9577.31	8	6	II	9769.51	3	I	
9415.76	1		I	9578.59	1		I	9772.27	1	I	
9417.42	1		I	9579.04	2		I	9773.54	2	I	
9420.58	1		I	9579.13	2		I	9775.12	1	I	
9431.58	10		I	9582.82	5		I	9779.41	3	I	
9432.26	10	6	II	9583.09	2	2	II	9785.32	1	I	
9436.79	2		I	9587.00	2		I	9789.47	3	I	
9439.30	1 h		I	9588.78	1		I	9792.86	1	I	
9441.61	1		I	9590.32	2		I	9794.58	1	I	
9442.00	1		I	9595.36	4		I	9796.15	5	I	
9446.93	1		I	9607.51	6	5	II	9797.21	2	I	
9450.47	1		I	9608.46	5		I	9812.67	12	1	I
9453.58	1		I	9613.67	15	10	II	9822.35	1	I	
9455.21	3		I	9619.17	1		I	9826.45	20	4	I
9455.91	1 h		I	9620.96	4		I	9831.61	2	I	
9456.02	3		I	9623.34	2		I	9833.41	20	2	I
9458.57	1 w		I	9625.15	4		I	9833.97	5	1	I
9461.04	12	2	I	9625.76	1		I	9845.61	1	I	
9464.99	1		I	9627.36	1		I	9855.68	2	I	
9467.20	12		I	9629.54	10		I	9863.90	1	I	
9470.68	15		I	9632.65	15	1	I	9864.54	3	1	II
9474.89	25	6	I	9638.55	1		I	9871.99	2	I	
9477.25	2	3	II	9640.26	3 w		I	9872.58	2	I	
9482.27	4		I	9641.82	5		I	9873.77	10	I	
9483.80	2	2	II	9642.43	3	2	II	9890.00	5 w	I	
9486.91	4		I	9643.29	1		I	9896.04	3	I	
9495.50	15	2	I	9664.70	10 w	1	I	9898.30	2	I	

Table 1. Wavelengths of Thorium Spectra - Continued

Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum	Wave-length	Intensity Lamp	Spec- trum
9902.31	5	I	10250.62	4	I	10723.80	5	I
9907.44	1	I	10252.43	2	I	10725.31	2	I
9911.05	4	I	10257.31	5	I	10726.91	10	I
9912.14	3	I	10283.08	1	I	10732.20	2	I
9915.95	1	I	10301.13	3	II	10749.38	2	I
9927.30	1	I	10308.50	2	I	10776.91	2	I
9929.97	2 w	I	10316.86	2	I	10779.03	1	I
9934.58	2	I	10329.87	2	I	10785.83	1	I
9935.17	3	I	10348.00	2	I	10786.31	2	I
9943.04	15	15 II	10374.46	2	I	10799.99	4	I
9952.30	2	I	10419.50	4	4 II	10803.84	1	I
9954.44	10	I	10429.59	1	I	10804.43	1 h	I
9954.78	10	I	10438.55	1	I	10812.23	2	I
9970.44	4	I	10450.38	1	I	10813.33	2	I
9974.72	3	I	10452.60	3	I	10820.01	2	I
9985.06	10	I	10459.55	1	I	10827.02	1 h	I
9987.61	10	I	10480.45	3	I	10834.11	3	I
9992.20	1	I	10487.25	1	I	10835.28	2	I
9992.63	4	I	10492.19	3	I	10844.33	2	I
9993.85	2	I	10498.43	4	I	10862.45	2	I
10011.35	2	I	10502.54	2	I	10869.89	2	I
10033.20	2	I	10512.15	10	I	10891.14	1	I
10039.35	10	I	10525.83	3	I	10894.79	1	I
10048.00	1	I	10527.74	5	I	10901.12	2	I
10082.82	2 w	I	10532.54	1	I	10913.59	1	I
10083.74	10	I	10533.31	1	I	10942.19	7	II
10086.40	1	I	10540.90	2	I	10962.85	2	I
10089.14	10	I	10554.76	2	I	10998.24	2	I
10133.54	10 c	II	10556.40	10	I	11051.84	5	I
10140.43	3	I	10565.25	5	I	11056.93	1	I
10141.36	4	I	10565.67	2 w	I	11074.71	2	I
10172.55	2 w	I	10581.64	3	I	11230.17	5	I
10173.11	2	I	10584.98	1	I	11316.71	1	I
10174.94	1	I	10591.24	1 w	I	11350.00	1	I
10178.48	2	I	10601.27	2	I	11354.53	2	I
10188.36	2	I	10605.37	2	I	11447.37	1	I
10211.54	1	I	10613.28	2	I	11461.65	1	I
10218.42	1	I	10614.94	3	I	11464.28	2	I
10235.97	3	I	10660.85	1	I	11508.48	1	I
10244.93	1	I	10664.17	3	I	11558.37	1	I
10247.49	2	I						



