

# Über die ultravioletten Funkenspectra der Elemente

(II. Mittheilung)

Prof. **Franz Exner**, c. M. k. Akad., und **E. Haschek**.

(Mit 5 Tafeln.)

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Seit dem Erscheinen unserer I. Mittheilung<sup>1</sup> steht uns ein Rowland'sches Originalgitter zur Verfügung, das ungleich Besseres zu leisten vermag, als das bisher von uns benützte. Das Gitter hat einen Krümmungsradius von 152 *cm* und zählt 538 Linien auf den Millimeter. Es ist wesentlich lichtstärker als das frühere, so dass die Expositionszeit auf wenige Minuten herabgesetzt ist. Die Schärfe und Definition der Linien lässt nichts zu wünschen übrig; die stärksten Linien im violetten Theile des Eisenspectrums weisen bei vollkommen scharfer Begrenzung nur eine Breite von 0·3 AE. auf. Doppellinien in scharfen Spectren, wie z. B. Wo, Pt, Mn u. dergl., die nur um 0·1 AE. von einander abstehen, erscheinen noch deutlich getrennt. Da in Folge dessen zahlreiche Linien unserer ersten Messung sich in Doppellinien oder Liniengruppen auflösten, und ausserdem in Folge der wesentlich grösseren Lichtstärke zahlreiche neue Linien sichtbar wurden, so unterzogen wir die sämtlichen Elemente unserer I. Mittheilung einer neuerlichen Messung.

Die Aufnahmen wurden sämtlich im zweiten Spectrum gemacht; um das störende Ultraviolett des dritten Spectrums zu beseitigen, genügte die Einschaltung eines Glases, das

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Strahlen bis zur Wellenlänge  $\lambda < 3200$  absorbierte; um das Blau und Violett des ersten Spectrums, das im äussersten ultraviolettten Theile des aufzunehmenden Bezirkes über  $\lambda = 2500$  bis 2000 fällt, zu eliminiren, deckten wir den Spalt theilweise durch Glas ab. Dadurch erscheinen die ultravioletten Linien des zweiten Spectrums verkürzt, die blauen und violetten des ersten Spectrums dagegen in normaler Länge und können so leicht ausgeschieden werden. Allerdings ist dabei bei linienreichen Spectren die Gefahr einer Verdeckung einer schwachen ultravioletten Linie durch eine starke blaue nicht ausgeschlossen. Die verhältnissmässig kurze Brennweite des Gitters bedingt eine merkliche Krümmung des Bildes; da wir ein Durchbiegen der Platten vermeiden wollten, so nahmen wir den gemessenen Bezirk von  $\lambda = 4800—2000$  immer auf je vier Platten von 21 cm Länge auf, deren mittlere Hälfte zur Messung verwendet wurde. Leider zeigte auch unser Gitter die üble Gewohnheit der »Gespenster«; allerdings treten dieselben nur bei scharfen und sehr starken Linien auf und sind insoferne weniger störend, als sie nach Distanz und Intensität vollkommen symmetrisch zu den Linien stehen. Ihre Distanz beträgt bei  $\lambda = 2300$  3·2 AE. und bei  $\lambda = 4600$  6·5 AE. Die allerstärksten Linien zeigen ausserdem noch in der halben Distanz schwache secundäre Gespenster.

Die Messung selbst geschah wieder in objectiver Weise mit Hilfe der Projection. Das Bild des Spectrums wurde in 30facher Vergrösserung so auf einen Schirm geworfen, dass sowohl das zu messende Spectrum, als auch das beiderseits einphotographirte Vergleichsspectrum, als welches wir ausschliesslich das Eisenspectrum benutzten, je auf eine in halbe Centimeter getheilte Scala fiel. Die Standardlinien wurden hierbei so eingestellt, dass ihre Wellenlänge (nach Rowland'schen Angaben) mit den Scalentheilen übereinstimmten; es konnten dann die unbekannten Wellenlängen ohne jede weitere Rechnung von der Scala abgelesen werden.

Zur Beurtheilung der erreichten Genauigkeit diene Folgendes: In sechs verschiedenen Aufnahmen haben wir unter Anderen folgende acht Luftlinien mitgemessen, wobei sich die nachstehende Tabelle ergibt:

|         | <i>A</i> | <i>B</i>       | $\lambda$ | <i>A</i> | <i>B</i>       |
|---------|----------|----------------|-----------|----------|----------------|
| 4607·32 | 0·08     | $\pm 0\cdot08$ | 4153·57   | 0·13     | $\pm 0\cdot11$ |
| 4596·28 | 0·06     | 0·05           | 3995·18   | 0·03     | 0·03           |
| 4319·85 | 0·08     | 0·08           | 3954·50   | 0 00     | 0·00           |
| 4190·00 | 0·07     | 0·06           | 3919·30   | 0·07     | 0·08           |

Hier stehen unter  $\lambda$  die Mittel der Wellenlängen aus je sechs Messungen, unter *A* die durchschnittliche Abweichung der einzelnen Zahlen vom Mittelwerthe, unter *B* der wahrscheinliche Fehler der einzelnen Messung. Obwohl die Luftlinien keineswegs zu den scharfen Linien gehören, beträgt der wahrscheinliche Fehler der einzelnen Messung im Durchschnitte nur 0·06 AE.

Zum weiteren Vergleiche haben wir die höchst verlässlichen Zahlen von Kayser und Runge für das Silber- und Kupferspectrum und die von Rowland für das Mangan herangezogen. Obwohl Silber und Kupfer zu den relativ linienarmen Spectren gehören, so finden sich doch im Bogenspectrum (Kayser und Runge) beim Silber 38 und beim Kupfer 172 Linien, welche mit solchen unseres Funkenspectrums als identisch anzusehen sind. Indem wir die Zahlen von Kayser und Runge als richtig ansehen, ergibt sich für das Kupferspectrum bei unseren Messungen ein mittlerer Fehler von 0·12 AE. Bei dem Umstande, dass die Kupferlinien zumeist, besonders im Blau und Violett, sehr unscharf und breit sind, und dass von uns jede Linie nur einmal gemessen wurde, muss diese Genauigkeit als eine ganz befriedigende angesehen werden. Für das Silber erhalten wir gleicherweise einen mittleren Fehler von 0·10 AE., wobei jedoch bemerkt werden muss, dass unter den verglichenen 38 Linien sich vier ausserordentlich breite und verwaschene finden, für welche Kayser und Runge selbst eine Fehlergrenze von 0·5—2·0 AE. angeben. Lässt man, wie es für den vorliegenden Zweck gerechtfertigt ist, diese vier Linien aus dem Vergleiche weg, so ergeben die restirenden 34 einen mittleren Fehler von 0·07 AE. In unserem Mangan-

spectrum finden sich 26 Linien, die auch von Rowland als Manganlinien im Sonnenspectrum gemessen wurden; mit den Rowland'schen Zahlen verglichen, zeigen die unseren einen mittleren Fehler von 0·06 AE.

Aus dem Vorstehenden glauben wir den Schluss ziehen zu dürfen, dass der wahrscheinliche Fehler unserer einzelnen Messung, insoferne es sich nicht um sehr unscharfe Linien handelt, kleiner als 0·1 AE. ist.

Bezüglich der nachfolgenden Tabellen wäre noch Folgendes zu bemerken: Dieselben stellen lediglich einen Nachtrag dar zu jenen unserer I. Mittheilung. Es sind darin nur Linien aufgenommen, welche dort noch nicht beobachtet wurden, oder solche, deren Wellenlängen bei der ersten Messung in Folge der mangelhaften Definition des damals verwendeten Gitters um mehr als 0·1 AE. von der neuen Bestimmung differiren, oder endlich solche, welche durch die neueren Aufnahmen in zwei oder mehr Linien aufgelöst wurden. In diesen Fällen finden sich die Zahlen der früheren Messung in der mit *i* überschriebenen Rubrik der Intensitäten eingeklammert angeführt; alle Zahlen der früheren Messungen, welche in den folgenden Tabellen nicht in Klammern vorkommen, sind daher bis auf 0·1 AE. richtig und nur der Raumersparniss wegen hier nicht nochmals mit abgedruckt. Die unter der Rubrik *i* beigefügten Zeichen behalten dieselbe Bedeutung wie früher: Die Intensitäten sind mit 1—6 bezeichnet, wobei 1 zur stärksten Intensität gehört; ein + bedeutet, dass die Linien verwaschen, d. dass sie doppelt, u. dass sie umgekehrt sind.

Bezüglich der Linien  $\lambda = 3933\cdot8$  und  $\lambda = 3968\cdot6$ , welche in allen von uns bisher untersuchten Spectren vorkommen, müssen wir bemerken, dass dieselben nicht, wie wir irrthümlicherweise glaubten, dem Wolfram angehören, in dem sie allerdings mit ganz besonderer Stärke auftreten, sondern dass es Calciumlinien sind, wovon wir uns durch eine Aufnahme des Ca-Spectrums überzeugten. Weitere Linien, die eventuellen Verunreinigungen angehören, werden sich erst ausscheiden lassen, bis der grösste Theil der Elemente untersucht sein wird.

Auf den beigefügten Tafeln geben wir die Spectren der untersuchten Elemente nach den Originalplatten und in Original-

grösse reproducirt wieder. Es soll dadurch die Möglichkeit geboten werden, sich durch einen Blick von dem Charakter eines Spectrums und der Lage der Hauptlinien in demselben zu überzeugen.

### Silber (Nachtrag).

Die Zahl der Linien ist sowohl im Silber-, als im Kupferspectrum<sup>1</sup> keine sehr bedeutende: Im Intervall  $\lambda = 4668\cdot8$  bis  $2113\cdot0$  haben wir 493 Linien gemessen. Die Schärfe derselben lässt viel zu wünschen übrig und nimmt im Allgemeinen mit abnehmender Wellenlänge zu. Aus der Tabelle 1 unserer I. Mittheilung sind die folgenden Linien als Luftlinien zu streichen:  $3918\cdot7$ ,  $3912\cdot9$ ,  $3906\cdot2$ ,  $3839\cdot7$ ,  $2928\cdot7$ .

| $\lambda$         |           | $\lambda$ |          | $\lambda$ |           |
|-------------------|-----------|-----------|----------|-----------|-----------|
| 4668·8            | 5         | 4055·9    | 6+       | 3838·8    | 5+ br.    |
| 4509·8            | 6         | 54·9      | 6+       | 30·3      | 6+ br.    |
| 4443·4            | 6+        | 45·7      | 6+       | 25·9      | 6         |
| 11·0              | 6         | 3985·3    | 5 (84·9) | 20·4      | 6         |
| 4396·0            | 6+        | 73·3      | 3 (72·7) | 15·8      | 6+        |
| 84·9              | 6         | 67·8      | 6        | 10·5      | 5+ (10·7) |
| 55·4              | 6         | 49·5      | 6        | 3759·8    | 6+        |
| 36·8              | 6         | 43·0      | 6+ br.   | 58·5      | 6+        |
| 11·2              | 5 (11·4)  | 20·2      | 6        | 45·8      | 6+        |
| 4227·2            | 6+ br.    | 14·5      | 5+       | 40·3      | 6+ br.    |
| 12·2 <sup>2</sup> | 4+ 10 AE. | 07·7      | 5+ br.   | 37·3      | 6+        |
|                   | (09·4)    | 3863·8    | 6        | 35·0      | 6         |
| 4182·7            | 6+ 2 AE.  | 60·0      | 6        | 32·5      | 6+        |
| 59·2              | 6+        | 56·5      | 5+ 2 AE. | 20·1      | 6         |
| 13·7              | 6+        | 51·0      | 6+ br.   | 09·5      | 6         |
| 4086·0            | 5 (85·5)  | 48·0      | 6+       | 3674·0    | 5+ (74·7) |
| 81·7              | 6+        | 43·0      | 6+ br.   | 55·0      | 6+ 3 AE   |
| 57·9              | 6 (57·7)  | 41·0      | 6+       |           | (54 2)    |

Vergl. auch die seither erschienenen Messungen des Cu- und Ag-Spectrums von J. M. Eder und E. Valenta (Denkschr. der k. Akad. Wien, Bd. 53, 1896).

<sup>2</sup> Umgekehrt; die Linien selbst scharf und 2 AE. br.

| $\lambda$         |                    | $\lambda$         |               | $\lambda$ |             |
|-------------------|--------------------|-------------------|---------------|-----------|-------------|
| 3639.7            | 5 (40.2) Pb        | 3295.6            | 6+            | 3207.3    | 6+ (07.5)   |
| 23.5              | 6+                 | 93.0              | 6 br. (92.5)  | 03.8      | 6+          |
| 19.0              | 6                  | 89.0              | 6+ (89.2)     | 00.9      | 5+ } (00.5) |
| 16.5              | 5 (16.2)           | 80.7 <sup>1</sup> | 1 (80.6)      | 00.0      | 6+ }        |
| 3596.3            | 6                  | 74.6              | 6             | 3198.1    | 6+          |
| 81.5              | 6                  | 68.6              | 6             | 96.1      | 6+          |
| 70.4              | 6                  | 67.3              | 6             | 93.6      | 6           |
| 57.2              | 6+ (57.7)          | 65.8              | 5+            | 91.9      | 6 (91.5)    |
| 19.0              | 6+                 | 64.3              | 6+            | 87.8      | 6 (87.5)    |
| 13.5              | 5 (13.2)           | 62.6              | 6+            | 85.8      | 6           |
| 05.3              | 6+ (05.7)          | 58.5              | 5+            | 85.0      | 5 (84.7)    |
| 01.8              | 5 (02.2)           | 57.6              | 6+            | 81.6      | 6 (81.3)    |
| 3495.3            | 6                  | 56.3              | 6+            | 80.7      | 4 (80.5)    |
| 76.1              | 5 (75.9)           | 54.9              | 6+            | 79.3      | 6+ (79.0)   |
| 71.0              | 6+                 | 53.7              | 6+            | 77.7      | 6+          |
| 69.3              | 5 (69.7)           | 52.8              | 6 } (52.5)    | 76.3      | 5           |
| 67.9              | 6+                 | 52.3              | 6 }           | 75.2      | 5           |
| 45.7              | 6+                 | 49.8              | 6 } (49.5)    | 72.1      | 6           |
| 29.8              | 6+                 | 49.2              | 6 }           | 70.5      | 5           |
| 21.7              | 6+                 | 47.6              | 5             | 67.9      | 6           |
| 05.0              | 5+ 2 AE.<br>(05.5) | 45.9              | 6             | 66.3      | 6+ br.      |
|                   |                    | 45.0              | 5 (44.5)      | 58.6      | 6+          |
| 3397.8            | 6+ (98.0)          | 43.1              | 6 Pb          | 57.6      | 6+          |
| 83.1 <sup>1</sup> | 1 (83.3)           | 41.3              | 6             | 55.8      | 6           |
| 73.0              | 6+ br.             | 37.6              | 6             | 55.3      | 6           |
| 67.2              | 6 (67.5)           | 36.5              | 6             | 49.9      | 6           |
| 45.0              | 6+                 | 33.2              | 5+ br. (33.0) | 46.3      | 6           |
| 43.3              | 6                  | 31.3              | 6             | 42.6      | 6           |
| 33.9              | 6+ (33.5)          | 30.0              | 5 } (29.5)    | 41.9      | 6           |
| 32.0              | 5                  | 28.9              | 6 }           | 34.6      | 6+ br.      |
| 29.3              | 6+                 | 27.9              | 6             | 30.1      | 5+          |
| 21.7              | 6                  | 25.1              | 6             | 23.9      | 6           |
| 18.3              | 6+                 | 21.4              | 6+            | 22.8      | 5           |
| 15.5              | 6+                 | 18.6              | 6+            | 17.9      | 6           |
| 12.8              | 6+ (12.6)          | 16.8              | 6 (16.5)      | 15.6      | 6           |
| 01.6              | 5+ (01.8)          | 15.6              | 5             | 14.6      | 6           |
| 3299.8            | 6+ (99.5)          | 11.9              | 6+            | 13.4      | 6+          |
| 97.8              | 6+                 | 08.1              | 6+            | 02.8      | 6           |

| $\lambda$ |          | $\lambda$ |           | $\lambda$ |            |
|-----------|----------|-----------|-----------|-----------|------------|
| 3101·7    | 6        | 2878·9    | 6         | 2617·2    | 6 (16·9)   |
| 3099·3    | 6        | 77·8      | 6         | 12·0      | 6          |
| 96·5      | 6 d.     | 72·1      | 6         | 02·1      | 6          |
| 94·8      | 6+       | 70·6      | 6         | 2599·4    | 6          |
| 93·1      | 6+       | 63·5      | 6         | 86·0      | 6+         |
| 92·0      | 6+       | 62·3      | 6         | 80·8      | 2 (80·6)   |
| 86·4      | 6+       | 57·3      | 6         | 75·5      | 6+         |
| 83·1      | 6+       | 52·4      | 6         | 63·0      | 4 } (62·8) |
| 81·1      | 6+       | 52·1      | 6         | 62·6      | 6 }        |
| 72·6      | 6+ br.   | 49·6      | 6         | 60·8      | 6          |
| 67·9      | 6        | 48·3      | 6         | 59·0      | 6          |
| 67·0      | 6        | 45·0      | 6         | 57·5      | 6          |
| 64·9      | 6        | 44·1      | 6         | 53·3      | 5 (53·6)   |
| 52·6      | 6        | 40·0      | 6         | 22·7      | 6          |
| 51·1      | 6        | 37·8      | 6         | 07·3      | 5          |
| 47·6      | 6        | 37·2      | 6         | 2497·3    | 6+ br.     |
| 47·1      | 6        | 33·2      | 5 Pb      | 85·7      | 5 (85·9)   |
| 38·3      | 6        | 24·5      | 4+ (24·1) | 83·8      | 6          |
| 37·5      | 6        | 20·9      | 6         | 73·8      | 3 } (73·8) |
| 34·2      | 6        | 02·1      | 6 Pb      | 73·0      | 6 }        |
| 28·6      | 6        | 2799·8    | 3 (99·5)  | 68·8      | 6 (68·5)   |
| 24·1      | 6        | 75·2      | 6         | 63·8      | 6          |
| 21·2      | 6        | 67·6      | 2 (67·4)  | 62·3      | 5 (62·1)   |
| 20·8      | 6        | 61·8      | 6         | 61·2      | 6          |
| 10·8      | 6        | 49·5      | 6         | 60·2      | 5 } (59·1) |
| 09·3      | 6        | 47·1      | 6         | 58·8      | 6 }        |
| 02·6      | 6        | 46·6      | 6         | 56·7      | 5          |
| 01·1      | 6        | 43·9      | 4         | 53·3      | 4 (53·0)   |
| 2994·4    | 6        | 39·6      | 6         | 49·7      | 6          |
| 90·6      | 6        | 35·8      | 6         | 48·0      | 3 (47·6)   |
| 83·6      | 6        | 32·6      | 6+        | 46·3      | 5          |
| 82·3      | 6+       | 11·1      | 5         | 44·3      | 5 (44·0)   |
| 73·3      | 6        | 07·4      | 6         | 39·4      | 6+         |
| 67·1      | 6        | 2675·9    | 5         | 33·0      | 6 } (32·6) |
| 49·1      | 6        | 63·2      | 6 Pb      | 31·5      | 6+ }       |
| 30·1      | 6+       | 37·6      | 6+        | 30·3      | 6          |
| 20·1      | 4 (19·7) | 28·8      | 4 (29·4)  | 29·6      | 4 } (29·3) |
| 2896·4    | 4 (96·2) | 22·0      | 6         | 28·3      | 5 }        |
| 85·6      | 6        | 20·8      | 6         | 22·7      | 6 } (22·5) |
| 82·3      | 6        | 19·5      | 6+        | 22·0      | 6 }        |

| $\lambda$         |                    | $\lambda$         |               | $\lambda$ |             |
|-------------------|--------------------|-------------------|---------------|-----------|-------------|
| 3639·7            | 5 (40·2) Pb        | 3295·6            | 6+            | 3207·3    | 6+ (07·5)   |
| 23·5              | 6+                 | 93·0              | 6 br. (92·5)  | 03·8      | 6+          |
| 19·0              | 6                  | 89·0              | 6+ (89·2)     | 00·9      | 5+ } (00·5) |
| 16·5              | 5 (16·2)           | 80·7 <sup>1</sup> | 1 (80·6)      | 00·0      | 6+ }        |
| 3596·3            | 6                  | 74·6              | 6             | 3198·1    | 6+          |
| 81·5              | 6                  | 68·6              | 6             | 96·1      | 6+          |
| 70·4              | 6                  | 67·3              | 6             | 93·6      | 6           |
| 57·2              | 6+ (57·7)          | 65·8              | 5+            | 91·9      | 6 (91·5)    |
| 19·0              | 6+                 | 64·3              | 6+            | 87·8      | 6 (87·5)    |
| 13·5              | 5 (13·2)           | 62·6              | 6+            | 85·8      | 6           |
| 05·3              | 6+ (05·7)          | 58·5              | 5+            | 85·0      | 5 (84·7)    |
| 01·8              | 5 (02·2)           | 57·6              | 6+            | 81·6      | 6 (81·3)    |
| 3495·3            | 6                  | 56·3              | 6+            | 80·7      | 4 (80·5)    |
| 76·1              | 5 (75·9)           | 54·9              | 6+            | 79·3      | 6+ (79·0)   |
| 71·0              | 6+                 | 53·7              | 6+            | 77·7      | 6+          |
| 69·3              | 5 (69·7)           | 52·8              | 6 } (52·5)    | 76·3      | 5           |
| 67·9              | 6+                 | 52·3              | 6 }           | 75·2      | 5           |
| 45·7              | 6+                 | 49·8              | 6 } (49·5)    | 72·1      | 6           |
| 29·8              | 6+                 | 49·2              | 6 }           | 70·5      | 5           |
| 21·7              | 6+                 | 47·6              | 5             | 67·9      | 6           |
| 05·0              | 5+ 2 AE.<br>(05·5) | 45·9              | 6             | 66·3      | 6+ br.      |
|                   |                    | 45·0              | 5 (44·5)      | 58·6      | 6+          |
| 3397·8            | 6+ (98·0)          | 43·1              | 6 Pb          | 57·6      | 6+          |
| 83·1 <sup>1</sup> | 1 (83·3)           | 41·3              | 6             | 55·8      | 6           |
| 73·0              | 6+ br.             | 37·6              | 6             | 55·3      | 6           |
| 67·2              | 6 (67·5)           | 36·5              | 6             | 49·9      | 6           |
| 45·0              | 6+                 | 33·2              | 5+ br. (33·0) | 46·3      | 6           |
| 43·3              | 6                  | 31·3              | 6             | 42·6      | 6           |
| 33·9              | 6+ (33·5)          | 30·0              | 5 } (29·5)    | 41·9      | 6           |
| 32·0              | 5                  | 28·9              | 6 }           | 34·6      | 6+ br.      |
| 29·3              | 6+                 | 27·9              | 6             | 30·1      | 5+          |
| 21·7              | 6                  | 25·1              | 6             | 23·9      | 6           |
| 18·3              | 6+                 | 21·4              | 6+            | 22·8      | 5           |
| 15·5              | 6+                 | 18·6              | 6+            | 17·9      | 6           |
| 12·8              | 6+ (12·6)          | 16·8              | 6 (16·5)      | 15·6      | 6           |
| 01·6              | 5+ (01·8)          | 15·6              | 5             | 14·6      | 6           |
| 3299·8            | 6+ (99·5)          | 11·9              | 6+            | 13·4      | 6+          |
| 97·8              | 6+                 | 08·1              | 6+            | 02·8      | 6           |



| $\lambda$ |          | $\lambda$ |           | $\lambda$ |            |
|-----------|----------|-----------|-----------|-----------|------------|
| 3101·7    | 6        | 2878·9    | 6         | 2617·2    | 6 (16·9)   |
| 3099·3    | 6        | 77·8      | 6         | 12·0      | 6          |
| 96·5      | 6 d.     | 72·1      | 6         | 02·1      | 6          |
| 94·8      | 6+       | 70·6      | 6         | 2599·4    | 6          |
| 93·1      | 6+       | 63·5      | 6         | 86·0      | 6+         |
| 92·0      | 6+       | 62·3      | 6         | 80·8      | 2 (80·6)   |
| 86·4      | 6+       | 57·3      | 6         | 75·5      | 6+         |
| 83·1      | 6+       | 52·4      | 6         | 63·0      | 4 } (62·8) |
| 81·1      | 6+       | 52·1      | 6         | 62·6      | 6 }        |
| 72·6      | 6+ br.   | 49·6      | 6         | 60·8      | 6          |
| 67·9      | 6        | 48·3      | 6         | 59·0      | 6          |
| 67·0      | 6        | 45·0      | 6         | 57·5      | 6          |
| 64·9      | 6        | 44·1      | 6         | 53·3      | 5 (53·6)   |
| 52·6      | 6        | 40·0      | 6         | 22·7      | 6          |
| 51·1      | 6        | 37·8      | 6         | 07·3      | 5          |
| 47·6      | 6        | 37·2      | 6         | 2497·3    | 6+ br.     |
| 47·1      | 6        | 33·2      | 5 Pb      | 85·7      | 5 (85·9)   |
| 38·3      | 6        | 24·5      | 4+ (24·1) | 83·8      | 6          |
| 37·5      | 6        | 20·9      | 6         | 73·8      | 3 } (73·8) |
| 34·2      | 6        | 02·1      | 6 Pb      | 73·0      | 6 }        |
| 28·6      | 6        | 2799·8    | 3 (99·5)  | 68·8      | 6 (68·5)   |
| 24·1      | 6        | 75·2      | 6         | 63·8      | 6          |
| 21·2      | 6        | 67·6      | 2 (67·4)  | 62·3      | 5 (62·1)   |
| 20·8      | 6        | 61·8      | 6         | 61·2      | 6          |
| 10·8      | 6        | 49·5      | 6         | 60·2      | 5 } (59·1) |
| 09·3      | 6        | 47·1      | 6         | 58·8      | 6 }        |
| 02·6      | 6        | 46·6      | 6         | 56·7      | 5          |
| 01·1      | 6        | 43·9      | 4         | 53·3      | 4 (53·0)   |
| 2994·4    | 6        | 39·6      | 6         | 49·7      | 6          |
| 90·6      | 6        | 35·8      | 6         | 48·0      | 3 (47·6)   |
| 83·6      | 6        | 32·6      | 6+        | 46·3      | 5          |
| 82·3      | 6+       | 11·1      | 5         | 44·3      | 5 (44·0)   |
| 73·3      | 6        | 07·4      | 6         | 39·4      | 6+         |
| 67·1      | 6        | 2675·9    | 5         | 33·0      | 6 } (32·6) |
| 49·1      | 6        | 63·2      | 6 Pb      | 31·5      | 6+ }       |
| 30·1      | 6+       | 37·6      | 6+        | 30·3      | 6          |
| 20·1      | 4 (19·7) | 28·8      | 4 (29·4)  | 29·6      | 4 } (29·3) |
| 2896·4    | 4 (96·2) | 22·0      | 6         | 28·3      | 5 }        |
| 85·6      | 6        | 20·8      | 6         | 22·7      | 6 } (22·5) |
| 82·3      | 6        | 19·5      | 6+        | 22·0      | 6 }        |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |               |
|-----------|------------|-----------|------------|-----------|---------------|
| 2420·2    | 4 (19·8)   | 2328·2    | 6+         | 2233·1    | 6             |
| 14·9      | 5          | 25·2      | 5 } (24·8) | 32·8      | 6             |
| 13·2      | 3 (13·0)   | 23·5      | 6 }        | 29·7      | 5 (29·4)      |
| 11·4      | 4 (11·0)   | 20·3      | 5 (20·1)   | 26·4      | 5+ (26·1)     |
| 09·0      | 6          | 18·5      | 6          | 20·0      | 6 } (19·6)    |
| 08·0      | 5 (07·5)   | 17·1      | 5 (16·9)   | 19·0      | 6 }           |
| 05·1      | 5 (04·8)   | 12·5      | 6+ (12·1)  | 11·5      | 6             |
| 02·7      | 5 (02·5)   | 09·7      | 5 (09·4)   | 06·2      | 6+ (05·8)     |
| 2395·7    | 5 (95·5)   | 2296·2    | 6 } (95·8) | 04·7      | 6+            |
| 94·1      | 6          | 95·5      | 5 }        | 03·8      | 6+            |
| 93·0      | 6 } (92·8) | 91·1      | 6 (90·8)   | 02·4      | 6+ (02·0)     |
| 92·5      | 6 }        | 89·8      | 6          | 2192·1    | 6             |
| 90·7      | 5 (90·4)   | 86·6      | 6 (86·3)   | 90·0      | 6             |
| 83·2      | 5 (83·0)   | 83·2      | 6          | 87·0      | 5             |
| 82·2      | 6          | 82·8      | 6 } (82·2) | 81·8      | 6             |
| 75·0      | 5+ 4 AE.   | 81·7      | 6 }        | 71·0      | 6 } (70·6)    |
| 73·6      | 6 (73·8)   | 80·2      | 5 (79·8)   | 69·8      | 6 }           |
| 67·2      | 6          | 78·6      | 6          | 66·8      | 6+            |
| 64·0      | 5 (63·8)   | 77·7      | 6 } (77·3) | 64·0      | 6             |
| 62·2      | 5 (62·0)   | 77·1      | 6 }        | 63·2      | 6             |
| 61·2      | 6          | 75·5      | 5 (75·3)   | 62·2      | 6 (61·8)      |
| 60·7      | 6          | 73·4      | 6          | 49·5      | 6             |
| 58·8      | 5 (58·3)   | 72·4      | 6          | 48·9      | 6             |
| 57·9      | 4 (57·7)   | 65·3      | 6+ 2 AE.   | 47·5      | 6             |
| 56·3      | 6          | 57·6      | 6          | 46·0      | 6+ br. (45·5) |
| 55·6      | 6          | 56·7      | 6+         | 43·1      | 6             |
| 55·1      | 6          | 53·9      | 5+ (53·5)  | 38·3      | 6+ 2 AE.      |
| 54·7      | 5          | 52·0      | 6          | 29·5      | 6             |
| 43·8      | 6 (43·6)   | 50·3      | 6+         | 26·5      | 6+ 2 AE.      |
| 42·0      | 6 (41·8)   | 43·4      | 6+ br.     | 21·0      | 6+ br. (20·3) |
| 39·1      | 5 (38·9)   | 42·1      | 6          | 13·0      | 6+ br. (13·5) |
| 32·3      | 6          | 40·7      | 6 (40·1)   |           |               |
| 31·4      | 5 (31·1)   | 33·8      | 6          |           |               |

### Kupfer (Nachtrag).

Im Kupferspectrum wurden von uns zwischen  $\lambda = 4704·8$  und  $\lambda = 2105·0$  im Ganzen 444 Linien gemessen. Bezüglich der Schärfe gilt dasselbe wie bei Silber. Aus der Tabelle II unserer I. Mittheilung sind folgende Linien als Luftlinien aus-

zuscheiden: 4650·4, 4642·7, 4592·1, 4553·5, 4508·4, 4460·6, 4434·5, 4426·0, 4345·6, 4207·1, 4190·1, 4185·7, 4103·5, 4072·4, 3939·8, 3882·3, 3864·3, 3856·3, 3839·0, 3712·8, 3365·6, 3354·3.

| $\lambda$ |           | $\lambda$ |               | $\lambda$ |               |
|-----------|-----------|-----------|---------------|-----------|---------------|
| 4704·8    | 4         | 3866·1    | 6+            | 3655·9    | 5 (56·1)      |
| 4698·0    | 6+        | 62·0      | 6+            | 54·6      | 6+            |
| 51·3      | 1 (52·4)  | 51·1      | 6+ br. (50·3) | 52·3      | 6+            |
| 4587·2    | 3 (88·2)  | 48·1      | 6+ br.        | 48·4      | 6             |
| 56·2      | 5 (56·8)  | 25·3      | 6             | 45·3      | 6+ (45·6)     |
| 40·0      | 4+ (40·4) | 20·9      | 6+            | 35·9      | 5 (36·1)      |
| 31·2      | 4 (31·5)  | 13·6      | 6+            | 32·6      | 6             |
| 25·5      | 6+        | 12·0      | 6+            | 29·8      | 6+            |
| 20·3      | 6+ br.    | 09·6      | 6+ (09·0)     | 27·3      | 5 (27·6)      |
| 13·5      | 6+ br.    | 07·6      | 6+            | 24·3      | 6 (24·6)      |
| 09·8      | 4 (10·2)  | 05·3      | 5             | 20·6      | 6+            |
| 06·2      | 5         | 00·1      | 6+ br.        | 3589·1    | 6+            |
| 4480·7    | 4 (80·9)  | 3791·4    | 6+            | 46·4      | 6             |
| 37·5      | 6+ 2 AE.  | 77·3      | 6+            | 45·0      | 6             |
| 15·8      | 6         | 75·1      | 6+            | 29·3      | 6+            |
| 4396·2    | 6+        | 64·9      | 6+            | 27·6      | 4 (27·4)      |
| 55·5      | 6+        | 62·6      | 6+            | 20·1      | 4 (19·9)      |
| 48·2      | 6         | 59·6      | 6             | 14·6      | 6+            |
| 29·0      | 6+        | 54·8      | 6+            | 00·3      | 6+            |
| 4253·8    | 6+        | 52·3      | 6             | 3498·3    | 6+            |
| 28·2      | 5         | 45·4      | 6+            | 92·1      | 6+            |
| 4178·3    | 5         | 34·2      | 5             | 87·8      | 6             |
| 44·2      | 6         | 20·6      | 6+            | 83·9      | 3 (83·7)      |
| 04·8      | 6         | 15·1      | 6+            | 76·2      | 3 (75·8)      |
| 4057·1    | 6+ br.    | 11·9      | 6             | 72·4      | 6+ br. (71·8) |
| 03·1      | 6+        | 03·2      | 6             | 59·7      | 6             |
| 3968·6    | 6 Ca.     | 3695·4    | 6+            | 55·0      | 5             |
| 64·6      | 6+        | 86·6      | 4 (86·8)      | 40·8      | 6+            |
| 61·6      | 6+        | 81·5      | 6             | 20·4      | 6+            |
| 40·6      | 6+ 3 AE.  | 77·0      | 5 (76·8)      | 02·2      | 5 (02·0)      |
| 28·6      | 6+        | 65·8      | 6             | 3395·4    | 6+            |
| 25·3      | 6+        | 64·2      | 6+            | 84·9      | 6+            |
| 21·3      | 6+        | 59·4      | 6 (59·8)      | 81·3      | 4+ (81·5)     |
| 07·6      | 6         | 56·8      | 6             | 75·6      | 6+            |

| $\lambda$ |          | $\lambda$ |          | $\lambda$ |            |
|-----------|----------|-----------|----------|-----------|------------|
| 3365·4    | 4        | 3186·2    | 6+       | 3021·7    | 6          |
| 49·4      | 5 (49·2) | 84·7      | 6+       | 15·0      | 6          |
| 44·7      | 6        | 81·7      | 6+       | 12·0      | 6          |
| 42·6      | 6        | 76·0      | 6+ br.   | 10·9      | 5          |
| 27·2      | 6+       | 71·4      | 6+       | 07·4      | 6+ 2 AE.   |
| 24·2      | 6+       | 69·8      | 5        | 2997·5    | 5          |
| 22·9      | 6+       | 68·4      | 6+       | 89·2      | 6+         |
| 21·9      | 6+       | 65·5      | 6        | 83·9      | 6+         |
| 18·8      | 6        | 60·2      | 6        | 79·2      | 6+ br.     |
| 15·6      | 6+ 2 AE. | 58·9      | 6+       | 78·4      | 6+         |
| 01·2      | 6+       | 57·5      | 6+       | 75·6      | 6+         |
| 3293·9    | 6+       | 56·9      | 6+       | 61·2      | 2 (61·5)   |
| 93·1      | 6 (92·8) | 54·7      | 6+       | 2883·1    | 6 (83·3)   |
| 88·4      | 5+ br.   | 51·6      | 6+       | 74·4      | 6+         |
| 84·5      | 6        | 49·7      | 6+       | 58·2      | 6+ br.     |
| 82·7      | 5 (82·9) | 47·9      | 6+       | 37·6      | 4 (38·1)   |
| 77·4      | 6        | 44·9      | 6+       | 24·4      | 2 (24·8)   |
| 76·4      | 6        | 38·4      | 6+ br.   | 13·1      | 6          |
| 74·1      | 1 (74·2) | 35·2      | 6+ br.   | 2777·2    | 6+ br.     |
| 68·4      | 6        | 32·4      | 6+       | 70·1      | 2 (70·3)   |
| 66·1      | 5        | 28·9      | 5 (28·6) | 66·6      | 5 (67·0)   |
| 62·7      | 6        | 20·6      | 6+       | 62·9      | 6+         |
| 47·7      | 1 (47·8) | 18·3      | 6+       | 51·4      | 6          |
| 38·9      | 6+       | 16·4      | 5+       | 45·5      | 5 (45·7)   |
| 35·9      | 5 (35·7) | 13·6      | 6+       | 40·1      | 6+         |
| 34·1      | 6        | 03·7      | 6        | 37·6      | 6+         |
| 28·2      | 6        | 00·1      | 5 (00·3) | 35·6      | 6+ br.     |
| 26·7      | 5        | 3094·1    | 5        | 33·6      | 6+ br.     |
| 24·9      | 5        | 88·4      | 6        | 31·9      | 6+ br.     |
| 23·6      | 5        | 82·7      | 6 d.?    | 25·7      | 6+         |
| 20·9      | 6+       | 81·8      | 6        | 23·9      | 6+         |
| 11·7      | 6+       | 73·9      | 5        | 21·8      | 5 (22·2)   |
| 08·5      | 5        | 65·9      | 6+       | 18·9      | 4 (19·3)   |
| 07·4      | 6+       | 55·9      | 6+       | 13·6      | 3 (14·1)   |
| 04·4      | 6+ br.   | 53·9      | 6+       | 03·2      | 3 (03·9)   |
| 01·8      | 6+ br.   | 47·1      | 6+       | 01·1      | 3 (01·7)   |
| 3194·2    | 4 (94·4) | 38·5      | 6        | 2696·4    | 6          |
| 92·2      | 6+       | 25·0      | 6+       | 89·4      | 2 (90·1)   |
| 89·4      | 6+       | 23·5      | 6        | 79·9      | 6+         |
| 87·8      | 6+       | 22·7      | 6        | 66·4      | 4 o. (66·) |

| $\lambda$ |              | $\lambda$ |           |        |              |
|-----------|--------------|-----------|-----------|--------|--------------|
| 2658·6    | 6+           | 2533·1    | 6         | 2346·2 | 6 (46·4)     |
| 49·7      | 6+           | 29·6      | 3 (29·8)  | 36·4   | 6+ (36·6)    |
| 47·7      | 6+           | 26 9      | 5 (27·2)  | 2279 8 | 6            |
| 46·4      | 6+           | 25 4      | 6 (25·7)  | 73·3   | 6            |
| 44·0      | 5 (44·3)     | 18·9      | 6+ (19·1) | 69·1   | 6            |
| 41·6      | 6+           | 12·1      | 6         | 50·3   | 6            |
| 21·0      | 6+           | 08·8      | 5+ (09·1) | 49·3   | 6 (49·5)     |
| 02·8      | 6+           | 2496·4    | 6+ (96 6) | 46·0   | 6            |
| 00 5      | 3 (00·7)     | 89·8      | 3 (90·1)  | 44·1   | 6            |
| 2599·0    | 4 (99·2)     | 86·1      | 4 (86·3)  | 42·7   | 5 (43·0)     |
| 92·8      | 6            | 82·5      | 5 (82·7)  | 29·0   | 6 (29·3)     |
| 90·7      | 4 (91·0)     | 73·6      | 5 (73·9)  | 27·9   | 6+           |
| 87·6      | 6            | 47·3      | 6+ (47·6) | 27·0   | 6+           |
| 86·8      | 6            | 44·6      | 5 (44·9)  | 18·2   | 5 (18 5)     |
| 81·2      | 6            | 40·1      | 6+        | 15·3   | 5+ br.(15·5) |
| 80·2      | 6            | 36·1      | 6+ (36·4) | 2195·8 | 6+ (96·0)    |
| 73·4      | 6 (73·9)     | 05·5      | 6 (05·9)  | 92·3   | 5+ (92·5)    |
| 71·9      | 6 (72·4)     | 03·7      | 4 (03·9)  | 79·5   | 5 (79·8)     |
| 71·4      | 6            | 00·3      | 4 (00·5)  | 61·5   | 6 (61·8)     |
| 69·5      | 6+ br.(69·7) | 2393·0    | 6         | 49·1   | 6 (49·3)     |
| 66·4      | 6 (66 9)     | 92·0      | 6         | 36·1   | 6+ (36·3)    |
| 50·6      | 6            | 76·6      | 5 (76·8)  | 34·3   | 6 (34·8)     |
| 45·0      | 1 (45·4)     | 70·0      | 2 (70·4)  | 12·0   | 6 (12·3)     |
| 38·9      | 6 (39·1)     | 68 3      | 6         | 05·0   | 6            |
| 35·5      | 6 (35·7)     | 56·8      | (57·2)    |        |              |

### Mangan (Nachtrag).

Mangan liefert schon eines der linienreicheren Spectren; zwischen  $\lambda = 4823\cdot9$  und  $\lambda = 2111\cdot7$  wurden von uns 1550 Linien gemessen. Dieselben zeichnen sich durch grosse Schärfe aus. Aus der Tabelle III der I. Mittheilung sind die folgenden Linien als Luftlinien auszuscheiden: 4416·3, 4414·8, 4282·6, 4189·8, 4185·3, 4176·3, 4152·8, 4145·6, 4119·0, 3919·5, 3134·9.