Selected Publications of the National Bureau of Standards

Table of Wavenumbers, C. D. Coleman, W. R. Bozman, and
W. F. Meggers:

Monograph 3, Volume I. 2000 Å to 7000 Å.	p. (1960)	\$6. 00
Monograph 3, Volume II. 7000 Å to 1000 μ .	p. (1960)	\$6. 00

Atomic Energy Levels, C. E. Moore:

Circular 467, Volume I. H to V ($Z=1$ to 23) 206 spectra.	309 p. (1949)	\$5. 50
Circular 467, Volume II. Cr to Nb ($Z=24$ to 41) 152 spectra.	227 p. (1952)	\$4. 00
Circular 467, Volume III. $\left\{ \begin{array}{l} \text{Mo to La } (Z=42 \text{ to } 57) \\ \text{Hf to Ac } (Z=72 \text{ to } 89) \end{array} \right\}$	124 spectra. 245 p. (1958)	\$2. 50

An Ultraviolet Multiplet Table, C. E. Moore:

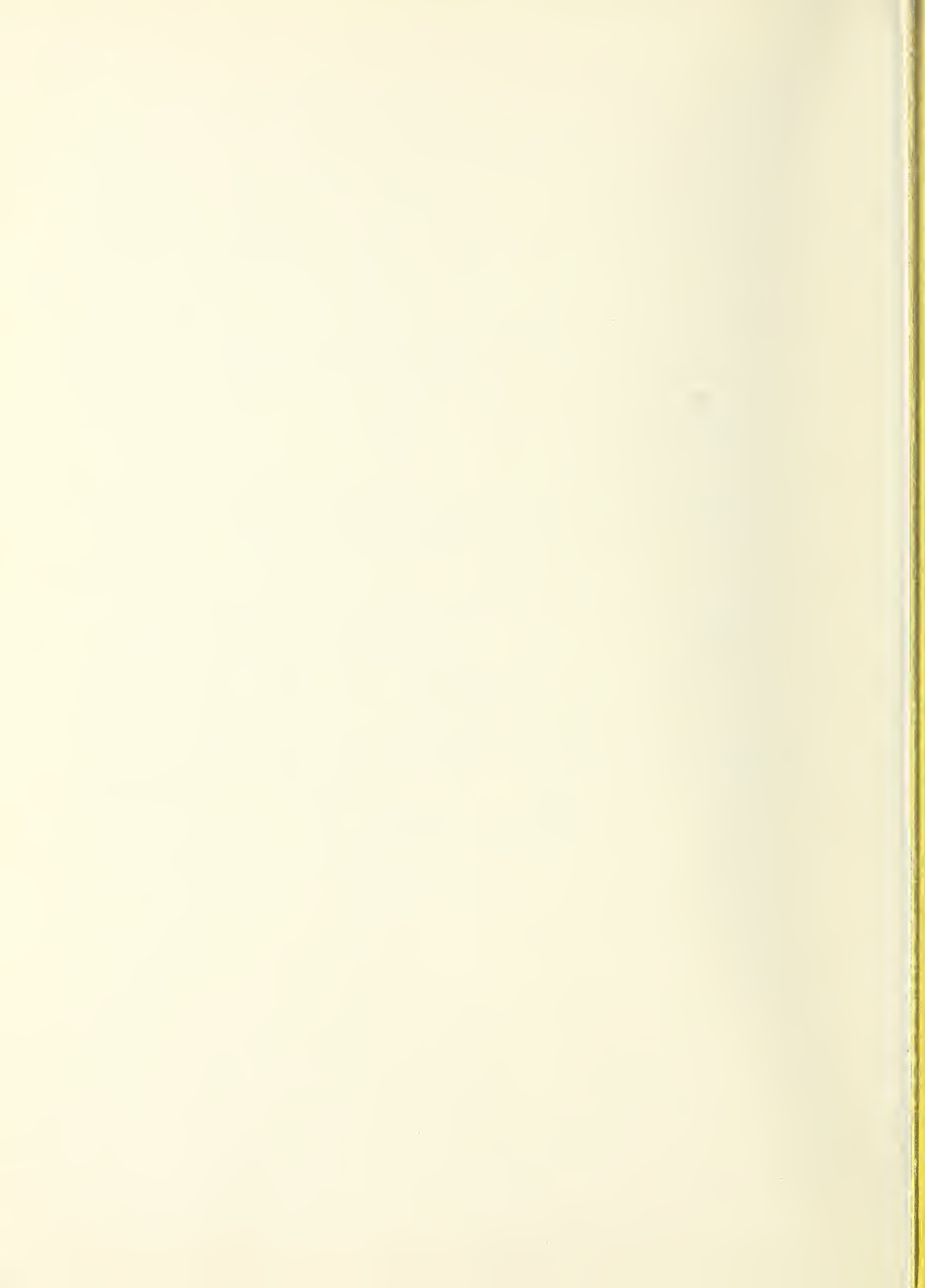
Circular 488, Section 1. H to V ($Z=1$ to 23); Selected Multiplets of 79 Spectra.	78 p. (1950).	\$0. 55
Circular 488, Section 2. Cr to Nb ($Z=24$ to 41); Selected Multiplets of 46 Spectra.	115 p. (1952).	\$0. 70

The above publications may be purchased from the Superintendent of Documents, U.S. Government Printing
Office, Washington 25, D.C.

A Multiplet Table of Astrophysical Interest, C. E. Moore. A Reprinting of the 1945 Multiplet Table (Princeton Univ., Obs. Contr. No. 20):

Technical Note 36 (PB151395), Part I. Table of Multiplets and Part II. Finding List, $\lambda\lambda 2951\text{\AA}$ – $13164\text{\AA}$.	242 p. (1959).	\$4. 00
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The above Technical Note may be purchased by the PB number from the Department of Commerce, Office of
Technical Services, Washington 25, D.C.



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Optics and Metrology. Photometry and Colorimetry. Optical Instruments. Photographic Technology. Length. Engineering Metrology.

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Organic and Fibrous Materials. Rubber. Textiles. Paper. Leather. Testing and Specifications. Polymer Structure. Plastics. Dental Research.

Metallurgy. Thermal Metallurgy. Chemical Metallurgy. Mechanical Metallurgy. Corrosion. Metal Physics.

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• Office of Basic Instrumentation.

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Radio Propagation Engineering. Data Reduction Instrumentation. Radio Noise. Tropospheric Measurements. Tropospheric Analysis. Propagation-Terrain Effects. Radio Meteorology. Lower Atmosphere Physics.

Radio Standards. High-Frequency Electrical Standards. Radio Broadcast Service. Radio and Microwave Materials.

Atomic Frequency and Time Standards. Electronic Calibration Center. Microwave Circuit Standards.

Radio Communication and Systems. Low Frequency and Very Low Frequency Research. High Frequency and Very High Frequency Research. Modulation Systems. Antenna Research. Navigation Systems. Systems Analysis. Field Operations.