| $\lambda$ |            | $\lambda$ |             | $\lambda$ |             |
|-----------|------------|-----------|-------------|-----------|-------------|
| 4823·9    |            | 4466·9    | 6+ (66·0)   | 4337·5    | 6+          |
| 4783·6    | 3          | 62·3      | 3 (62·0)    | 35·9      | 6+          |
| 73·2      | 6          | 61·4      | 5 } (61·3)  | 28·9      | 6+          |
| 68·2      | 6          | 60·6      | 6 }         | 27·9      | 6+          |
| 66·6      | 4          | 58·4      | 5 (58·1)    | 26·8      | 5 (26·6)    |
| 66·0      | 4          | 57·7      | 5 } (57·5)  | 25·9      | 6 (25·7) Fe |
| 64·9      | 6+         | 57·2      | 6 }         | 23·5      | 6+          |
| 62·5      | 4          | 56·0      | 5           | 21·4      | 6+ (20·9)   |
| 61·7      | 5          | 55·5      | 5 } (55·3)  | 15·4      | 6+          |
| 55·8      | 5          | 55·2      | 5 }         | 14·5      | 6+          |
| 54·2      | 3          | 53·1      | 5 (52·9)    | 08·1      | 5 (07·9) Fe |
| 49·4      | 6+         | 41·2      | 6+          | 05·9      | 6+          |
| 46·0      | 6+         | 36·5      | 4 (36·3)    | 03·1      | 6+          |
| 39·2      | 5          | 22·9      | 6+          | 00·4      | 6 (00·2)    |
| 38·4      | 6+         | 20 0      | 5 (19·7)    | 4294·4    | 6+          |
| 34·1      | 6+         | 18·1      | 6+          | 90·1      | 6           |
| 30·4      | 6+         | 15·2      | 6+ Fe       | 88·1      | 6+ (87·7)   |
| 27 7      | 5          | 12·1      | 5 (11·7)    | 84·1      | 6+ } (84·0) |
| 09·8      | 5          | 08·2      | 6 (07·7)    | 83·9      | 6 }         |
| 02·1      | 6          | 04·8      | 6 (04·5) Fe | 81·9      | 6           |
| 01·2      | 6          | 4395·9    | 6+          | 81·2      | 4 (81·0)    |
| 4671·8    | 6          | 93·4      | 6+          | 79·7      | 6           |
| 4595·5    | 6+ br.     | 89·9      | 6+          | 75·9      | 6+          |
| 86·2      | 6+ br.     | 88·1      | 6+          | 71·9      | 5 (71·5) Fe |
| 48·6      | 6          | 84·7      | 6           | 63·6      | 6           |
| 44·6      | 6+         | 83·6      | 5 (83·4) Fe | 60·5      | 6 Fe        |
| 42 5      | 6          | 82·8      | 6 (82·6)    | 59·2      | 6 (59·6)    |
| 34·4      | 6+         | 81·7      | 5 (81·4)    | 50·9      | 6 Fe        |
| 29 9      | 6          | 79·6      | 6           | 48·1      | 6+          |
| 25·4      | 6+ br.     | 79·3      | 6 (79·1)    | 47·1      | 6+          |
| 23·4      | 6+ br.     | 77·6      | 6+          | 45·6      | 6+          |
| 19·1      | 6+ br.     | 75·1      | 5 (74·8)    | 44·4      | 6+          |
| 03·7      | 6 (03·9)   | 65·3      | 6+          | 42·5      | 6           |
| 02·1      | 4 (02·3)   | 63·4      | 6+          | 39·7      | 5 (39·5)    |
| 4496·7    | 6+         | 56·6      | 6+          | 35·2      | 3 (35·0)    |
| 79·6      | 6 } (79·3) | 48·5      | 6+          | 32·4      | 6           |
| 78·8      | 6 }        | 46·6      | 6+          | 30·3      | 6+          |
| 76·5      | 6+         | 44·1      | 5 (43·9)    | 26 5      | 6           |
| 73·0      | 5 (72·8)   | 42·7      | 6+          | 11·8      | 5 (11·5)    |
| 70·4      | 5 (70·1)   | 38·2      | 6+          | 05·5      | 6+          |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |            |
|-----------|------------|-----------|------------|-----------|------------|
| 4204.1    | 6+         | 4111.8    | 6          | 4016.7    | 6          |
| 03.1      | 6+         | 10.9      | 5 (10.7)   | 12.0      | 6          |
| 00.3      | 6+         | 08.6      | 6          | 11.6      | 6          |
| 4195.9    | 6+         | 05.4      | 5          | 11.1      | 6+         |
| 84.4      | 6+ br.     | 03.5      | 5          | 09.9      | 6+         |
| 82.4      | 6+ br.     | 00.1      | 6+         | 08.7      | 6+         |
| 77.4      | 6+         | 4099.9    | 6+         | 08.0      | 6          |
| 74.4      | 6+         | 99.6      | 6+ br.     | 07.1      | 6          |
| 71.7      | 6+ br.     | 95.3      | 5 (95.1)   | 05.3      | 6 (05.5)Fe |
| 71.0      | 6+ br.     | 92.6      | 6+ (92.4)  | 03.4      | 6+ br.     |
| 66.2      | 6+         | 90.9      | 6          | 01.2      | 6+         |
| 64.9      | 6+         | 90.2      | 5 (89.8)   | 00.2      | 6+         |
| 58.7      | 6+         | 86.7      | 6+         | 3997.3    | 5 } (97.0) |
| 57.1      | 5 (56.8)   | 83.8      | 3 (83.5)   | 96.5      | 6 }        |
| 55.5      | 6 (55.3)   | 81.6      | 6+ (80.7)  | 92.5      | 6          |
| 54.6      | 6+         | 71.9      | 6 Fe       | 91.6      | 6          |
| 51.1      | 6+ br.     | 70.4      | 5 (70.7)   | 90.8      | 6+         |
| 48.9      | 5 (48.6)   | 68.2      | 6 (68.0)   | 90.0      | 6+         |
| 47.6      | 6 (47.3)   | 67.6      | 6+         | 88.7      | 6          |
| 44.1      | 6 Fe       | 66.4      | 6 (66.2)   | 87.5      | 6          |
| 41.1      | 5 (40.5)   | 65.2      | 5 (64.9)   | 87.2      | 5 } (87.2) |
| 40.3      | 6+ (39.7)  | 63.7      | 4 (63.5)Fe | 86.9      | 5 }        |
| 37.1      | 6+         | 61.9      | 5 (61.6)   | 84.2      | 6          |
| 36.9      | 5 (36.3)   | 59.6      | 6          | 82.8      | 6          |
| 35.0      | 5 (34.5)   | 58.1      | 6 (58.3)   | 82.5      | 5          |
| 34.6      | 6          | 54.5      | 6          | 82.2      | 6          |
| 32.4      | 6          | 52.6      | 5 (52.4)   | 81.6      | 6          |
| 32.2      | 6 Fe       | 51.9      | 5 (51.7)   | 81.4      | 6          |
| 31.2      | 5 (30.6)   | 50.9      | 6          | 80.9      | 6          |
| 28.2      | 5 (27.7)   | 45.9      | 5 (45.6)Fe | 80.2      | 6          |
| 26.5      | 6          | 41.5      | 3 (41.3)   | 78.9      | 6+         |
| 25.9      | 6          | 37.6      | 6+         | 76.0      | 5 (76.2)   |
| 25.6      | 6          | 34.5      | 3 (34.8)   | 73.3      | 6          |
| 23.5      | 6 } (23.0) | 33.7      | 5 } (33.6) | 70.2      | 6          |
| 23.4      | 6 }        | 33.1      | 3 }        | 69.3      | 6 Fe       |
| 22.8      | 6 }        | 31.9      | 6          | 68.5      | 5 Ca       |
| 22.5      | 6          | 30.9      | 2 (30.7)   | 62.6      | 6+         |
| 14.5      | 6          | 21.0      | 6          | 58.5      | 6+         |
| 13.9      | 6 } (13.5) | 20.2      | 6          | 52.2      | 6          |
| 13.2      | 6 }        | 18.1      | 2 (18.4)   | 44.0      | 6+         |

| $\lambda$ |             |        |             | $\lambda$ |            |
|-----------|-------------|--------|-------------|-----------|------------|
| 3943.2    | 6+ (43.0)   | 3888.7 | 6 Fe        | 3795.2    | 6Fe (94.8) |
| 42.2      | 6           | 87.3   | 6 Fe        | 93.0      | 6+ br.     |
| 41.4      | 6           | 86.4   | 5 Fe (86.6) | 90.3      | 4 (89.8)   |
| 38.5      | 6+          | 79.2   | 6+ } (79.0) | 88.1      | 6 Fe       |
| 37.8      | 6           | 78.7   | 6 Fe        | 86.9      | 6          |
| 35.7      | 6           | 78.1   | 6 Fe        | 85.7      | 6 (85.5)   |
| 33.8      | 5 Ca (33.9) | 73.3   | 6           | 78.5      | 5 (78.2)   |
| 31.8      | 6           | 72.6   | 6 } (72.4)  | 76.6      | 6+         |
| 29.8      | 6           | 72.2   | 6 }         | 74.8      | 6+         |
| 28.6      | 6           | 65.7   | 6Fe (65.9)  | 74.1      | 6          |
| 28.2      | 6 (28.0)    | 60.0   | 5Fe (60.2)  | 73.2      | 6+ (73.5)  |
| 24.3      | 6 (24.5)    | 56.5   | 5Fe (56.8)  | 71.6      | 6+ (71.2)  |
| 23.6      | 6           | 54.7   | 6 } (54.0)  | 69.3      | 6+         |
| 22.0      | 6+ (22.3)   | 53.5   | 6 }         | 68.5      | 6          |
| 20.5      | 6 Fe        | 52.7   | 6           | 68.0      | 6          |
| 17.7      | 6+          | 50.0   | 6Fe (50.3)  | 67.4      | 6Fe (67.2) |
| 16.8      | 6+          | 40.0   | 4 } (39.7)  | 66.5      | 6          |
| 14.5      | 6+          | 39.5   | 6 }         | 65.8      | 6 Fe       |
| 11.6      | 6 } (11.5)  | 37.2   | 6           | 64.1      | 5          |
| 11.4      | 6 }         | 36.6   | 6           | 63.8      | 6 (63.5)   |
| 10.6      | 6           | 34.4   | 4 } (34.1)  | 60.0      | 6+         |
| 08.3      | 6+          | 33.9   | 4 }         | 58.4      | 5Fe (58.0) |
| 07.8      | 6+          | 29.8   | 5 (29.6)    | 56.8      | 6 (56.4)   |
| 06.7      | 6+          | 28.0   | 5Fe (27.7)  | 54.7      | 6+         |
| 05.0      | 6+          | 26.1   | 5Fe (25.8)  | 50.8      | 6          |
| 04.5      | 6           | 24.7   | 6Fe (24.9)  | 50.6      | 6 (50.3)   |
| 03.7      | 6           | 24.1   | 4           | 49.6      | 4Fe (49.2) |
| 03.2      | 6 Fe        | 23.7   | 3 (23.5)    | 48.4      | 5Fe (48.0) |
| 02.6      | 6           | 20.6   | 5Fe (20.4)  | 46.8      | 6          |
| 3899.5    | 6           | 13.1   | 6 Fe        | 46.2      | 6          |
| 98.2      | 6           | 10.8   | 6           | 45.7      | 5Fe (45.4) |
| 97.7      | 6           | 09.7   | 4 (09.4)    | 43.7      | 5 (43.3)   |
| 97.5      | 6           | 06.8   | 1 (06.4)    | 42.5      | 6+         |
| 96.4      | 6           | 05.0   | 6+          | 41.3      | 6+         |
| 95.8      | 6 Fe        | 02.1   | 5           | 40.2      | 6+ br.     |
| 95.6      | 6           | 00.8   | 5 (00.2)    | 37.4      | 5 } (37.0) |
| 95.0      | 6           | 3799.5 | 5 (99.1)    | 37.3      | 5 }        |
| 92.8      | 6           | 98.7   | 6+ br.      | 35.0      | 5Fe (34.7) |
| 91.8      | 6           | 97.8   | 6+ br.      | 33.5      | 6Fe (33.0) |
| 89.6      | 6 (89.9)    | 96.7   | 6+ br.      | 32.1      | 5 (31.8)   |



| $\lambda$ |             | $\lambda$ |             | $\lambda$ |               |
|-----------|-------------|-----------|-------------|-----------|---------------|
| 3731·2    | 6           | 3670·6    | 6           | 3601·4    | 6             |
| 30·2      | 6+          | 70·0      | 6           | 3593·5    | 6+            |
| 29·6      | 6           | 69·4      | 6           | 90·8      | 6             |
| 29·4      | 6           | 68·0      | 6+          | 89·3      | 6+            |
| 29·1      | 5 (28·8)    | 65·7      | 6           | 85·5      | 6             |
| 22·7      | 6 Fe (22·5) | 65·0      | 6           | 83·8      | 6             |
| 21·1      | 6+          | 60·6      | 5 (60·3)    | 80·5      | 6+            |
| 20·1      | 4 Fe (19·9) | 58·6      | 6           | 79·8      | 6             |
| 19·1      | 4 (18·8)    | 58·0      | 6           | 76·5      | 6+            |
| 15·5      | 6+ (15·1)   | 56·7      | 6           | 72·0      | 6             |
| 11·8      | 6           | 55·5      | 6           | 70·0      | 2 } u. (69·8) |
| 10·1      | 6           | 54·7      | 6           | 69·7      | 3 }           |
| 09·5      | 6           | 53·6      | 6+          | 60·0      | 6             |
| 08·3      | 6           | 53·0      | 6+          | 59·7      | 6             |
| 07·0      | 6           | 51·7      | 6+          | 58·7      | 6 Fe          |
| 06·3      | 4 } (05·9)  | 49·7      | 6+          | 57·1      | 6+            |
| 05·8      | 6 }         | 48·8      | 6           | 55·2      | 6             |
| 03·7      | 6+          | 48·0      | 5 Fe (47·8) | 48·1      | 1 u. (48·0)   |
| 02·0      | 6           | 43·0      | 6+          | 36·2      | 6+            |
| 00·5      | 6+          | 41·5      | 6+          | 35·5      | 6+            |
| 3696·7    | 5 } (96·4)  | 40·3      | 6+ br.      | 26·4      | 6             |
| 96·2      | 6 }         | 38·0      | 6+ br.      | 24·8      | 6 (25·0)      |
| 94·3      | 6           | 36·5      | 6           | 21·5      | 6 Fe          |
| 93·8      | 4 } (93·6)  | 35·8      | 6           | 15·2      | 6             |
| 93·0      | 6 }         | 34·8      | 6           | 14·0      | 6 Fe          |
| 91·1      | 6           | 31·6      | 5 (31·4)    | 12·0      | 6             |
| 90·6      | 6           | 29·9      | 5 (29·7)    | 10·1      | 6             |
| 87·7      | 6 Fe        | 27·6      | 5 (27·2)    | 3495·3    | 6+            |
| 86·5      | 6+          | 26·5      | 6+          | 94·5      | 6+            |
| 85·2      | 5+          | 25·4      | 6+          | 93·6      | 6             |
| 85·0      | 6+ (84·8)   | 21·6      | 6+          | 93·1      | 6             |
| 83·7      | 6+          | 19·3      | 4 (19·1)    | 92·3      | 6             |
| 82·2      | 5 (82·0)    | 18·8      | 5 Fe        | 90·6      | 6 Fe          |
| 80·4      | 6           | 15·5      | 6           | 82·2      | 6             |
| 80·2      | 6 (80·0)    | 08·7      | 6+ } (08·7) | 76·8      | 6 Fe          |
| 78·7      | 6           | 08·5      | 3 }         | 75·5      | 6 Fe          |
| 77·8      | 6           | 06·7      | 6+          | 74·2      | 1 (73·9)      |
| 77·2      | 5 (77·0)    | 05·8      | 6           | 70·1      | 6             |
| 76·0      | 6           | 03·8      | 6           | 66·8      | 6+            |
| 72·0      | 6           | 01·8      | 6           | 66·0      | 6 Fe          |

| $\lambda$ |                | $\lambda$ |             | $\lambda$ |               |
|-----------|----------------|-----------|-------------|-----------|---------------|
| 3463·7    | 6              | 3373·7    | 6+          | 3316·3    | 6+            |
| 61·7      | 6+             | 72·7      | 6+          | 14·7      | 6+ (14·9)     |
| 60·5      | 1 (60·2)       | 72·0      | 6+          | 14·3      | 6+            |
| 52·5      | 6+             | 70·5      | 6+          | 14·0      | 6+            |
| 51·7      | 6+             | 69·2      | 6+          | 13·3      | 6+            |
| 51·4      | 6+ (51·2)      | 68·2      | 6+          | 13·1      | 6+            |
| 50·8      | 6              | 64·0      | 6+ } (63·2) | 12·7      | 6+            |
| 49·5      | 6+ br.         | 63·0      | 5 }         | 12·3      | 6+            |
| 44·5      | 6              | 61·2      | 6+          | 11·7      | 6+            |
| 43·9      | 6 Fe           | 60·0      | 6+          | 11·5      | 6+            |
| 42·1      | 1 (41·8)       | 59·3      | 6+ } (58·6) | 11·2      | 6+            |
| 41·1      | 6 Fe           | 58·3      | 5 }         | 07·7      | 6 (07·9)      |
| 39·7      | 6              | 56·0      | 6+          | 07·0      | 6             |
| 35·2      | 6              | 55·4      | 6+          | 06·6      | 6 Fe          |
| 34·8      | 6              | 51·5      | 6+          | 05·3      | 6             |
| 34·3      | 6              | 49·1      | 6+          | 03·2      | 6 (03·7)      |
| 33·7      | 6 <sub>s</sub> | 48·3      | 6+          | 01·7      | 6+            |
| 29·3      | 6              | 47·5      | 6+          | 3298·1    | 5 (98·3)      |
| 29·0      | 6              | 45·0      | 5+ br.      | 96·8      | 5 (97·0)      |
| 28·2      | 6              | 43·7      | 6           | 93·7      | 6+ br.        |
| 27·3      | 6 Fe           | 41·8      | 6+          | 92·6      | 6+ br.        |
| 24·0      | 6+ br.         | 41·3      | 6+          | 90·9      | 6+ br.        |
| 22·7      | 6+ br.         | 41·0      | 6+          | 88·2      | 6+ 1·5 AE br. |
| 20·8      | 6              | 38·7      | 6+          | 87·2      | 6+            |
| 20·2      | 6 } (19·7)     | 37·3      | 5 (37·5)    | 85·7      | 6+            |
| 19·5      | 5 }            | 36·3      | 5 (36·6)    | 80·7      | 6             |
| 18·3      | 6+             | 35·3      | 6           | 78·4      | 6             |
| 17·1      | 6+             | 31·6      | 5+ } (31·0) | 78·0      | 6             |
| 14·7      | 6              | 30·7      | 5 }         | 76·7      | 6             |
| 04·7      | 6 +            | 28·5      | 6           | 76·1      | 6             |
| 01·6      | 6              | 28·0      | 6           | 73·9      | 5             |
| 3394·8    | 6              | 26·1      | 6+          | 72·9      | 6             |
| 92·6      | 6+ (Fe)        | 25·4      | 6+          | 71·1      | 6             |
| 89·7      | 6+             | 25·0      | 6+          | 70·3      | 6             |
| 87·7      | 6+             | 24·6      | 6+          | 69·4      | 6             |
| 83·5      | 6+             | 22·7      | 6+          | 69·3      | 6             |
| 81·6      | 6+             | 21·8      | 6+          | 68·7      | 6 (68·9)      |
| 80·5      | 6+             | 18·7      | 6+ br.      | 67·7      | 6 (67·9)      |
| 76·2      | 6+             |           | (17·9)      | 64·2      | 6+            |
| 74·8      | 6              | 17·3      | 6+ (17·9)   | 63·0      | 6+            |

| $\lambda$ |              | $\lambda$ |            | $\lambda$ |            |
|-----------|--------------|-----------|------------|-----------|------------|
| 3261·1    | 6            | 3189·2    | 6          | 3110·1    | 6 (09·9)   |
| 58·3      | 5 (58·6)     | 88·5      | 6          | 09·5      | 6+ br.     |
| 53·9      | 6            | 87·7      | 6          |           | (09·9)     |
| 52·8      | 4 (53·0)     | 85·3      | 6          | 09·0      | 6+         |
| 48·4      | 4 (48·6)     | 84·7      | 6          | 06·6      | 6+         |
| 47·6      | 4            | 83·9      | 6 } (83·6) | 06·1      | 6+         |
| 46·2      | 6+           | 83·4      | 6 }        | 03·0      | 6+         |
| 45·0      | 6+           | 83·3      | 6          | 02·3      | 6 }        |
| 42·6      | 6+           | 79·5      | 6+         | 01·4      | 6 } (01·9) |
| 41·8      | 6+           | 78·5      | 5 (78·7)   | 00·3      | 6          |
| 40·5      | 6 } (40·4)   | 75·7      | 6+         | 3099 5    | 6          |
| 40·3      | 6 }          | 74·7      | 6+         | 98·1      | 6          |
| 39·0      | 6            | 73·3      | 6          | 97·9      | 6          |
| 38·8      | 6            | 72·0      | 6          | 97·1      | 6 }        |
| 37·3      | 6            | 70·7      | 6          | 96·3      | 6 } (96·6) |
| 34·8      | 6+ 1 AE. br. | 69·8      | 6          | 96·1      | 6          |
| 33·8      | 6+ br.       | 68·3      | 6+         | 89·8      | 6+         |
| 30·2      | 6            | 65·5      | 6          | 88·5      | 6+         |
| 28·2      | 3 (28·0)     | 60·0      | 6          | 85·8      | 6+         |
| 26·1      | 6 } (25·9)   | 59·3      | 6          | 83·8      | 6+         |
| 25·7      | 6 }          | 58·6      | 6+         | 82·8      | 6 }        |
| 24·7      | 5 (24·9)     | 57·7      | 6+         | 82·3      | 6 } (82·6) |
| 23·3      | 6            | 52·0      | 6+         | 82·1      | 6          |
| 11·8      | 6            | 51·4      | 6+         | 76·4      | 6          |
| 11·3      | 6            | 49·9      | 6 (49·7)   | 75·2      | 6          |
| 06·8      | 6            | 46·2      | 6          | 67·3      | 6 Fe       |
| 06·5      | 6            | 45·7      | 6          | 66·4      | 6          |
| 03·7      | 6            | 42·5      | 6          | 62·7      | 6 }        |
| 02·5      | 6            | 32·3      | 6+         | 62·2      | 6 } (62·4) |
| 01·7      | 6            | 26·6      | 6          | 61·2      | 6+         |
| 01·2      | 6            | 26·1      | 6          | 57·4      | 6+         |
| 00·5      | 6+           | 23·6      | 6          | 56·7      | 6+         |
| 3198·9    | 6            | 21·0      | 6          | 55·7      | 6+         |
| 97·0      | 6            | 20·7      | 6          | 53·3      | 6+         |
| 96·2      | 6            | 18·3      | 6          | 51·3      | 5 (51·6)   |
| 94·3      | 6+           | 17·3      | 6          | 47·6      | 6 Fe       |
| 92·9      | 6+           | 13·7      | 6+         | 46·3      | 6 (46·7)   |
| 91·4      | 6            | 13·1      | 6+         | 45·6      | 5 (45·8)   |
| 90·7      | 6            | 11·2      | 6          | 43·3      | 6 }        |
| 90·0      | 6            | 10·6      | 6          | 43·1      | 6 } (43·2) |

| $\lambda$ |             | $\lambda$ |             | $\lambda$ |             |
|-----------|-------------|-----------|-------------|-----------|-------------|
| 3042.8    | 6           | 2996.1    | 6+          | 2924.6    | 6+          |
| 42.2      | 6           | 95.1      | 6+ } (94.6) | 24.0      | 6+          |
| 41.2      | 6 } (40.8)  | 94.3      | 6 }         | 23.3      | 6+ } (22.9) |
| 40.6      | 6 }         | 93.5      | 6+          | 22.6      | 4 }         |
| 39.6      | 5+ (39.8)   | 92.3      | 6+          | 21.3      | 6           |
| 38.5      | 5 } (38.3)  | 89.7      | 6           | 20.6      | 6+          |
| 38.0      | 5 }         | 84.7      | 6+ br.      | 17.3      | 6+          |
| 37.3      | 6           |           | (84.9)      | 14.6      | 6 (14.9)    |
| 35.3      | 5 (35.5)    | 80.7      | 6+ br.      | 11.0      | 6+          |
| 34.7      | 5 (35.0)    | 76.9      | 5 } (76.7)  | 09.0      | 6+          |
| 34.2      | 6           | 76.5      | 5 }         | 08.8      | 6+          |
| 33.5      | 5 (33.7)    | 74.1      | 6+          | 07.2      | 6 (07.4)    |
| 33.0      | 6+          | 73.2      | 6 Fe }      | 05.3      | 6 (05.6)    |
| 29.3      | 5+ } (29.2) | 72.6      | 6 }         | 04.7      | 6 (05.0)    |
| 29.1      | 5+ }        | 72.4      | 6+ }        | 02.8      | 5 (03.1)    |
| 25.7      | 6           | 71.2      | 6+          | 02.2      | 6+          |
| 25.2      | 6           | 70.2      | 6+ br.      | 01.0      | 6+          |
| 22.7      | 6 (22.9)    | 68.5      | 6+ br.      | 2898.9    | 6+ } (98.8) |
| 21.7      | 6           | 66.8      | 6 (67.0)    | 98.7      | 4 }         |
| 20.9      | 6           | 64.6      | 6           | 96.1      | 6           |
| 20.4      | 6           | 63.7      | 6           | 95.3      | 6 } (95.1)  |
| 18.5      | 6+          | 60.0      | 6           | 94.8      | 6 }         |
| 17.5      | 6+          | 58.8      | 6 (59.1)    | 93.8      | 6 (94.0)    |
| 14.7      | 6 (14.9)    | 57.0      | 6           | 92.4      | 4 (92.6)    |
| 14.6      | 6           | 51.8      | 6 } (51.4)  | 89.5      | 3 (89.8)    |
| 13.4      | 6           | 51.2      | 5 }         | 88.2      | 6           |
| 12.7      | 6+          | 45.8      | 6           | 87.8      | 6           |
| 11.7      | 6+ }        | 42.8      | 6           | 86.6      | 4 (86.8)    |
| 11.2      | 6 } (11.4)  | 41.5      | 6 (41.9)    | 85.1      | 6           |
| 11.1      | 6 }         | 41.0      | 6           | 83.3      | 6           |
| 08.0      | 6 Fe        | 40.3      | 6           | 81.5      | 6 } (81.3)  |
| 07.1      | 6+ Fe       | 37.2      | 6 Fe        | 81.1      | 6 }         |
| 03.1      | 6           | 34.6      | 6           | 79.9      | 6 } (79.7)  |
| 02.0      | 6           | 34.3      | 6           | 79.5      | 3 }         |
| 00.9      | 6 Fe        | 33.1      | 2 (33.2)    | 75.8      | 6           |
| 2999.5    | 6+          | 30.4      | 5 (30.7)    | 75.0      | 6 (75.2)    |
| 98.7      | 6+          | 29.0      | 6           | 73.5      | 6+          |
| 97.8      | 6+          | 27.3      | 5           | 70.7      | 6           |
| 97.1      | 6+          | 26.5      | 6 Fe        | 69.7      | 6+          |
| 96.5      | 6+          | 25.5      | 6           | 69.0      | 6+          |

| $\lambda$ |               | $\lambda$ |            | $\lambda$ |               |
|-----------|---------------|-----------|------------|-----------|---------------|
| 2868·2    | 6+ br.        | 2804·1    | 6          | 2768·1    | 5 (68·4)      |
| 66·7      | 6+            | 02·8      | 6          | 65·7      | 6             |
| 61·8      | 6+ br.        | 02·5      | 6          | 64·2      | 6             |
| 58·5      | 6+ br. (58·3) | 02·0      | 6+         | 63·9      | 6             |
| 57·0      | 6             | 01·2      | 5 (01·0)   | 62·5      | 5+ br. (62·1) |
| 55·2      | 6 } (55·1)    | 2799·2    | 6          | 61·1      | 5 (60·9)      |
| 55·1      | 6 }           | 97·6      | 6          | 60·5      | 6             |
| 54·3      | 6             | 95·2      | 5 } (95·1) | 58·6      | 6             |
| 54·2      | 6             | 94·9      | 5 }        | 58·2      | 6 (58·0)      |
| 48·0      | 6+            | 93·7      | 6          | 57·3      | 6+            |
| 38·6      | 6+            | 93·3      | 6          | 56·3      | 6             |
| 36·4      | 6+            | 91·2      | 6 } (91·1) | 54·3      | 6+ (54·0)     |
| 35·5      | 6+            | 91·1      | 6+ }       | 53·5      | 6+ } (53·3)   |
| 31·5      | 6+            | 90·4      | 6+         | 53·2      | 6 }           |
| 30·6      | 6             | 90·2      | 5 (89·9)   | 52·5      | 6+            |
| 23·3      | 6             | 89·3      | 6+ br.     | 51·6      | 6+            |
| 22·4      | 6 }           |           | (89·9)     | 50·2      | 5 Fe (50·0)   |
| 21·9      | 6 } (22·0)    | 88·2      | 6 Fe       | 48·7      | 6             |
| 21·8      | 6 }           | 86·6      | 6          | 48·0      | 6             |
| 21·4      | 6             | 85·3      | 6          | 47·4      | 6             |
| 20·7      | 6             | 83·8      | 6 Fe       | 45·7      | 6             |
| 20·2      | 6             | 82·3      | 5 (82·1)   | 45·5      | 6             |
| 18·8      | 6             | 81·7      | 6+         | 45·0      | 6             |
| 18·7      | 6             | 80·6      | 6+         | 44·7      | 6             |
| 17·7      | 6 } (17·5)    | 80·3      | 6+         | 43·2      | 5 Fe (43·0)   |
| 17·3      | 6 }           | 79·2      | 5 (78·9)   | 40·9      | 5 } (40·7)    |
| 16·3      | 5             | 78·0      | 5 }        | 40·3      | 6+ }          |
| 15·0      | 4 (15·4)      | 77·6      | 6+ }       | 39·0      | 6+            |
| 14·0      | 6+ } (13·9)   | 75·5      | 6          | 38·6      | 6+            |
| 13·3      | 6 }           | 75·1      | 6          | 37·7      | 5 (37·5)      |
| 13·0      | 6 }           | 74·5      | 6          | 37·2      | 5 (37·0)      |
| 12·6      | 5 } (12·6)    | 74·0      | 6          | 34·1      | 6             |
| 12·3      | 5 }           | 73·7      | 6          | 33·4      | 6             |
| 11·3      | 5 (11·5)      | 73·2      | 6          | 32·7      | 6             |
| 08·6      | 6             | 72·7      | 6          | 31·9      | 6             |
| 08·3      | 6             | 72·3      | 6          | 30·9      | 6+            |
| 07·9      | 6 }           | 71·3      | 6          | 29·9      | 6+            |
| 07·5      | 6 } (07·7)    | 69·9      | 5          | 28·8      | 4 (28·5)      |
| 06·1      | 6             | 69·1      | 6          | 27·7      | 4 (27·3)      |
| 04·3      | 6             | 68·7      | 5 (68·4)   | 26·1      | 4 (25·8)      |

| $\lambda$ |             | $\lambda$ |             | $\lambda$ |            |
|-----------|-------------|-----------|-------------|-----------|------------|
| 2725.1    | 6           | 2696.2    | 6+ } (96.0) | 2663.5    | 6          |
| 24.6      | 4 } (24.3)  | 95.6      | 5 }         | 62.9      | 5 (62.6)   |
| 24.0      | 6 }         | 93.8      | 5           | 60.9      | 6          |
| 23.8      | 6 Fe        | 92.7      | 5           | 60.1      | 6          |
| 23.2      | 6           | 92.0      | 6+          | 59.8      | 6          |
| 22.9      | 6           | 91.4      | 6+          | 56.4      | 5          |
| 22.2      | 4 (21.8)    | 90.7      | 6           | 56.1      | 4 } (55.8) |
| 20.0      | 5           | 90.1      | 5 (89.9)    | 55.0      | 6 }        |
| 19.9      | 5           | 86.1      | 4 (85.9)    | 53.8      | 6 (53.6)   |
| 19.4      | 5 } (19.3)  | 84.0      | 5+          | 52.7      | 4 (52.5)   |
| 19.1      | 5 }         | 83.1      | 6+          | 52.0      | 6          |
| 18.5      | 6+          | 82.6      | 6+          | 51.1      | 4 (50.9)   |
| 17.6      | 5 (17.4)    | 82.0      | 6+          | 48.1      | 5          |
| 16.9      | 5 (16.7)    | 81.6      | 5 (81.3)    | 47.6      | 6          |
| 16.3      | 6+ Fe       | 81.0      | 5 } (80.7)  | 43.9      | 6          |
| 15.9      | 6           | 80.6      | 5 }         | 43.2      | 6          |
| 15.7      | 6           | 80.2      | 5           | 42.5      | 6          |
| 15.0      | 6+          | 79.5      | 5 } (79.1)  | 41.8      | 6          |
| 14.7      | 6           | 78.9      | 6 }         | 40.0      | 3 (39.8)   |
| 14.1      | 6+ (13.8)   | 78.1      | 5           | 38.7      | 5+         |
| 12.4      | 6           | 77.6      | 5 } (77.3)  | 38.3      | 4 }        |
| 11.7      | 4 (11.5)    | 77.0      | 6 }         | 38.0      | 5 }        |
| 10.7      | 5           | 75.7      | 5           | 37.2      | 6          |
| 10.5      | 5           | 75.2      | 5           | 37.0      | 6+         |
| 10.1      | 5+ } (10.1) | 75.0      | 5 }         | 34.6      | 6          |
| 09.7      | 6+ }        | 74.7      | 5 }         | 34.4      | 6          |
| 08.7      | 5+ (Fe)     | 73.6      | 4 (73.4)    | 33.9      | 6          |
| 08.5      | 4 (08.3)    | 72.8      | 3 (72.6)    | 33.4      | 6          |
| 07.7      | 5 (07.5)    | 72.1      | 5           | 33.1      | 6          |
| 06.8      | 6           | 71.4      | 6           | 32.5      | 3 } (32.3) |
| 04.8      | 6           | 71.0      | 6           | 32.0      | 5 }        |
| 04.1      | 5 } (03.8)  | 70.8      | 6           | 31.4      | 5          |
| 03.6      | 6 }         | 70.0      | 6           | 31.1      | 5          |
| 03.1      | 6           | 69.7      | 6 (69.3)    | 30.6      | 6          |
| 01.7      | 3 } (01.3)  | 68.2      | 6 (67.8)    | 30.1      | 6+         |
| 01.2      | 4 }         | 67.2      | 4 } (66.9)  | 29.6      | 5          |
| 2699.3    | 5 } (98.9)  | 67.0      | 4 }         | 27.3      | 6          |
| 98.3      | 6 }         | 65.5      | 5           | 27.1      | 6          |
| 97.7      | 6           | 64.4      | 5 } (64.0)  | 26.6      | 5          |
| 97.3      | 6           | 63.7      | 6 }         | 24.9      | 5          |

| $\lambda$ |            | $\lambda$ |             | $\lambda$ |            |
|-----------|------------|-----------|-------------|-----------|------------|
| 2624·1    | 5          | 2593·3    | 5           | 2553·9    | 6          |
| 21·9      | 6 Fe       | 92·1      | 6           | 53·1      | 5 (53·3)   |
| 20·3      | 6          | 91·9      | 6           | 52·9      | 6+         |
| 20·2      | 6 } (20·1) | 91·3      | 5           | 52·1      | 6          |
| 19·6      | 6 }        | 89·7      | 5           | 51·5      | 6          |
| 19·4      | 6          | 87·6      | 6 } (87·5)  | 50·2      | 6          |
| 17·6      | 5 Fe       | 87·4      | 6 }         | 49·8      | 6          |
| 17·1      | 6          | 86·6      | 6           | 49·2      | 6          |
| 16·6      | 5          | 86·1      | 6+          | 48·3      | 5          |
| 15·9      | 6+         | 85·5      | 6+          | 48·0      | 6          |
| 15·6      | 6+         | 84·3      | 6           | 47·6      | 6          |
| 14·2      | 6          | 82·4      | 6+          | 47·5      | 6          |
| 12·7      | 6          | 81·7      | 6           | 47·0      | 6          |
| 12·2      | 6          | 78·4      | 6           | 46·7      | 6          |
| 11·0      | 6          | 76·1      | 1 u. (76·3) | 46·5      | 6          |
| 10·8      | 6          | 75·4      | 6+          | 45·1      | 5 (45·3)   |
| 09·6      | 5          | 72·4      | 6           | 44·7      | 6+         |
| 08·8      | 5          | 70·2      | 6           | 44·2      | 6          |
| 08·5      | 5          | 69·4      | 6           | 44·0      | 6          |
| 08·1      | 6          | 68·6      | 6           | 42·6      | 6          |
| 07·9      | 6          | 68·4      | 6           | 42·1      | 6+         |
| 07·4      | 6          | 67·3      | 6           | 41·0      | 5 (41·2)   |
| 07·2      | 6 Fe       | 67·0      | 6 Fe        | 40·8      | 6          |
| 06·9      | 6 } (06·8) | 66·1      | 6           | 40·3      | 6          |
| 06·7      | 6 }        | 64·2      | 6           | 40·0      | 6          |
| 06·2      | 6          | 63·5      | 6 Fe        | 39·4      | 5+         |
| 04·4      | 5          | 62·4      | 6           | 38·9      | 5+ (39·1)  |
| 03·2      | 6          | 62·0      | 6           | 37·6      | 6          |
| 03·1      | 6          | 61·7      | 6           | 37·3      | 6 Fe       |
| 02·1      | 6          | 61·0      | 6           | 36·8      | 6 Fe       |
| 01·9      | 6          | 60·7      | 6           | 36·3      | 6          |
| 01·2      | 6          | 60·0      | 6           | 36·0      | 6          |
| 00·7      | 6          | 59·3      | 5           | 35·0      | 6          |
| 2599·6    | 6 Fe       | 58·6      | 6 } (58·6)  | 33·4      | 5 } (33·0) |
| 99·0      | 5 } (98·8) | 58·4      | 5 }         | 32·8      | 5 }        |
| 98·4      | 5 }        | 58·1      | 6           | 29·6      | 6          |
| 97·6      | 6          | 56·3      | 5           | 29·2      | 6          |
| 94·8      | 6 (94·6)   | 55·7      | 6           | 29·1      | 6          |
| 93·9      | 5 } (93·8) | 55·2      | 6           | 27·5      | 6          |
| 93·7      | 5 }        | 54·9      | 6           | 27·2      | 6          |

| $\lambda$ |            | $\lambda$ |               | $\lambda$ |             |
|-----------|------------|-----------|---------------|-----------|-------------|
| 2526·4    | 6          | 2487·0    | 6             | 2434·9    | 6+          |
| 26·2      | 6          | 85·1      | 6 (85·3)      | 34·2      | 5+          |
| 24·7      | 6+         | 84·4      | 6             | 33·7      | 5 (33·5)    |
| 24·1      | 6+         | 83·0      | 6             | 33·0      | 6           |
| 23·1      | 5          | 82·8      | 6             | 32·4      | 6           |
| 22·6      | 6          | 82·2      | 6             | 31·4      | 6+ br.      |
| 21·7      | 6          | 81·1      | 6             | 30·1      | 6+          |
| 21·1      | 6+         | 80·3      | 6             | 29·6      | 6+          |
| 20·2      | 6          | 77·4      | 6+            | 28·0      | 3+ } u.     |
| 20·1      | 6          | 75·6      | 6             | 27·6      | 4+ } (27·8) |
| 19·6      | 6          | 73·7      | 6+ (73·9)     | 25·9      | 6+ br.      |
| 18·1      | 5 (18·3)   | 72·9      | 5 (73·1)      | 23·9      | 5+          |
| 17·4      | 6          | 69·4      | 6             | 23·1      | 6+ } (22·8) |
| 16·8      | 5 } (16·9) | 67·1      | 6+            | 22·4      | 6 }         |
| 16·7      | 5 }        | 66·3      | 5             | 21·7      | 6+          |
| 16·2      | 6          | 65·4      | 6+            | 21·0      | 6+          |
| 15·6      | 6          | 64·2      | 6             | 20·0      | 6 } (19·7)  |
| 15·5      | 6          | 61·9      | 6             | 19·3      | 6 }         |
| 15·0      | 6          | 61·0      | 6             | 18·1      | 6 (17·9)    |
| 14·1      | 5          | 60·8      | 6             | 17·1      | 5+          |
| 13·1      | 6+         | 60·1      | 6+            | 13·9      | 6+          |
| 11·8      | 6 Fe       | 58·8      | 4+ (59·0)     | 12·9      | 6           |
| 09·2      | 6          | 58·1      | 6+            | 11·2      | 6           |
| 09·0      | 6          | 57·0      | 6+            | 10·7      | 4 (10·5)    |
| 08·4      | 6          | 55·5      | 6             | 09·4      | 5           |
| 07·0      | 6          | 53·7      | 5             | 08·1      | 6           |
| 06·6      | 6          | 53·2      | 4 } (53·0)    | 07·8      | 6           |
| 06·1      | 6+         | 52·6      | 3 }           | 07·3      | 6           |
| 05·4      | 6+         | 49·9      | 6             | 06·1      | 6+          |
| 2497·3    | 5+         | 48·9      | 6+            | 03·7      | 6+ (03·5)   |
| 97·1      | 5+ (96·9)  | 48·0      | 6+            | 02·2      | 6 (02·0)    |
| 96·0      | 6+         | 45·7      | 6+            | 01·7      | 6           |
| 95·7      | 6+         | 44·7      | 5 (44·5)      | 00·5      | 6 (00·3)    |
| 94·6      | 6+         | 43·7      | 6+            | 2399·6    | 6           |
| 92·7      | 6          | 43·0      | 6+            | 99·1      | 6           |
| 92·4      | 6+         | 40·6      | 6 (40·3)      | 98·1      | 6+          |
| 91·6      | 6          | 39·4      | 6             | 97·6      | 6+          |
| 91·0      | 6          | 38·2      | 2 u. } (37·7) | 95·5      | 6           |
| 90·7      | 6          | 37·6      | 4 }           | 89·2      | 6+ } (89·0) |
| 88·2      | 6          | 36·8      | 6+            | 88·8      | 5 }         |



| $\lambda$ |          | $\lambda$ |            | $\lambda$ |          |
|-----------|----------|-----------|------------|-----------|----------|
| 2387·9    | 6+       | 2348·4    | 6 (48·4)   | 2308 4    | 6        |
| 87·5      | 6+       | 41·4      | 6 } (41·1) | 05·1      | 6 (05·4) |
| 85·3      | 6        | 40·8      | 6 }        | 2299·8    | 6        |
| 74·5      | 6        | 33·4      | 6          | 99·2      | 6 (99·4) |
| 73·9      | 6        | 32·4      | 6          | 93·6      | 6+       |
| 65·5      | 6        | 19·6      | 6          | 70·4      | 6        |
| 65·4      | 6        | 19·1      | 6          | 20·8      | 6        |
| 59·2      | 6        | 14·1      | 6          | 2177·1    | 6        |
| 48·9      | 6        | 13·0      | 6          | 11·7      | 6+       |
| 48·5      | 6 (48·4) | 09·1      | 6+         |           |          |

### Wolfram (Nachtrag).

Die Zahl der Linien im Wolframspectrum ist eine sehr bedeutende. Wir haben zwischen  $\lambda = 4694\cdot1$  und  $\lambda = 2161\cdot2$  nicht weniger als 3300 Linien gemessen. Dieselben sind sehr scharf, zeigen aber verhältnissmässig geringe Intensitätsunterschiede, wie überhaupt die letzteren mit der Linienzahl im Allgemeinen abzunehmen scheinen. In der Tabelle IV unserer I. Mittheilung sind die folgenden Linien als der Luft angehörig zu streichen: 4396·1, 4336·9, 4327·3, 4325·7, 4319·7, 4317·0, 4189·3, 4185·0, 4153·4, 4145·7, 4085·2, 4041·5, 3882·1, 3007·0. Ferner ist zu bemerken, dass die Linien 3968·7 und 3933·8 nicht dem Wo, sondern dem Ca angehören.

|        |    | $\lambda$ |    | $\lambda$ |    |
|--------|----|-----------|----|-----------|----|
| 4694·1 | 5+ | 4679·3    | 6  | 4671·6    | 6  |
| 92·0   | 5+ | 78·8      | 6  | 68·7      | 6  |
| 87·9   | 6  | 77·9      | 6  | 66·0      | 5  |
| 83·7   | 5  | 76·9      | 6  | 65·0      | 6+ |
| 82·8   | 6  | 75·4      | 6+ | 64·1      | 6+ |
| 81·4   | 6  | 75·2      | 6+ | 63·2      | 6+ |
| 80·8   | 3  | 72·4      | 6  | 62·1      | 6  |
| 79·8   | 6  | 71·9      | 6  | 61·7      | 6  |

| $\lambda$ |        | $\lambda$ |             | $\lambda$ |           |
|-----------|--------|-----------|-------------|-----------|-----------|
| 4661·4    | 6      | 4600·6    | 6           | 4542·0    | 6         |
| 60·0      | 3      | 00·1      | 5           | 40·3      | 6         |
| 57·6      | 4      | 4598·4    | 6           | 39·8      | 6         |
| 55·5      | 6+     | 92·6      | 4           | 36·6      | 5         |
| 54·4      | 6      | 88·8      | 4           | 35·0      | 5         |
| 50·9      | 5+     | 87·8      | 6+          | 34·6      | 5         |
| 46·3      | 6      | 86·9      | 5           | 32·3      | 6         |
| 45·3      | 6      | 86·1      | 6           | 30·5      | 6         |
| 45 1      | 6      | 85·5      | 6+          | 29·8      | 6         |
| 42·7      | 5      | 84·8      | 6+          | 28·6      | 6+        |
| 40·4      | 6      | 82·2      | 6           | 27·3      | 6         |
| 38·0      | 6+     | 79·8      | 6+          | 22·9      | 6+        |
| 37·4      | 6+     | 78·3      | 5           | 20·0      | 6+        |
| 36·2      | 6      | 75·2      | 6+          | 19·1      | 6         |
| 34·8      | 5      | 72·8      | 6           | 17·4      | 6         |
| 33·3      | 6+     | 72·6      | 6           | 16 5      | 6+        |
| 32·7      | 6+     | 71·9      | 6           | 15·8      | 6+ (15·5) |
| 31·8      | 6+     | 70·6      | 4           | 14·1      | 6+        |
| 29·9      | 6      | 69·3      | 6+          | 13·1      | 5         |
| 29·5      | 6      | 67·6      | 6+          | 12·8      | 5 (12 5)  |
| 29 0      | 6      | 67·3      | 6+          | 09·6      | 6         |
| 28·6      | 6      | 66·3      | 6           | 09·3      | 6         |
| 27·8      | 6+     | 65·4      | 6           | 08·9      | 6         |
| 27·4      | 6+     | 64·1      | 6           | 08·4      | 6         |
| 27·1      | 6+     | 63·7      | 6           | 04·8      | 5         |
| 26·3      | 6+     | 62 1      | 6           | 04·0      | 5         |
| 25·4      | 6+     | 61·6      | 6           | 03·1      | 6         |
| 23·9      | 6+     | 60·4      | 6           | 02·3      | 6         |
| 23·5      | 6      | 59·0      | 6           | 00·3      | 6         |
| 20·8      | 6      | 56·8      | 6           | 00·2      | 6         |
| 16·6      | 6+     | 55·3      | 6+ } (54·5) | 4498·6    | 5         |
| 15·0      | 6      | 54·1      | 2 }         | 97·8      | 6         |
| 13·5      | 4      | 52·6      | 6           | 97·0      | 6         |
| 10·0      | 5      | 51·9      | 5           | 96·4      | 6+        |
| 09·0      | 6+     | 50·4      | 6           | 95·4      | 6         |
| 06·6      | 6+     | 49·8      | 6+          | 94·0      | 5         |
| 04·8      | 5      | 45·6      | 6+          | 92·4      | 6         |
| 03·5      | 6+ br. | 44·6      | 6+ } (44·0) | 90·0      | 6         |
| 01·6      | 6+ br. | 43·6      | 5 }         | 89·1      | 5         |
| 01·0      | 6      | 42·9      | 6           | 88·5      | 6         |

| $\lambda$ |          | $\lambda$ |             | $\lambda$ |             |
|-----------|----------|-----------|-------------|-----------|-------------|
| 4487·8    | 6        | 4442·5    | 6           | 4396·9    | 6           |
| 87·5      | 6+       | 41·9      | 5           | 95·1      | 6           |
| 85·3      | 6        | 39·8      | 6           | 94·5      | 6           |
| 84·3      | 3 (84·5) | 39 0      | 5           | 93·8      | 5           |
| 82·0      | 6        | 38·5      | 6           | 90·9      | 6+          |
| 81·5      | 5        | 37·6      | 6           | 89·9      | 5           |
| 80·3      | 6        | 37·0      | 5           | 87·9      | 6+          |
| 79·0      | 6        | 35·8      | 6           | 87·5      | 6           |
| 78·6      | 6        | 35·1      | 6 Mo        | 86·7      | 6           |
| 76·0      | 6        | 33·7      | 6+ } (33·5) | 84 8      | 4 (85·1)    |
| 75·7      | 6        | 33·1      | 6 }         | 81·8      | 6+ Mo       |
| 75·0      | 6+ Mo    | 32·2      | 6           | 80·1      | 6           |
| 74 1      | 5        | 30·9      | 6+          | 79·3      | 6           |
| 73·0      | 6        | 29 0      | 6           | 77·5      | 6+          |
| 72·6      | 6        | 28·6      | 6           | 73·8      | 6+          |
| 72·0      | 6        | 27·6      | 6+          | 73·0      | 6+ } (72·7) |
| 71·6      | 6        | 25·6      | 6           | 72·5      | 5 }         |
| 69·9      | 6        | 25·1      | 6           | 71·8      | 6           |
| 68·8      | 5        | 23·8      | 5           | 70·8      | 6           |
| 66·9      | 5        | 22·8      | 6+          | • 68·7    | 6           |
| 66·5      | 5        | 22·6      | 6           | 65·9      | 4 (66·1)    |
| 65·8      | 6        | 21·9      | 5           | 64·7      | 4 (64·9)    |
| 63·5      | 6        | 21·1      | 6           | 61·6      | 5           |
| 63·1      | 6        | 20·6      | 5           | 61·1      | 6           |
| 62·6      | 6        | 19·4      | 6           | 60·0      | 6+          |
| 60·6      | 5        | 18·9      | 6           | 59·3      | 6+          |
| 59·3      | 6+ br.   | 18·6      | 6           | 58·6      | 6+          |
| 58·4      | 6        | 15·8      | 6           | 58·0      | 6+          |
| 58·2      | 6        | 13·4      | 6           | 56·5      | 6+          |
| 56·2      | 6        | 13·2      | 6           | 55·2      | 5 (55·0)    |
| 54·9      | 6        | 11·5      | 6           | 47·0      | 5           |
| 52·3      | 6 (52·5) | 11·1      | 6           | 46·3      | 6           |
| 50·4      | 6        | 10·0      | 6           | 45·9      | 6           |
| 49·9      | 6        | 09·6      | 6+          | 45·1      | 6           |
| 49·0      | 5        | 08·8      | 6 } (08·5)  | 43 2      | 5           |
| 45·2      | 5        | 08·3      | 4 }         | 42·4      | 6           |
| 44·6      | 6        | 06·1      | 5           | 41·3      | 6+          |
| 44·2      | 6        | 03·5      | 6           | 39·5      | 6           |
| 43·1      | 6        | 02·8      | 6           | 39·1      | 6           |
| 42·8      | 6        | 00·3      | 6+ (00·1)   | 38·6      | 6           |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |            |
|-----------|------------|-----------|------------|-----------|------------|
| 4338.2    | 6+         | 4287.0    | 6+         | 4249.5    | 6          |
| 30.7      | 5          | 85.0      | 5 (85.3)   | 48.8      | 6          |
| 26.9      | 6+         | 83.8      | 6          | 48.2      | 6          |
| 25.1      | 6+         | 83.0      | 6+         | 47.6      | 6          |
| 24.6      | 6          | 82.0      | 6          | 47.3      | 6          |
| 22.9      | 6          | 81.4      | 6+         | 46.0      | 6          |
| 21.5      | 6+         | 80.5      | 6+         | 45.6      | 6          |
| 20.4      | 6+         | 79.0      | 6          | 44.5      | 4 } (43.9) |
| 18.6      | 6          | 78.5      | 6          | 43.8      | 6 }        |
| 16.8      | 5          | 77.8      | 6          | 43.4      | 6 (43.0)   |
| 16.3      | 6+         | 77.4      | 6          | 41.5      | 4 } (41.1) |
| 15.3      | 6+         | 76.0      | 6          | 41.0      | 6 }        |
| 13.1      | 6+         | 75.5      | 4 } (75.3) | 40.8      | 6          |
| 12.8      | 6+         | 75.0      | 6 }        | 40.4      | 6          |
| 12.3      | 6          | 74.6      | 4 (74.4)   | 40.1      | 6          |
| 11.0      | 6+         | 73.7      | 5          | 38.6      | 6          |
| 10.2      | 6          | 72.3      | 6          | 36.6      | 6 (36.8)   |
| 10.0      | 6          | 71.8      | 6          | 35.5      | 6          |
| 09.3      | 6          | 70.9      | 6 } (70.7) | 34.4      | 5          |
| 09.0      | 6          | 70.8      | 6 }        | 33.0      | 6          |
| 07.6      | 5          | 69.9      | 5          | 32.6      | 6          |
| 06.3      | 6          | 69.5      | 3 } (69.3) | 31.9      | 6          |
| 05.8      | 6          | 68.8      | 6 }        | 31.8      | 6          |
| 05.6      | 6          | 68.1      | 6          | 31.4      | 6 } (31.3) |
| 05.1      | 6+         | 67.9      | 6          | 31.3      | 6 }        |
| 02.6      | 6          | 66.6      | 5 (66.4)   | 30.0      | 6+         |
| 01.1      | 6          | 65.0      | 6          | 29.1      | 6          |
| 4299.0    | 6+         | 63.5      | 4 (63.1)   | 28.5      | 6 } (27.8) |
| 97.6      | 6          | 60.3      | 4 } (60.0) | 27.6      | 6 }        |
| 97.2      | 6          | 59.9      | 6 }        | 26.8      | 3 Ca       |
| 95.7      | 6          | 59.4      | 4 } (59.0) | 26.4      | 6 }        |
| 94.6      | 2 (94.4)   | 58.5      | 6 }        | 25.7      | 6 }        |
| 94.1      | 5          | 57.3      | 6          | 25.0      | 5 }        |
| 93.0      | 6+         | 57.0      | 6 (56.8)   | 24.9      | 5 }        |
| 92.8      | 6+         | 55.6      | 6          | 24.1      | 6+ }       |
| 92.0      | 6+         | 54.3      | 5          | 22.2      | 5          |
| 91.5      | 6+         | 54.1      | 6 (53.8)   | 22.0      | 6 } (21.6) |
| 90.1      | 6 } (89.7) | 52.6      | 6+         | 21.5      | 6 }        |
| 89.3      | 6 }        | 51.8      | 6+         | 20.7      | 6          |
| 88.4      | 6          | 50.1      | 6+         | 20.5      | 6          |

| $\lambda$ |            | $\lambda$ |             | $\lambda$ |            |
|-----------|------------|-----------|-------------|-----------|------------|
| 4219·5    | 4          | 4180·4    | 5 (80·2)    | 4142·3    | 5          |
| 19·2      | 6 } (18·8) | 78·7      | 6           | 41·6      | 6          |
| 18·7      | 6 }        | 78·0      | 6+          | 40·9      | 6          |
| 16·0      | 6          | 77·0      | 6           | 40·4      | 6          |
| 15·5      | 3          | 76·9      | 6           | 40·1      | 6          |
| 15·1      | 6 } (15·0) | 76·0      | 6           | 39·3      | 6          |
| 14·5      | 6 }        | 75·6      | 4 } (75·1)  | 38·5      | 6          |
| 14·0      | 6          | 74·6      | 6+          | 38·3      | 6          |
| 13·5      | 6          | 72·9      | 6+          | 38·1      | 6          |
| 12·9      | 6          | 72·1      | 6           | 37·6      | 5          |
| 11·5      | 6 } (11·0) | 71·9      | 6           | 37·5      | 4 } (37·3) |
| 10·4      | 6 }        | 71·1      | 4 (70·7)    | 36·5      | 6 }        |
| 10·3      | 6 } (10·0) | 68·7      | 4 } (68·3)  | 34·7      | 6+         |
| 09·7      | 6+ }       | 68·3      | 6 }         | 33·6      | 5          |
| 07·0      | 4 } (06·6) | 66·9      | 6           | 32·3      | 6          |
| 06·3      | 5 }        | 66·2      | 6           | 30·9      | 6          |
| 05·6      | 6+         | 65·7      | 6+ } (65·2) | 30·6      | 6 }        |
| 04·5      | 4          | 64·9      | 6 }         | 30·2      | 6 }        |
| 02·0      | 6          | 64·0      | 6           | 27·0      | 6 }        |
| 01·3      | 6          | 63·0      | 6+          | 26·9      | 5 } (26·8) |
| 00·9      | 6          | 61·6      | 6           | 23·0      | 6          |
| 00·5      | 6          | 61·0      | 6           | 22·7      | 6          |
| 00·1      | 6          | 60·4      | 6           | 22·0      | 6          |
| 4199·7    | 6          | 60·0      | 6           | 20·8      | 6          |
| 98·9      | 6          | 59·0      | 6           | 19·0      | 6          |
| 98·7      | 6          | 57·1      | 5           | 14·8      | 6          |
| 98·3      | 6          | 54·8      | 5           | 14·2      | 5 } (14·0) |
| 97·9      | 6          | 53·2      | 6           | 13·9      | 6 }        |
| 97·4      | 6          | 52·6      | 6           | 12·4      | 6          |
| 97·3      | 6          | 51·8      | 6           | 11·8      | 5          |
| 93·9      | 6+         | 51·1      | 6           | 09·8      | 4          |
| 93·0      | 6+         | 50·6      | 6           | 08·5      | 6          |
| 89·3      | 6          | 50·0      | 6           | 07·9      | 6          |
| 87·0      | 6+         | 49·8      | 6           | 06·8      | 6          |
| 86·0      | 6          | 49·5      | 6 } (49·4)  | 04·0      | 6          |
| 85·5      | 6          | 49·3      | 6+ }        | 01·8      | 6          |
| 83·7      | 6          | 48·3      | 6           | 01·0      | 6          |
| 83·6      | 6 } (83·2) | 46·8      | 5           | 4099·2    | 5 (98·9)   |
| 83·0      | 6+ }       | 45·3      | 5 (45·1)    | 97·2      | 6          |
| 81·5      | 6          | 44·6      | 6           | 96·6      | 6          |

| $\lambda$ |          | $\lambda$ |    | $\lambda$ |    |
|-----------|----------|-----------|----|-----------|----|
| 4095·8    | 6        | 4052·5    | 6  | 4011·1    | 6  |
| 94·3      | 6+       | 51·5      | 6  | 11·0      | 6  |
| 93·3      | 6        | 50·1      | 6+ | 10·3      | 6  |
| 92·5      | 6        | 48·5      | 6  | 09·7      | 6  |
| 91·3      | 6        | 48·1      | 6  | 07·0      | 6  |
| 91·2      | 6        | 46·8      | 6  | 05·7      | 6  |
| 90·8      | 6        | 44·1      | 6  | 05·3      | 6  |
| 90·3      | 6        | 42·5      | 6  | 04·1      | 6  |
| 89·6      | 6        | 41·7      | 6  | 03·8      | 6  |
| 88·9      | 5        | 41·2      | 6  | 02·8      | 6  |
| 88·5      | 5        | 40·7      | 6  | 01·5      | 6  |
| 87·6      | 6        | 40·0      | 6  | 00·7      | 6  |
| 87·1      | 6        | 39·5      | 6  | 3998·7    | 6  |
| 84·5      | 6+       | 35·3      | 6  | 98·2      | 6  |
| 83·9      | 6+       | 33·9      | 6  | 97·8      | 6  |
| 83·1      | 5 (82·9) | 32·5      | 6+ | 97·3      | 6  |
| 81·6      | 4        | 31·6      | 6  | 97·1      | 6  |
| 81·3      | 6        | 31·4      | 6  | 95·0      | 6  |
| 79·5      | 6        | 30·0      | 6  | 93·8      | 6  |
| 79·1      | 6        | 29·7      | 6  | 92·5      | 6  |
| 78·3      | 6        | 29·0      | 6  | 88·8      | 6  |
| 77·9      | 5        | 28·9      | 6  | 88·5      | 6  |
| 75·7      | 6        | 28·4      | 6+ | 88·0      | 6  |
| 73·2      | 6        | 25·6      | 6  | 87·5      | 6  |
| 73·1      | 6        | 25·1      | 6  | 87·1      | 6  |
| 70·7      | 5        | 24·9      | 6  | 86·3      | 6+ |
| 70·0      | 3        | 22·8      | 6  | 84·9      | 6  |
| 67·0      | 6        | 22·1      | 6  | 84·2      | 6  |
| 65·5      | 6        | 20·8      | 6  | 83·3      | 4  |
| 65·0      | 5        | 19·7      | 6+ | 80·7      | 5  |
| 63·8      | 6        | 19·3      | 5  | 80·0      | 6  |
| 60·9      | 6+       | 17·0      | 6  | 77·8      | 6  |
| 60·3      | 6        | 16·2      | 6  | 76·5      | 6+ |
| 59·2      | 6+       | 15·3      | 4  | 75·9      | 6  |
| 58·0      | 6        | 13·9      | 6  | 75·5      | 6  |
| 57·5      | 6        | 13·8      | 6  | 72·5      | 6  |
| 56·8      | 6        | 13·2      | 6  | 72·0      | 6  |
| 55·8      | 6        | 12·2      | 6  | 69·3      | 6  |
| 55·2      | 6        | 12·0      | 6  | 62·4      | 6  |
| 53·5      | 6        | 11·8      | 6  | 61·7      | 5  |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |             |
|-----------|------------|-----------|------------|-----------|-------------|
| 3960·8    | 6          | 3917·8    | 6          | 3879·7    | 6           |
| 60·1      | 6+         | 17·6      | 6          | 79·4      | 6           |
| 59·5      | 6+         | 15·5      | 5+ (15·3)  | 79·2      | 6           |
| 58·9      | 6          | 14·3      | 6+         | 78·7      | 6           |
| 57·6      | 6          | 13·8      | 6          | 78·3      | 6           |
| 57·2      | 6          | 13·5      | 6 } (13·2) | 77·9      | 6           |
| 55·7      | 5          | 13·0      | 6 }        | 77·5      | 5 (77·2)    |
| 53·8      | 6          | 11·5      | 6 (11·7)   | 76·2      | 6+          |
| 53·5      | 6          | 09·4      | 6          | 76·0      | 5           |
| 53·2      | 5 } (53·1) | 07·5      | 6          | 74·7      | 5           |
| 53·0      | 6 }        | 07·3      | 6 (07·0)   | 73·1      | 5           |
| 52·3      | 6          | 06·1      | 6          | 72·8      | 5+ (72·6)   |
| 52·0      | 6          | 06·0      | 6          | 71·8      | 6+          |
| 48·8      | 6          | 05·8      | 6 (05·6)   | 70·8      | 6+          |
| 48·3      | 6 } (47·9) | 04·2      | 6          | 69·6      | 6+ } (69·1) |
| 48·2      | 5 }        | 03·5      | 6          | 68·7      | 6 }         |
| 46·5      | 6          | 03·1      | 6 Mo       | 67·7      | 6           |
| 44·3      | 5 (44·0)   | 02·0      | 6          | 67·5      | 6           |
| 42·5      | 6          | 01·5      | 6          | 66·2      | 6+          |
| 42·0      | 6          | 01·0      | 6 (00·7)   | 65·5      | 6           |
| 41·7      | 6          | 00·0      | 6 (99·7)   | 64·6      | 5 } (64·3)  |
| 41·1      | 6          | 3899·0    | 6          | 63·8      | 6 }         |
| 40·6      | 6          | 98·2      | 5 (97·8)   | 63·0      | 6           |
| 38·3      | 6          | 97·2      | 4 (96·9)   | 62·7      | 6           |
| 37·8      | 6          | 95·8      | 6+         | 61·3      | 6 } (61·2)  |
| 37·2      | 5          | 94·2      | 6 } (93·9) | 61·2      | 6 }         |
| 35·5      | 5          | 93·7      | 6 }        | 60·1      | 5 } (60·0)  |
| 35·2      | 6 (35·0)   | 93·0      | 5          | 59·5      | 5 }         |
| 31·7      | 6          | 91·0      | 6          | 59·0      | 6           |
| 31·1      | 6          | 89·5      | 6+         | 57·6      | 6           |
| 30·7      | 6          | 88·7      | 6+         | 57·5      | 6           |
| 30·5      | 6 (30·3)   | 88·2      | 6 (88·0)   | 57·0      | 5 } (56·7)  |
| 26·2      | 6          | 86·9      | 6          | 56·6      | 5 }         |
| 25·3      | 6          | 86·5      | 6 (86·3)   | 56·2      | 6 }         |
| 24·9      | 6          | 84·2      | 6          | 55·7      | 6 } (55·7)  |
| 24·6      | 6 (24·4)   | 84·0      | 6          | 55·5      | 6 }         |
| 23·1      | 6          | 83·5      | 6+         | 54·8      | 6           |
| 22·9      | 6          | 82·7      | 6+         | 54·0      | 6           |
| 18·8      | 6          | 81·6      | 4 (81·2)   | 53·0      | 6           |
| 18·5      | 6          | 80·3      | 6          | 51·7      | 4 (51·5)    |

|        |    |        | $\lambda$ |    | $\lambda$ |      |        |        |
|--------|----|--------|-----------|----|-----------|------|--------|--------|
| 3851.3 | 6  | (51.5) | 3819.2    | 6  | 3782.0    | 6    |        |        |
| 50.2   | 6  |        | 19.1      | 6  | 81.5      | 6    |        |        |
| 47.7   | 5  | (47.4) | 18.0      | 6+ | 80.3      | 6+   |        |        |
| 46.4   | 4  | (46.1) | 17.6      | 4  | (17.4)    | 78.3 | 6      |        |
| 46.0   | 6  |        | 16.5      | 5  | 77.5      | 5    |        |        |
| 44.5   | 6  |        | 16.0      | 5  | 75.5      | 5    |        |        |
| 43.8   | 6  |        | 15.3      | 6+ | 74.3      | 5    | (74.1) |        |
| 43.5   | 6  |        | 14.6      | 6  | 73.8      | 4    |        |        |
| 42.6   | 5  | (42.2) | 13.2      | 6+ | 72.6      | 6    |        |        |
| 41.2   | 6+ |        | 12.8      | 6+ | 72.2      | 6    |        |        |
| 40.5   | 6  |        | 10.9      | 5  | (10.6)    | 70.0 | 6      |        |
| 39.4   | 6  |        | 10.5      | 5  |           | 69.4 | 6      |        |
| 38.6   | 5  | (38.4) | 10.0      | 6  | 69.2      | 6    |        |        |
| 38.1   | 6  |        | 07.8      | 6  | 68.0      | 6    |        |        |
| 37.9   | 6  |        | 07.5      | 6  | (07.3)    | 67.5 | 6      |        |
| 37.4   | 5  |        | 06.8      | 6+ | (06.5)    | 67.3 | 6      |        |
| 36.7   | 6  |        | 05.8      | 6  | 67.0      | 6    |        |        |
| 36.0   | 6+ |        | 05.5      | 6  | 65.5      | 6+   | br.    |        |
| 35.2   | 4  | (35.0) | 04.6      | 6  | 64.6      | 6    |        |        |
| 34.4   | 6  |        | 04.2      | 6  | 64.0      | 6    |        |        |
| 34.3   | 6  |        | 03.4      | 6  | 63.2      | 6    |        |        |
| 33.1   | 6  |        | 03.1      | 6  | 61.7      | 6    |        |        |
| 32.8   | 6  | (32.7) | 02.1      | 5  | 61.5      | 6    |        |        |
| 32.5   | 6  |        | 01.6      | 6  | 60.5      | 5    |        |        |
| 30.9   | 6+ | (30.8) | 00.2      | 6  | 60.3      | 5    | (60.1) |        |
| 30.7   | 6  |        | 3799.7    | 6  | 59.3      | 6    |        |        |
| 30.4   | 6  |        | 99.2      | 6  | 58.4      | 6    |        |        |
| 30.0   | 6  |        | 96.4      | 5+ | 57.0      | 5+   |        |        |
| 28.1   | 5  | (27.7) | 95.0      | 6  | (94.7)    | 55.0 | 6      |        |
| 27.4   | 6+ | br.    | 94.4      | 5  |           | 54.9 | 6      |        |
|        |    | (27.7) | 93.5      | 6  | (93.8)    | 53.7 | 5      | (53.5) |
| 26.3   | 6  |        | 92.8      | 5  | (93.0)    | 53.3 | 6      |        |
| 25.6   | 6  |        | 92.3      | 6  | 51.5      | 6    |        |        |
| 25.4   | 6  |        | 91.6      | 6  | (91.8)    | 48.4 | 6      |        |
| 24.6   | 5  |        | 91.5      | 6  | 47.9      | 6    |        |        |
| 23.2   | 5  | (23.1) | 91.0      | 6+ | 47.6      | 6    |        |        |
| 23.0   | 6  |        | 86.5      | 6  | 47.0      | 6    |        |        |
| 22.3   | 6  |        | 86.2      | 6  | 46.0      | 6    |        |        |
| 21.8   | 6+ |        | 83.9      | 6  | 44.4      | 6    |        |        |
| 20.6   | 5  |        | 83.6      | 6  | 44.2      | 6    |        |        |



| $\lambda$ |            | $\lambda$ |            | $\lambda$ |            |
|-----------|------------|-----------|------------|-----------|------------|
| 3743.5    | 6          | 3703.4    | 6          | 3671.9    | 6+         |
| 42.7      | 6          | 03.0      | 6          | 71.5      | 6+         |
| 39.7      | 6          | 02.9      | 6          | 70.6      | 6+         |
| 39.3      | 6          | 02.4      | 6 } (02.2) | 70.2      | 6+         |
| 38.9      | 6          | 01.9      | 6 }        | 69.3      | 6          |
| 37.1      | 5+ br.     | 00.7      | 6+         | 68.7      | 6          |
| 35.5      | 6          | 3699.5    | 6          | 67.6      | 6          |
| 33.7      | 6          | 98.7      | 6          | 67.5      | 6          |
| 33.5      | 6          | 98.6      | 6          | 67.1      | 6+         |
| 32.7      | 6+         | 97.5      | 6          | 65.7      | 6+         |
| 32.1      | 6          | 96.9      | 6          | 64.7      | 6+         |
| 31.9      | 6          | 96.5      | 6          | 63.7      | 6          |
| 29.9      | 6          | 96.2      | 6          | 63.3      | 6          |
| 29.4      | 6          | 93.8      | 6          | 61.6      | 6          |
| 28.5      | 6+         | 93.6      | 6          | 61.2      | 6          |
| 26.2      | 6          | 92.8      | 6+ Mo      | 60.1      | 6          |
| 25.3      | 6          | 91.6      | 6          | 59.2      | 6          |
| 22.7      | 6          | 90.3      | 5          | 57.8      | 4 } (57.6) |
| 21.3      | 5 } (21.1) | 89.9      | 6          | 57.5      | 3 }        |
| 20.7      | 6 }        | 89.7      | 5          | 56.7      | 6          |
| 18.7      | 6          | 89.2      | 6          | 56.6      | 6          |
| 18.4      | 6          | 88.6      | 6          | 55.5      | 6          |
| 18.0      | 6          | 88.4      | 5 } Mo     | 54.7      | 6 } (54.5) |
| 17.3      | 6          | 88.1      | 5 } (87.9) | 54.2      | 5 }        |
| 16.7      | 6          | 87.4      | 5+         | 53.3      | 5 (53.5)   |
| 15.1      | 6          | 86.7      | 6          | 51.5      | 6          |
| 15.0      | 6          | 86.4      | 6          | 50.0      | 6          |
| 14.8      | 6          | 85.6      | 6          | 49.0      | 6          |
| 14.3      | 6          | 85.5      | 6          | 47.9      | 6          |
| 13.8      | 6          | 85.2      | 6          | 44.3      | 6          |
| 13.2      | 6          | 84.7      | 6          | 44.0      | 6          |
| 11.6      | 6          | 83.9      | 5          | 43.6      | 6          |
| 11.0      | 6          | 83.3      | 5          | 43.5      | 6          |
| 09.4      | 6          | 80.8      | 6+         | 43.1      | 6          |
| 07.6      | 6          | 79.9      | 6          | 42.8      | 6          |
| 06.2      | 6+ br.     | 79.3      | 6          | 40.1      | 6          |
| 05.5      | 6          | 77.6      | 6          | 40.0      | 6          |
| 05.4      | 6          | 76.3      | 6          | 39.2      | 6          |
| 04.8      | 6          | 74.9      | 6          | 38.0      | 6          |
| 04.4      | 6          | 72.9      | 6          | 37.4      | 6          |

| $\lambda$ |               | $\lambda$ |            | $\lambda$ |            |
|-----------|---------------|-----------|------------|-----------|------------|
| 3851·3    | 6 (51·5)      | 3819·2    | 6          | 3782·0    | 6          |
| 50·2      | 6             | 19·1      | 6          | 81·5      | 6          |
| 47·7      | 5 (47·4)      | 18·0      | 6+         | 80·3      | 6+         |
| 46·4      | 4 } (46·1)    | 17·6      | 4 (17·4)   | 78·3      | 6          |
| 46·0      | 6 }           | 16·5      | 5          | 77·5      | 5          |
| 44·5      | 6             | 16·0      | 5          | 75·5      | 5          |
| 43·8      | 6             | 15·3      | 6+         | 74·3      | 5 } (74·1) |
| 43·5      | 6             | 14·6      | 6          | 73·8      | 4 }        |
| 42·6      | 5 } (42·2)    | 13·2      | 6+         | 72·6      | 6          |
| 41·2      | 6+ }          | 12·8      | 6+         | 72·2      | 6          |
| 40·5      | 6             | 10·9      | 5 } (10·6) | 70·0      | 6          |
| 39·4      | 6             | 10·5      | 5 }        | 69·4      | 6          |
| 38·6      | 5 } (38·4)    | 10·0      | 6          | 69·2      | 6          |
| 38·1      | 6 }           | 07·8      | 6          | 68·0      | 6          |
| 37·9      | 6             | 07·5      | 6 (07·3)   | 67·5      | 6          |
| 37·4      | 5             | 06·8      | 6+ (06·5)  | 67·3      | 6          |
| 36·7      | 6             | 05·8      | 6          | 67·0      | 6          |
| 36·0      | 6+            | 05·5      | 6          | 65·5      | 6+ br.     |
| 35·2      | 4 (35·0)      | 04·6      | 6          | 64·6      | 6          |
| 34·4      | 6             | 04·2      | 6          | 64·0      | 6          |
| 34·3      | 6             | 03·4      | 6          | 63·2      | 6          |
| 33·1      | 6             | 03·1      | 6          | 61·7      | 6          |
| 32·8      | 6 } (32·7)    | 02·1      | 5          | 61·5      | 6          |
| 32·5      | 6 }           | 01·6      | 6          | 60·5      | 5          |
| 30·9      | 6+ } (30·8)   | 00·2      | 6          | 60·3      | 5 } (60·1) |
| 30·7      | 6 }           | 3799·7    | 6          | 59·3      | 6 }        |
| 30·4      | 6             | 99·2      | 6          | 58·4      | 6          |
| 30·0      | 6             | 96·4      | 5+         | 57·0      | 5+         |
| 28·1      | 5 (27·7)      | 95·0      | 6 } (94·7) | 55·0      | 6          |
| 27·4      | 6+ br. (27·7) | 94·4      | 5 }        | 54·9      | 6          |
| 26·3      | 6             | 93·5      | 6 (93·8)   | 53·7      | 5 } (53·5) |
| 25·6      | 6             | 92·8      | 5 (93·0)   | 53·3      | 6 }        |
| 25·4      | 6             | 92·3      | 6          | 51·5      | 6          |
| 24·6      | 5             | 91·6      | 6 (91·8)   | 48·4      | 6          |
| 23·2      | 5 } (23·1)    | 91·5      | 6          | 47·9      | 6          |
| 23·0      | 6 }           | 91·0      | 6+         | 47·6      | 6          |
| 22·3      | 6             | 86·5      | 6          | 47·0      | 6          |
| 21·8      | 6+            | 86·2      | 6          | 46·0      | 6          |
| 20·6      | 5             | 83·9      | 6          | 44·4      | 6          |
|           |               | 83·6      | 6          | 44·2      | 6          |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |            |
|-----------|------------|-----------|------------|-----------|------------|
| 3743·5    | 6          | 3703·4    | 6          | 3671·9    | 6+         |
| 42·7      | 6          | 03·0      | 6          | 71·5      | 6+         |
| 39·7      | 6          | 02·9      | 6          | 70·6      | 6+         |
| 39·3      | 6          | 02·4      | 6 } (02·2) | 70·2      | 6+         |
| 38·9      | 6          | 01·9      | 6 }        | 69·3      | 6          |
| 37·1      | 5+ br.     | 00·7      | 6+         | 68·7      | 6          |
| 35·5      | 6          | 3699·5    | 6          | 67·6      | 6          |
| 33·7      | 6          | 98·7      | 6          | 67·5      | 6          |
| 33·5      | 6          | 98·6      | 6          | 67·1      | 6+         |
| 32·7      | 6+         | 97·5      | 6          | 65·7      | 6+         |
| 32·1      | 6          | 96·9      | 6          | 64·7      | 6+         |
| 31·9      | 6          | 96·5      | 6          | 63·7      | 6          |
| 29·9      | 6          | 96·2      | 6          | 63·3      | 6          |
| 29·4      | 6          | 93·8      | 6          | 61·6      | 6          |
| 28·5      | 6+         | 93·6      | 6          | 61·2      | 6          |
| 26·2      | 6          | 92·8      | 6+ Mo      | 60·1      | 6          |
| 25·3      | 6          | 91·6      | 6          | 59·2      | 6          |
| 22·7      | 6          | 90·3      | 5          | 57·8      | 4 } (57·6) |
| 21·3      | 5 } (21·1) | 89·9      | 6          | 57·5      | 3 }        |
| 20·7      | 6 }        | 89·7      | 5          | 56·7      | 6          |
| 18·7      | 6          | 89·2      | 6          | 56·6      | 6          |
| 18·4      | 6          | 88·6      | 6          | 55·5      | 6          |
| 18·0      | 6          | 88·4      | 5 } Mo     | 54·7      | 6 } (54·5) |
| 17·3      | 6          | 88·1      | 5 } (87·9) | 54·2      | 5 }        |
| 16·7      | 6          | 87·4      | 5+ }       | 53·3      | 5 (53·5)   |
| 15·1      | 6          | 86·7      | 6          | 51·5      | 6          |
| 15·0      | 6          | 86·4      | 6          | 50·0      | 6          |
| 14·8      | 6          | 85·6      | 6          | 49·0      | 6          |
| 14·3      | 6          | 85·5      | 6          | 47·9      | 6          |
| 13·8      | 6          | 85·2      | 6          | 44·3      | 6          |
| 13·2      | 6          | 84·7      | 6          | 44·0      | 6          |
| 11·6      | 6          | 83·9      | 5          | 43·6      | 6          |
| 11·0      | 6          | 83·3      | 5          | 43·5      | 6          |
| 09·4      | 6          | 80·8      | 6+         | 43·1      | 6          |
| 07·6      | 6          | 79·9      | 6          | 42·8      | 6          |
| 06·2      | 6+ br.     | 79·3      | 6          | 40·1      | 6          |
| 05·5      | 6          | 77·6      | 6          | 40·0      | 6          |
| 05·4      | 6          | 76·3      | 6          | 39·2      | 6          |
| 04·8      | 6          | 74·9      | 6          | 38·0      | 6          |
| 04·4      | 6          | 72·9      | 6          | 37·4      | 6          |

| $\lambda$ |            |        |           | $\lambda$ |            |
|-----------|------------|--------|-----------|-----------|------------|
| 3636·8    | 6          | 3603·9 | 6         | 3569·7    | 6          |
| 35·4      | 6+         | 03·0   | 6+        | 69·3      | 6          |
| 35·2      | 6+ Mo      | 01·7   | 6         | 69·1      | 6 } (68·5) |
| 33·8      | 6          | 01·2   | 6         | 68·2      | 5 }        |
| 33·4      | 6          | 00·6   | 6+ (00·8) | 67·6      | 6          |
| 32·7      | 6          | 3599·0 | 6         | 65·8      | 6          |
| 31·5      | 6          | 97·8   | 6         | 65·7      | 6          |
| 31·0      | 6          | 95·6   | 6         | 65·5      | 6          |
| 30·9      | 6          | 95·2   | 6         | 64·5      | 6          |
| 30·4      | 6          | 95·0   | 6         | 64·2      | 6          |
| 30·2      | 6          | 94·6   | 6         | 63·6      | 6 (63·8)   |
| 29·1      | 5          | 94·1   | 6         | 62·6      | 5 (62·8)   |
| 26·5      | 6          | 93·6   | 6         | 61·5      | 5 (61·8)   |
| 25·8      | 6          | 90·9   | 6         | 59·0      | 6          |
| 25·5      | 6          | 90·5   | 6+        | 58·5      | 6          |
| 25·1      | 6          | 89·9   | 6         | 58·4      | 6          |
| 24·3      | 6          | 89·7   | 6+        | 57·3      | 6          |
| 23·6      | 6          | 88·7   | 6+        | 57·2      | 6          |
| 23·1      | 6          | 87·1   | 6         | 56·1      | 6          |
| 22·9      | 6          | 86·3   | 6+        | 55·8      | 6          |
| 21·4      | 6          | 85·8   | 6+        | 54·6      | 6          |
| 20·7      | 6          | 85·3   | 6+        | 54·1      | 6          |
| 20·0      | 6          | 85·0   | 6         | 54·0      | 6          |
| 19·6      | 6          | 84·8   | 6         | 53·0      | 6          |
| 19·3      | 6          | 83·5   | 5 (83·7)  | 52·3      | 6          |
| 16·9      | 6          | 82·8   | 6 (83·0)  | 51·6      | 6 } (51·3) |
| 16·5      | 6          | 82·7   | 6         | 51·0      | 6 }        |
| 16·2      | 6          | 82·0   | 5 (82·2)  | 50·8      | 6          |
| 15·6      | 6          | 79·8   | 6+        | 50·2      | 6          |
| 15·0      | 6          | 78·6   | 6+        | 48·3      | 5          |
| 14·6      | 6          | 77·6   | 6         | 46·5      | 6          |
| 11·0      | 6+         | 76·0   | 6         | 44·6      | 5          |
| 08·9      | 6          | 75·3   | 5         | 44·3      | 6          |
| 07·6      | 6+         | 74·0   | 6         | 43·3      | 5          |
| 07·3      | 5 } (07·0) | 73·5   | 6         | 42·3      | 6          |
| 06·7      | 6 }        | 72·7   | 6         | 41·7      | 6          |
| 06·4      | 6          | 72·2   | 6         | 41·3      | 6+         |
| 05·6      | 6          | 71·0   | 6         | 40·8      | 6          |
| 05·2      | 6          | 70·3   | 5         | 40·4      | 6          |
| 04·1      | 6          | 69·8   | 6         | 40·0      | 6          |

| $\lambda$ |            | $\lambda$ |               |        |            |
|-----------|------------|-----------|---------------|--------|------------|
| 3539.5    | 6          | 3510.6    | 6             | 3477.2 | 5          |
| 38.6      | 6 (38.8)   | 10.1      | 5             | 76.6   | 5          |
| 38.2      | 6          | 09.4      | 5             | 76.0   | 5          |
| 37.5      | 5 (37.7)   | 09.1      | 6 } (08.9)    | 74.2   | 6+         |
| 36.3      | 4 (36.5)   | 08.7      | 3 }           | 73.0   | 6          |
| 35.6      | 5          | 08.0      | 6             | 72.4   | 6          |
| 35.4      | 6          | 07.3      | 6             | 71.9   | 6          |
| 34.5      | 5 (34.8)   | 06.6      | 6             | 70.5   | 6+         |
| 32.8      | 6          | 06.3      | 6+            | 70.2   | 6+         |
| 32.7      | 6          | 04.9      | 6             | 68.3   | 5          |
| 31.4      | 6          | 04.8      | 6             | 68.0   | 6          |
| 31.1      | 6          | 03.7      | 4 (03.9)      | 67.6   | 6          |
| 30.9      | 6          | 03.1      | 6             | 67.0   | 6          |
| 30.7      | 6          | 02.2      | 6             | 66.5   | 6          |
| 28.9      | 6          | 01.4      | 6+ } (00.7)   | 66.0   | 6          |
| 28.8      | 6          | 00.3      | 6 }           | 65.2   | 6          |
| 28.1      | 6          | 3499.7    | 6             | 64.6   | 5          |
| 27.8      | 6          | 98.9      | 6 } (98.6)    | 63.6   | 3 } (63.2) |
| 26.9      | 5          | 98.2      | 6 }           | 62.7   | 6+ }       |
| 25.7      | 5 (26.0)   | 98.0      | 6             | 62.2   | 6+         |
| 24.6      | 6 Mo       | 96.9      | 6             | 61.7   | 6          |
| 24.3      | 6          | 96.0      | 6             | 60.3   | 6          |
| 23.6      | 6 } (23.4) | 95.8      | 6             | 59.8   | 6          |
| 23.2      | 6 }        | 93.2      | 6+ br. (93.4) | 59.6   | 6          |
| 22.2      | 6 } (22.2) | 91.2      | 5             | 58.8   | 6          |
| 22.1      | 6 }        | 90.3      | 5             | 58.4   | 6          |
| 21.0      | 6          | 89.9      | 6             | 57.8   | 6          |
| 20.2      | 6+         | 89.5      | 6+            | 56.5   | 6          |
| 18.9      | 6          | 88.7      | 6             | 55.1   | 5          |
| 18.6      | 6          | 88.6      | 6             | 54.0   | 6          |
| 17.5      | 6          | 87.1      | 6             | 52.9   | 6+         |
| 17.1      | 6 }        | 85.5      | 6             | 52.6   | 5 } (52.2) |
| 16.3      | 6 } (16.5) | 85.3      | 6             | 52.0   | 6 }        |
| 16.1      | 6 }        | 83.5      | 6             | 51.9   | 6          |
| 15.1      | 6 } (14.5) | 82.8      | 6             | 51.3   | 6          |
| 14.3      | 6 }        | 81.5      | 6             | 50.8   | 6          |
| 13.0      | 6          | 80.6      | 6             | 50.3   | 6          |
| 12.2      | 5 } (12.0) | 80.3      | 6             | 50.0   | 4 }        |
| 11.8      | 6 }        | 79.0      | 6+            | 49.5   | 6 }        |
| 11.3      | 5          | 78.0      | 5             | 49.0   | 6 }        |

| $\lambda$ |             | $\lambda$ |            | $\lambda$ |            |
|-----------|-------------|-----------|------------|-----------|------------|
| 3448·4    | 5           | 3415·4    | 5+         | 3386·7    | 6 } (86·4) |
| 48·2      | 6 } (48·1)  | 14·7      | 6          | 86·2      | 6 }        |
| 48·0      | 6 }         | 13·6      | 5 (13·4)   | 86·0      | 6 }        |
| 47·0      | 6           | 12·8      | 5          | 85·1      | 6 }        |
| 46·6      | 6           | 12·0      | 6+         | 84·5      | 6          |
| 45·8      | 6           | 11·0      | 6          | 84·4      | 6          |
| 45·6      | 6           | 09·3      | 6+         | 84·0      | 6          |
| 45·3      | 6           | 06·9      | 5 } (06·8) | 83·3      | 5          |
| 44·7      | 6           | 06·7      | 5 }        | 82·4      | 6          |
| 44·2      | 6           | 06·2      | 6          | 82·0      | 6          |
| 43·2      | 5           | 06·1      | 6          | 81·2      | 5          |
| 42·1      | 6           | 05·3      | 6          | 79·8      | 6          |
| 41·0      | 6           | 04·8      | 6          | 79·3      | 5 } (79·1) |
| 38·8      | 6+          | 04·3      | 6          | 78·7      | 6 }        |
| 38·2      | 6           | 04·2      | 6          | 78·4      | 6          |
| 35·7      | 5           | 03·8      | 6          | 78·3      | 6          |
| 33·9      | 6           | 02·8      | 6 Mo       | 77·5      | 6          |
| 32·6      | 6+          | 02·2      | 6 } (02·1) | 77·0      | 6          |
| 32·3      | 6+          | 01·9      | 3 }        | 75·3      | 6          |
| 31·7      | 6+          | 01·5      | 6          | 74·3      | 6          |
| 30·8      | 5+ } (30·6) | 01·0      | 6          | 73·4      | 6          |
| 30·4      | 6 }         | 00·7      | 6          | 73·0      | 6          |
| 29·7      | 5 } (29·6)  | 00·2      | 6          | 72·4      | 5 }        |
| 29·4      | 6 }         | 3398·3    | 5          | 71·7      | 6 }        |
| 27·8      | 5           | 97·7      | 6          | 71·3      | 6          |
| 26·3      | 6           | 97·4      | 6          | 70·7      | 6          |
| 26·0      | 6           | 96·5      | 6          | 70·4      | 6          |
| 25·6      | 6           | 96·0      | 6          | 70·0      | 6 }        |
| 24·9      | 6+          | 95·0      | 6          | 69·9      | 6 }        |
| 24·6      | 5 (24·4)    | 94·6      | 5          | 69·2      | 6          |
| 23·3      | 6           | 93·7      | 6+         | 68·3      | 6+         |
| 22·8      | 6           | 93·1      | 6          | 67·8      | 6          |
| 21·4      | 6           | 92·5      | 6          | 67·5      | 6          |
| 20·2      | 5           | 91·7      | 6          | 66·8      | 5          |
| 19·3      | 6           | 91·3      | 6          | 66·5      | 6          |
| 18·6      | 6           | 90·5      | 5+         | 66·0      | 6          |
| 18·4      | 6           | 89·7      | 6          | 65·3      | 6          |
| 17·7      | 6           | 89·0      | 5 (88·7)   | 64·9      | 6          |
| 17·6      | 6           | 87·8      | 5          | 64·0      | 5 }        |
| 16·7      | 4 (16·5)    | 87·0      | 6          | 63·5      | 5 }        |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |            |
|-----------|------------|-----------|------------|-----------|------------|
| 3362.5    | 6          | 3335.6    | 6          | 3300.5    | 6          |
| 62.1      | 6          | 34.0      | 6          | 3299.7    | 6 (99.9)   |
| 59.3      | 6          | 31.7      | 5          | 98.8      | 6 } (98.5) |
| 59.2      | 6          | 30.8      | 6+         | 98.3      | 5 }        |
| 57.8      | 6          | 28.2      | 6          | 97.5      | 5 (97.7)   |
| 57.2      | 6          | 27.8      | 6          | 96.3      | 6          |
| 56.5      | 6+ br.     | 27.2      | 6 } (26.4) | 95.2      | 6          |
| 55.9      | 6          | 26.3      | 5 }        | 94.3      | 6+         |
| 55.5      | 6          | 26.2      | 6 }        | 93.8      | 5          |
| 55.1      | 6          | 25.7      | 6          | 93.0      | 6          |
| 54.7      | 5 } (54.4) | 25.0      | 6          | 91.7      | 6          |
| 54.2      | 6 }        | 24.2      | 6          | 91.5      | 6          |
| 54.0      | 6          | 23.5      | 6          | 91.1      | 6          |
| 53.8      | 6          | 22.6      | 6          | 91.0      | 6          |
| 53.1      | 5          | 21.7      | 6          | 90.6      | 6          |
| 52.5      | 5          | 21.2      | 6 } (21.2) | 90.3      | 6          |
| 52.0      | 6          | 21.1      | 6 }        | 90.1      | 6+         |
| 51.6      | 6+         | 20.5      | 6          | 88.8      | 6+         |
| 50.2      | 6          | 20.4      | 6          | 88.0      | 6+         |
| 49.6      | 6          | 19.6      | 6          | 87.3      | 6+         |
| 49.4      | 5 } (48.9) | 18.7      | 6          | 85.8      | 5+         |
| 49.0      | 5 }        | 18.5      | 6          | 83.7      | 5+         |
| 48.4      | 5 }        | 18.0      | 6          | 82.0      | 5          |
| 47.8      | 6          | 17.0      | 6          | 80.2      | 6+         |
| 47.2      | 6          | 16.1      | 6          | 79.5      | 6+         |
| 46.2      | 6 } (45.9) | 15.2      | 6          | 77.8      | 6          |
| 45.8      | 5 }        | 13.6      | 6          | 77.6      | 6+         |
| 45.6      | 6 }        | 10.3      | 5 (10.5)   | 77.0      | 6          |
| 44.5      | 6          | 09.6      | 6          | 76.5      | 6+         |
| 43.5      | 4 } (43.4) | 09.2      | 6          | 75.7      | 6+         |
| 43.2      | 4 }        | 08.3      | 5 (08.5)   | 73.2      | 6+ (73.4)  |
| 41.3      | 6          | 05.5      | 6          | 72.0      | 6          |
| 40.3      | 6          | 04.6      | 5 } (04.6) | 71.7      | 6+         |
| 39.7      | 6          | 04.5      | 6 }        | 70.3      | 6 } (70.2) |
| 39.1      | 5 } (38.9) | 03.8      | 6          | 70.2      | 6 }        |
| 38.7      | 5 }        | 03.3      | 6          | 69.7      | 6          |
| 38.3      | 6          | 03.0      | 6          | 69.0      | 6 } (68.8) |
| 38.0      | 6+ (37.7)  | 02.0      | 6          | 68.6      | 6 }        |
| 36.7      | 5          | 01.3      | 6 } (01.2) | 68.3      | 5          |
| 36.1      | 6          | 01.0      | 5 }        | 66.7      | 5          |

| $\lambda$ |            | $\lambda$ |             | $\lambda$ |                |
|-----------|------------|-----------|-------------|-----------|----------------|
| 3266·0    | 5          | 3229·7    | 6 Mo        | 3205·6    | 6              |
| 65·2      | 5          | 29·5      | 6 } (29·2)  | 05·3      | 6              |
| 64·2      | 6          | 29·0      | 6 }         | 04·5      | 6 } (04·0)     |
| 63·2      | 6          | 27·9      | 6           | 03·7      | 6 }            |
| 62·0      | 6          | 27·7      | 6           | 03·3      | 4 } (03·0)     |
| 61·2      | 6          | 26·7      | 5 (26·4)    | 02·2      | 6 }            |
| 60·8      | 6          | 24·9      | 6           | 02·0      | 6              |
| 60·3      | 6          | 24·0      | 6           | 01·7      | 5 } (01·1)     |
| 59·4      | 6          | 23·3      | 6+          | 00·5      | 6+ }           |
| 57·8      | 6 (58·0)   | 22·7      | 6           | 00·1      | 6              |
| 56·1      | 6          | 22·1      | 6           | 3199·4    | 6              |
| 55·7      | 6 } (55·3) | 21·3      | 5           | 99·0      | 5              |
| 55·0      | 5 }        | 21·1      | 6+ } (20·8) | 98·4      | 5 (98·0)       |
| 54·3      | 5          | 20·2      | 6 }         | 97·5      | 5 (97·1)       |
| 52·5      | 6+         | 20·0      | 6           | 96·5      | 6              |
| 50·2      | 6          | 18·9      | 6           | 96·0      | 6              |
| 48·7      | 6          | 18·7      | 6 (18·3)    | 95·8      | 6              |
| 47·9      | 6          | 17·6      | 6 (17·2)    | 94·7      | 5+ br } (94·1) |
| 47·6      | 6          | 16·3      | 5 (15·9)    | 93·8      | 5              |
| 45·4      | 6          | 15·7      | 4 } (15·1)  | 93·2      | 6              |
| 43·5      | 4 }        | 15·3      | 5 }         | 93·0      | 6              |
| 43·2      | 5 } (43·1) | 14·4      | 6           | 92·3      | 6              |
| 42·1      | 5 }        | 14·1      | 6           | 92·2      | 6              |
| 41·4      | 6          | 13·4      | 6           | 91·6      | 5              |
| 41·2      | 6          | 13·2      | 6           | 91·0      | 5 (90·8)       |
| 40·0      | 6+         | 12·1      | 6           | 89·3      | 5 } (88·8)     |
| 38·9      | 6          | 11·9      | 6           | 88·5      | 6 }            |
| 38·5      | 6          | 11·2      | 6           | 88·0      | 6 (88·2)       |
| 38·3      | 6          | 10·9      | 6           | 87·8      | 6              |
| 37·2      | 6          | 10·7      | 6           | 87·1      | 5 } (86·7)     |
| 36·0      | 6          | 10·0      | 5 }         | 86·4      | 6 }            |
| 35·9      | 6          | 08·6      | 6 } (09·5)  | 85·0      | 6              |
| 35·1      | 6          | 08·3      | 6           | 84·4      | 6              |
| 34·6      | 6          | 08·2      | 6 }         | 84·0      | 6              |
| 33·8      | 6          | 07·8      | 6 } (08·0)  | 83·5      | 6 }            |
| 33·3      | 5 }        | 07·6      | 6 }         | 82·8      | 6 }            |
| 32·6      | 6 } (33·0) | 07·3      | 5 }         | 82·2      | 6              |
| 32·2      | 6          | 06·7      | 6 }         | 81·8      | 6              |
| 31·6      | 6          | 06·4      | 5 }         | 80·8      | 6              |
| 30·9      | 6          | 05·7      | 6 }         | 80·2      | 6              |



| $\lambda$ |             | $\lambda$ |            | $\lambda$ |             |
|-----------|-------------|-----------|------------|-----------|-------------|
| 3179.5    | 4+ } (79.0) | 3149.9    | 5 } (49.7) | 3118.3    | 6           |
| 78.7      | 6+ }        | 49.8      | 6 }        | 17.5      | 5           |
| 78.1      | 5 } (77.5)  | 48.1      | 6          | 16.0      | 6+ } (15.7) |
| 77.2      | 5 }         | 47.9      | 6          | 15.4      | 6 }         |
| 76.7      | 6           | 46.8      | 6          | 15.3      | 6           |
| 76.0      | 4           | 46.3      | 5          | 13.6      | 6           |
| 75.1      | 6           | 45.7      | 5          | 13.3      | 6           |
| 74.7      | 6           | 45.5      | 6          | 12.7      | 5           |
| 73.6      | 6           | 44.5      | 5 (44.8)   | 12.4      | 6           |
| 72.8      | 6           | 43.3      | 5          | 12.3      | 6           |
| 71.6      | 6           | 43.0      | 6          | 11.8      | 6           |
| 71.4      | 6           | 42.9      | 6          | 11.1      | 5           |
| 70.2      | 6           | 41.3      | 5          | 10.6      | 5 (10.4)    |
| 70.0      | 6           | 40.3      | 6          | 08.6      | 5           |
| 68.5      | 6+          | 40.2      | 6          | 08.3      | 6           |
| 67.9      | 6           | 39.4      | 6 } (39.2) | 07.9      | 5           |
| 67.7      | 6           | 38.7      | 6 }        | 07.5      | 6           |
| 67.0      | 6 } (66.7)  | 37.9      | 6          | 07.2      | 5           |
| 66.5      | 6+ }        | 37.6      | 6          | 06.5      | 5           |
| 65.7      | 6 } (65.5)  | 37.2      | 6          | 06.1      | 6           |
| 65.4      | 6 }         | 35.9      | 6          | 05.9      | 6           |
| 64.8      | 6           | 35.8      | 6          | 04.9      | 6           |
| 64.5      | 6           | 33.8      | 5          | 04.3      | 6           |
| 64.4      | 6           | 32.6      | 6          | 03.7      | 6           |
| 63.5      | 5           | 31.2      | 6          | 03.4      | 6           |
| 62.2      | 6           | 30.4      | 6          | 03.0      | 6+          |
| 62.0      | 6           | 29.7      | 5          | 02.2      | 5 (02.4)    |
| 61.3      | 6           | 29.0      | 5          | 01.2      | 6           |
| 60.7      | 6           | 27.7      | 5          | 00.7      | 5 } (00.4)  |
| 60.1      | 4           | 27.3      | 6          | 00.2      | 6+ }        |
| 59.0      | 4+ br.      | 26.3      | 5          | 3099.0    | 6           |
| 57.0      | 6+ } (56.5) | 25.7      | 6          | 98.7      | 6           |
| 55.7      | 6 }         | 25.3      | 6 }        | 98.4      | 6 (98.0)    |
| 55.5      | 6           | 24.5      | 6+ }       | 96.5      | 6           |
| 55.2      | 6           | 21.9      | 6+ Mo      | 96.0      | 5           |
| 54.2      | 6           | 21.0      | 6          | 95.3      | 6 } (95.1)  |
| 52.8      | 6           | 20.7      | 6          | 95.0      | 6 }         |
| 52.4      | 5           | 20.1      | 5          | 94.7      | 6           |
| 51.6      | 6           | 19.6      | 6          | 94.0      | 6           |
| 51.3      |             | 19.4      | 6          | 93.6      |             |

| $\lambda$ |            | $\lambda$ |            | $\lambda$ |             |
|-----------|------------|-----------|------------|-----------|-------------|
| 3093·3    | 6          | 3065·0    | 6          | 3038·0    | 6           |
| 92·3      | 6          | 64·1      | 5          | 37·7      | 6           |
| 91·9      | 6          | 63·3      | 6          | 37·4      | 6           |
| 91·7      | 6          | 63·0      | 6          | 36·7      | 5 } (36·1)  |
| 91·2      | 6          | 62·8      | 6          | 35·4      | 6 }         |
| 90·7      | 6          | 61·7      | 5          | 35·2      | 6           |
| 90·5      | 6          | 61·0      | 6          | 34·2      | 6           |
| 89·2      | 6          | 59·8      | 6          | 33·9      | 6           |
| 89·1      | 6          | 59·7      | 6          | 33·7      | 5 } (33·1)  |
| 88·3      | 6          | 59·1      | 6          | 32·5      | 5 }         |
| 88·1      | 6          | 58·5      | 5 } (58·0) | 32·0      | 5+ }        |
| 87·5      | 5          | 57·5      | 6 }        | 31·0      | 5 }         |
| 86·4      | 5          | 56·2      | 6+         | 30·3      | 6           |
| 85·4      | 6          | 55·7      | 6          | 29·9      | 6           |
| 85·0      | 5          | 55·5      | 6          | 29·5      | 6           |
| 84·4      | 6          | 55·1      | 6          | 28·9      | 6           |
| 83·6      | 5          | 55·0      | 6          | 28·7      | 6 } (28·2)  |
| 83·2      | 6 (83·0)   | 54·1      | 6          | 27·8      | 6 }         |
| 82·2      | 5          | 53·5      | 5          | 27·3      | 6           |
| 81·9      | 5 } (81·5) | 51·8      | 6          | 26·7      | 5           |
| 81·1      | 5 }        | 51·3      | 4 } (50·8) | 25·9      | 6           |
| 80·7      | 6          | 50·6      | 6 }        | 25·2      | 6           |
| 79·3      | 6          | 50·0      | 5          | 24·9      | 6           |
| 79·0      | 6          | 49·8      | 5 }        | 24·5      | 4 } (23·9)  |
| 77·6      | 3 }        | 49·0      | 6 }        | 23·6      | 6 }         |
| 76·9      | 6 } (77·0) | 48·6      | 5 }        | 22·9      | 6           |
| 76·0      | 5 }        | 47·6      | 5          | 22·7      | 6           |
| 75·3      | 6+         | 47·1      | 5 (46·5)   | 22·6      | 6           |
| 74·0      | 5          | 46·5      | 5 (46·1)   | 21·7      | 6+ } (21·5) |
| 73·3      | 5 } (73·0) | 45·6      | 6          | 21·0      | 6 }         |
| 72·7      | 5 }        | 45·2      | 6          | 20·7      | 5           |
| 71·8      | 5          | 44·4      | 6          | 20·3      | 6+ } (20·1) |
| 71·3      | 5 (71·0)   | 43·7      | 5 }        | 19·6      | 6 }         |
| 69·3      | 5 } (68·8) | 42·2      | 6+ }       | 19·4      | 6           |
| 68·6      | 6 }        | 41·8      | 5 }        | 18·6      | 5 } (18·1)  |
| 68·2      | 6          | 41·0      | 6+ }       | 17·9      | 6 }         |
| 67·9      | 5          | 40·3      | 6          | 17·4      | 5           |
| 67·6      | 5 (67·1)   | 39·6      | 5          | 17·1      | 6 (16·9)    |
| 67·0      | 5 (66·7)   | 39·3      | 5 }        | 15·6      | 6           |
| 65·1      | 6          | 38·7      | 6 }        | 14·9      | 6           |

| $\lambda$ |     | $\lambda$ |            | $\lambda$ |     |
|-----------|-----|-----------|------------|-----------|-----|
| 3014·6    | 6   | 2992·0    | 5 } (91·8) | 2969·0    | 6   |
| 13·7      | 6   | 91·5      | 6 }        | 68·0      | 5   |
| 13·2      | 6   | 90·7      | 6          | 67·1      | 6   |
| 12·1      | 6   | 89·5      | 6          | 67·0      | 6   |
| 11·7      | 6   | 88·8      | 6          | 66·7      | 6   |
| 11·2      | 6   | 88·6      | 6 (88·2)   | 66·2      | 6   |
| 11·0      | 6   | 87·3      | 5 (87·0)   | 65·6      | 6   |
| 10·7      | 5   | 86·4      | 6          | 65·0      | 6   |
| 09·6      | 6   | 86·1      | 6          | 64·5      | 5   |
| 08·8      | 5   | 85·9      | 6 (85·7)   | 62·6      | 6   |
| 08·0      | 6   | 84·9      | 6          | 61·8      | 6   |
| 06·5      | 6   | 84·5      | 6          | 61·0      | 5 } |
| 06·3      | 6   | 84·2      | 6          | 60·3      | 6 } |
| 05·3      | 6   | 83·6      | 6          | 60·1      | 6   |
| 04·8      | 6   | 83·2      | 6          | 60·0      | 6   |
| 04·2      | 6   | 82·6      | 6          | 59·0      | 6+  |
| 04·0      | 6   | 82·3      | 5          | 58·0      | 6   |
| 03·7      | 6   | 81·6      | 6          | 57·4      | 6   |
| 03·0      | 6   | 80·7      | 6+         | 57·3      | 6 } |
| 02·8      | 6   | 79·9      | 5          | 56·8      | 6 } |
| 02·2      | 5 } | 78·3      | 6          | 56·5      | 6   |
| 01·9      | 6 } | 78·0      | 6          | 55·3      | 6   |
| 00·9      | 6   | 77·6      | 5          | 55·0      | 5   |
| 00·6      | 5   | 77·2      | 5 }        | 54·0      | 6   |
| 00·3      | 6 } | 76·9      | 6 }        | 53·9      | 6   |
| 2999·6    | 6 } | 76·5      | 5 }        | 53·0      | 6   |
| 98·7      | 5 } | 75·7      | 6+ }       | 52·3      | 4 } |
| 98·0      | 6 } | 75·1      | 6          | 51·0      | 6 } |
| 97·7      | 6 } | 74·4      | 5          | 50·5      | 5 } |
| 97·6      | 6 } | 73·3      | 6          | 49·2      | 6 } |
| 96·9      | 6 } | 73·1      | 6 }        | 48·5      | 6   |
| 96·5      | 6   | 72·9      | 6 }        | 48·3      | 6   |
| 96·0      | 6   | 72·5      | 6          | 47·8      | 6+  |
| 95·7      | 6   | 71·7      | 6          | 47·5      | 6   |
| 95·4      | 6   | 71·4      | 6          | 47·0      | 5   |
| 95·3      | 5   | 71·0      | 6          | 46·0      | 6+  |
| 94·8      | 5 } | 70·4      | 6          | 45·3      | 6   |
| 94·7      | 6 } | 70·0      | 6          | 44·6      | 5   |
| 93·6      | 5 } | 69·8      | 6          | 43·5      | 6   |
| 92·9      | 6   | 69·1      | 6          | 43·2      | 6   |

|        |            | $\lambda$ |            | $\lambda$ |            |
|--------|------------|-----------|------------|-----------|------------|
| 2942·7 | 6          | 2917·0    | 6+         | 2893·0    | 6          |
| 42·3   | 6 } (42·0) | 16·7      | 6 } (16·2) | 92·6      | 6          |
| 41·6   | 6 }        | 15·6      | 6 }        | 92·2      | 6          |
| 41·4   | 6          | 15·2      | 6          | 91·6      | 6          |
| 41·1   | 6          | 14·7      | 6          | 91·1      | 6          |
| 40·8   | 6          | 14·4      | 6          | 90·7      | 6 } (90·3) |
| 40·3   | 5          | 12·6      | 5          | 89·9      | 5 }        |
| 39·0   | 5+ (39·3)  | 12·3      | 6 } (12·0) | 89·5      | 6 }        |
| 37·7   | 6          | 11·7      | 5 }        | 88·8      | 6 }        |
| 37·2   | 6          | 10·5      | 5 }        | 88·4      | 6          |
| 36·7   | 5 } (36·2) | 09·3      | 6 }        | 87·7      | 6          |
| 35·7   | 6 }        | 08·6      | 5          | 87·0      | 5          |
| 35·3   | 6          | 08·3      | 6 } (08·0) | 86·5      | 6 (86·3)   |
| 35·0   | 5 (34·7)   | 07·6      | 6 }        | 85·8      | 6          |
| 33·0   | 6          | 07·4      | 6          | 85·6      | 6          |
| 32·7   | 6          | 06·5      | 5          | 85·0      | 6          |
| 32·0   | 6          | 05·7      | 6          | 84·3      | 5 } (83·8) |
| 31·6   | 6 } (31·3) | 05·3      | 6          | 83·3      | 6 }        |
| 31·0   | 6 }        | 05·0      | 6          | 82·5      | 5          |
| 30·0   | 5 (29·8)   | 04·7      | 6          | 81·7      | 5 } (81·1) |
| 29·1   | 6          | 04·3      | 5 (03·7)   | 80·8      | 6 }        |
| 28·7   | 6          | 03·7      | 5 (03·1)   | 80·3      | 6          |
| 28·2   | 6          | 02·7      | 6          | 79·6      | 6          |
| 28·0   | 6          | 02·3      | 6          | 79·3      | 6 Mo       |
| 27·9   | 6 } (27·3) | 01·8      | 6          | 78·4      | 6          |
| 27·1   | 6 }        | 01·3      | 5          | 78·3      | 6 } (77·7) |
| 27·0   | 6 (26·4)   | 01·0      | 6          | 77·1      | 6 }        |
| 25·9   | 5 (25·4)   | 00·2      | 6          | 76·3      | 6          |
| 25·1   | 5 (24·7)   | 2899·0    | 6          | 76·1      | 6          |
| 24·1   | 6          | 98·7      | 6          | 75·6      | 6 }        |
| 23·6   | 5          | 98·4      | 6          | 75·3      | 6 }        |
| 23·2   | 6          | 97·7      | 6          | 74·7      | 6 }        |
| 22·0   | 6          | 97·3      | 6          | 74·0      | 6          |
| 21·2   | 6          | 96·5      | 5          | 73·5      | 6 } (73·0) |
| 21·1   | 6          | 96·1      | 5          | 72·8      | 6 }        |
| 19·6   | 6          | 95·0      | 6          | 72·0      | 6          |
| 19·1   | 6          | 94·3      | 6          | 71·5      | 6          |
| 18·7   | 5          | 93·8      | 6          | 71·0      | 6          |
| 18·3   | 6 } (18·1) | 93·6      | 6          | 70·8      | 6          |
| 17·7   | 6+br }     | 93·1      | 6          | 69·7      | 6          |

| $\lambda$ |            | $\lambda$ |             | $\lambda$ |             |
|-----------|------------|-----------|-------------|-----------|-------------|
| 2868.7    | 5 } (68.4) | 2847.4    | 6 (47.8)    | 2819.2    | 5 (19.8)    |
| 68.0      | 6 } (68.4) | 47.3      | 5 } (46.9)  | 18.2      | 5 } (17.7)  |
| 67.8      | 6 } (67.7) | 46.3      | 6 } (46.9)  | 17.5      | 6+ } (17.7) |
| 67.5      | 6 } (67.7) | 45.8      | 6           | 16.3      | 5 } (16.0)  |
| 66.8      | 6          | 45.1      | 6           | 15.5      | 6 } (16.0)  |
| 66.7      | 6          | 44.7      | 6           | 14.9      | 5 } (14.5)  |
| 66.5      | 6          | 43.9      | 6+          | 14.3      | 6+ } (14.5) |
| 66.2      | 6 } (66.0) | 42.8      | 6 (43.0)    | 13.3      | 5           |
| 65.9      | 6 } (66.0) | 42.7      | 6 } (42.2)  | 12.3      | 5           |
| 65.5      | 6          | 41.7      | 5 } (42.2)  | 10.0      | 5           |
| 65.0      | 6          | 41.2      | 6           | 09.0      | 5           |
| 64.7      | 6          | 40.8      | 6           | 08.0      | 6           |
| 64.2      | 6 } (64.2) | 40.0      | 5           | 07.9      | 6 Mo        |
| 63.7      | 6 } (64.2) | 39.0      | 6           | 06.7      | 6           |
| 63.3      | 6          | 38.6      | 6+          | 06.1      | 5 } (05.7)  |
| 62.6      | 6          | 37.9      | 6           | 05.7      | 6 } (05.7)  |
| 62.3      | 6          | 37.5      | 6           | 05.2      | 6 } (05.7)  |
| 61.6      | 6          | 37.0      | 6           | 04.9      | 6           |
| 61.3      | 6          | 36.3      | 6           | 04.7      | 6           |
| 61.1      | 6 } (60.7) | 35.8      | 6           | 04.3      | 6           |
| 60.3      | 6 } (60.7) | 35.3      | 6+          | 04.0      | 6           |
| 59.6      | 5 } (59.1) | 34.3      | 5 } (34.0)  | 03.7      | 5           |
| 58.7      | 6 } (59.1) | 33.7      | 5 } (34.0)  | 03.3      | 6 } (03.0)  |
| 58.5      | 6          | 33.3      | 6 } (33.4)  | 03.1      | 6 } (03.0)  |
| 58.2      | 6          | 33.2      | 6 } (33.4)  | 02.7      | 6 } (03.0)  |
| 57.8      | 6          | 32.6      | 6           | 02.5      | 6           |
| 57.7      | 6          | 32.0      | 6           | 02.2      | 6           |
| 57.3      | 6 (57.1)   | 31.4      | 5 } (31.0)  | 01.6      | 6           |
| 56.2      | 5          | 30.2      | 5 } (31.0)  | 01.3      | 5 (00.8)    |
| 55.6      | 5 } (55.2) | 30.0      | 6 } (29.5)  | 00.2      | 6 (99.8)    |
| 54.9      | 6 } (55.2) | 28.7      | 6+ } (29.5) | 2799.3    | 4 } (98.9)  |
| 54.6      | 6          | 27.5      | 5 (27.1)    | 98.5      | 6+ } (98.9) |
| 53.6      | 5          | 26.6      | 5 (26.1)    | 97.6      | 6+          |
| 52.3      | 5          | 25.3      | 6           | 97.1      | 6+          |
| 51.1      | 6          | 25.0      | 6+          | 96.3      | 6           |
| 50.9      | 6          | 24.3      | 6+          | 95.7      | 5 (95.4)    |
| 49.7      | 6          | 23.9      | 6+          | 93.8      | 6           |
| 48.3      | 6          | 22.6      | 5 (22.2)    | 93.2      | 6           |
| 48.2      | 6 Mo       | 20.7      | 5           | 92.8      | 6 } (92.4)  |
| 48.0      | 6 (47.8)   | 20.0      | 5 (19.8)    | 92.0      | 6 } (92.4)  |

|        |    |          | $\lambda$ |      |          | $\lambda$ |    |          |
|--------|----|----------|-----------|------|----------|-----------|----|----------|
| 2791·9 | 6  | (91·5)   | 2760·6    | 6    | (60·7)   | 2728·1    | 6+ |          |
| 90·6   | 5  |          | 59·6      | 6    |          | 27·7      | 6  | (27·4)   |
| 90·3   | 6  |          | 59·5      | 6    |          | 26·7      | 5  | (26·4)   |
| 89·3   | 5  | { (89·0) | 57·9      | 6    |          | 25·5      | 6  |          |
| 88·7   | 6  |          | 57·3      | 6    | { (57·1) | 25·2      | 6  |          |
| 88·2   | 6  |          | 56·8      | 6    |          | 24·5      | 6  |          |
| 86·5   | 5  |          | 55·1      | 6    |          | 20·6      | 5+ | { (20·4) |
| 85·8   | 5  | { (85·5) | 53·3      | 5    | { (53·3) | 19·9      | 6  |          |
| 85·3   | 6  |          | 53·2      | 6    |          | 19·0      | 6  |          |
| 84·4   | 6  |          | 51·6      | 6    |          | 18·1      | 5  |          |
| 84·2   | 6  |          | 50·8      | 6    |          | 17·2      | 6  |          |
| 83·9   | 6  |          | 50·4      | 6    |          | 16·9      | 6  |          |
| 83·3   | 6  |          | 50·2      | 6    |          | 16·4      | 5  | (16·0)   |
| 82·7   | 6  |          | 49·4      | 5 d. | { (49·2) | 15·4      | 5  | { (15·1) |
| 82·3   | 5  | (82·0)   | 49·0      | 6    |          | 14·5      | 6+ |          |
| 80·5   | 5  |          | 48·4      | 5    |          | 14·0      | 6  | { (13·7) |
| 79·5   | 6  |          | 47·0      | 6    |          | 13·5      | 6+ |          |
| 78·8   | 5  | { (78·5) | 46·9      | 6    | { (46·7) | 12·7      | 5+ |          |
| 78·1   | 6  |          | 46·5      | 5    |          | 10·9      | 5  | { (10·6) |
| 77·7   | 6  |          | 43·3      | 6    |          | 10·4      | 6  |          |
| 76·7   | 5  |          | 43·2      | 6    |          | 08·9      | 6  |          |
| 75·2   | 6  |          | 43·0      | 5    | { (42·8) | 08·7      | 5  |          |
| 74·7   | 5  |          | 42·6      | 5    |          | 07·1      | 6+ | (07·5)   |
| 74·2   | 6  |          | 42·1      | 6    |          | 06·8      | 5  |          |
| 72·8   | 6  |          | 41·3      | 6    |          | 06·0      | 6  |          |
| 71·2   | 6  | { (70·9) | 41·0      | 5    | { (40·7) | 05·8      | 6  | { (04·2) |
| 70·7   | 6  |          | 40·3      | 6    |          | 03·6      | 5  |          |
| 70·2   | 6  |          | 39·7      | 5+   |          | 03·2      | 5  | { (02·8) |
| 70·0   | 6  |          | 38·6      | 6+   |          | 02·2      | 4  |          |
| 69·2   | 6  |          | 37·9      | 6+   |          | 01·6      | 5  |          |
| 68·5   | 5  |          | 37·0      | 6    |          | 00·6      | 5  |          |
| 68·2   | 6  | { (68·0) | 36·7      | 6    |          | 00·3      | 6  |          |
| 67·7   | 6  |          | 35·9      | 6+   |          | 2699·4    | 5+ | br.      |
| 67·2   | 5  | (66·9)   | 34·8      | 5    | (34·6)   |           |    | (98·6)   |
| 66·5   | 5  | (66·2)   | 31·2      | 6+   |          | 98·6      | 6  | { (98·6) |
| 65·5   | 6  |          | 30·9      | 6+   |          | 98·1      | 5  |          |
| 65·0   | 5  |          | 30·0      | 6    | { (29·5) | 97·2      | 6  |          |
| 64·5   | 4  | { (64·0) | 29·3      | 6    |          | 96·0      | 6+ | { (95·5) |
| 62·7   | 6+ |          | 29·0      | 6    |          | 95·1      | 6+ |          |
| 60·8   | 6  | (60·7)   | 28·5      | 6    |          | 94·7      | 5  |          |

| $\lambda$ |             |        |            | $\lambda$ |            |
|-----------|-------------|--------|------------|-----------|------------|
| 2694·6    | 5           | 2659·9 | 6          | 2628·1    | 6          |
| 94·2      | 6           | 59·4   | 6          | 27·8      | 6          |
| 92·7      | 6+ } (93·2) | 58·2   | 4          | 26·9      | 6+         |
| 92·0      | 6+ } (91·5) | 58·0   | 6          | 26·5      | 6          |
| 91·2      | 5           | 57·5   | 6          | 26·3      | 6          |
| 88·4      | 5 } (87·9)  | 56·7   | 6          | 25·7      | 6+         |
| 87·7      | 6           | 56·2   | 6          | 25·2      | 6+         |
| 87·2      | 5           | 55·7   | 6          | 22·9      | 6          |
| 86·6      | 6           | 54·7   | 6          | 22·3      | 5+         |
| 85·5      | 6           | 54·5   | 6          | 21·7      | 5          |
| 85·3      | 6           | 53·7   | 5          | 20·8      | 5 } (20·6) |
| 84·6      | 6 } (84·4)  | 52·1   | 5          | 20·2      | 4          |
| 83·8      | 5           | 51·5   | 6          | 18·0      | 6          |
| 83·4      | 5           | 51·1   | 6          | 17·2      | 6          |
| 80·8      | 6           | 50·4   | 6          | 16·7      | 6          |
| 79·9      | 4 (79·7)    | 50·0   | 6          | 15·4      | 4 (15·6)   |
| 79·2      | 6           | 49·8   | 6          | 14·4      | 6+         |
| 78·1      | 5           | 47·2   | 6          | 13·8      | 5          |
| 76·5      | 6           | 46·9   | 6          | 13·1      | 6          |
| 76·1      | 5 } (75·7)  | 46·2   | 6          | 12·8      | 5          |
| 75·4      | 6           | 45·7   | 6          | 11·9      | 5          |
| 74·9      | 6           | 44·7   | 6          | 11·4      | 6          |
| 74·3      | 6           | 44·1   | 6          | 10·7      | 6          |
| 73·2      | 6           | 43·3   | 5 } (43·2) | 10·3      | 6          |
| 72·9      | 6           | 43·1   | 5          | 08·4      | 6          |
| 70·6      | 5 (70·4)    | 39·6   | 6          | 07·1      | 5          |
| 69·5      | 5 (69·2)    | 39·2   | 6          | 06·5      | 5 } (06·4) |
| 68·2      | 6           | 38·7   | 6          | 06·4      | 6          |
| 67·9      | 6           | 38·3   | 6          | 05·9      | 6          |
| 66·7      | 5 } (66·4)  | 37·2   | 6          | 05·5      | 6          |
| 66·2      | 5           | 36·7   | 6+         | 04·5      | 6          |
| 65·9      | 6+          | 35·4   | 5 (35·6)   | 04·2      | 6          |
| 65·2      | 6           | 34·9   | 6          | 03·6      | 6          |
| 64·6      | 4 } (64·3)  | 34·0   | 5          | 03·1      | 4 } (02·9) |
| 64·1      | 6           | 33·2   | 6          | 02·6      | 4          |
| 63·7      | 6           | 32·9   | 6          | 02·1      | 6          |
| 63·0      | 6           | 31·4   | 5          | 01·5      | 5 (01·7)   |
| 62·4      | 6           | 29·6   | 6+         | 01·2      | 6          |
| 61·8      | 6+          | 29·1   | 5 } (28·9) | 00·9      | 6          |
| 60·8      | 6           | 28·3   | 6          | 2598·9    | (98·7)     |

| $\lambda$ |            |        |            | $\lambda$ |             |
|-----------|------------|--------|------------|-----------|-------------|
| 2598.5    | 5 (98.7)   | 2572.4 | 6 } (72.5) | 2548.9    | 6           |
| 97.9      | 5          | 72.2   | 4 } (71.7) | 48.7      | 6           |
| 96.2      | 6+         | 71.4   | 4          | 48.4      | 5           |
| 95.6      | 6          | 69.8   | 6          | 47.8      | 6           |
| 94.9      | 6          | 68.7   | 5          | 47.0      | 6           |
| 93.8      | 6          | 67.8   | 6 } (67.8) | 46.2      | 5           |
| 93.4      | 6          | 67.7   | 6 }        | 45.3      | 6 } (45.1)  |
| 92.9      | 6          | 67.4   | 5          | 44.7      | 5 }         |
| 92.6      | 6          | 66.8   | 6          | 43.9      | 6           |
| 89.7      | 6          | 66.6   | 6          | 43.3      | 5 (43.5)    |
| 88.5      | 6          | 66.2   | 6          | 41.6      | 6+ } (41.5) |
| 87.9      | 6          | 65.7   | 6          | 41.4      | 6 }         |
| 87.5      | 6          | 64.4   | 6+ d.      | 40.9      | 5+          |
| 87.2      | 6          | 63.7   | 5          | 39.8      | 5 } (39.6)  |
| 86.6      | 6          | 63.4   | 6 } (63.2) | 39.2      | 5 }         |
| 86.3      | 6          | 63.0   | 4 }        | 38.9      | 6           |
| 85.7      | 6          | 62.5   | 5          | 38.8      | 6           |
| 85.1      | 6          | 62.2   | 6          | 38.2      | 6           |
| 84.2      | 5          | 61.9   | 6          | 37.5      | 6           |
| 83.3      | 6          | 61.5   | 6          | 36.6      | 6           |
| 82.5      | 6          | 60.7   | 6          | 36.4      | 5           |
| 82.3      | 6          | 59.9   | 6 } (59.7) | 35.5      | 6           |
| 80.3      | 6          | 59.4   | 5 }        | 34.7      | 5 (34.9)    |
| 79.8      | 6          | 57.9   | 5          | 34.0      | 5 (34.5)    |
| 79.5      | 4 } (79.5) | 57.4   | 6          | 33.5      | 6           |
| 79.2      | 4 }        | 57.1   | 6          | 33.1      | 6 } (33.0)  |
| 78.7      | 6          | 56.9   | 6          | 32.8      | 6 }         |
| 78.2      | 6          | 56.6   | 6          | 32.7      | 6           |
| 77.8      | 6          | 55.9   | 6 } (55.2) | 32.2      | 6           |
| 77.5      | 6          | 55.0   | 4 }        | 31.9      | 6           |
| 77.2      | 6 } (76.7) | 54.8   | 5          | 30.9      | 5           |
| 76.7      | 6 }        | 54.6   | 5          | 30.6      | 6           |
| 76.2      | 5 }        | 53.7   | 6          | 29.7      | 6           |
| 76.0      | 5          | 53.1   | 5          | 29.6      | 6           |
| 74.9      | 6+         | 52.2   | 5 (52.5)   | 29.2      | 6 } (29.1)  |
| 74.1      | 6+         | 52.0   | 6          | 29.0      | 5 }         |
| 73.8      | 6          | 51.3   | 5 (51.5)   | 28.6      | 5           |
| 73.4      | 6          | 51.0   | 6 } (50.4) | 28.2      | 6           |
| 73.2      | 6          | 50.1   | 6 }        | 27.7      | 6           |
| 72.7      | 6 (72.5)   | 49.9   | 6          | 26.2      | (26.5)      |

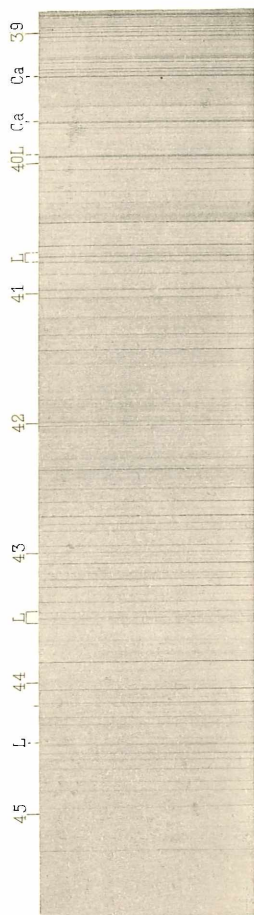


| $\lambda$ |            |        |            | $\lambda$ |            |
|-----------|------------|--------|------------|-----------|------------|
| 2525·7    | 6          | 2502·0 | 6 (02·4)   | 2477·7    | 4 (78·0)   |
| 25·5      | 6          | 01·8   | 6          | 77·2      | 5          |
| 25·0      | 6          | 01·0   | 6          | 76·6      | 6+         |
| 24·8      | 6 } (24·4) | 00·8   | 6          | 75·7      | 6 } (75·8) |
| 24·1      | 5 }        | 00·1   | 5 } (99·8) | 75·6      | 5 }        |
| 23·5      | 6          | 2499·7 | 6 }        | 74·3      | 6 }        |
| 23·4      | 6          | 99·2   | 5 }        | 74·2      | 6 }        |
| 22·9      | 6          | 98·9   | 6          | 73·9      | 6+         |
| 22·8      | 6          | 98·2   | 6+         | 72·4      | 6 } (72·0) |
| 22·3      | 6+         | 97·5   | 5 (97·7)   | 71·7      | 5 }        |
| 21·1      | 6          | 96·6   | 5 (96·8)   | 69·9      | 5 (70·1)   |
| 20·4      | 6          | 95·5   | 6          | 69·2      | 6          |
| 20·0      | 6          | 95·3   | 6          | 68·4      | 5          |
| 19·0      | 6          | 94·9   | 6          | 67·4      | 6          |
| 18·6      | 6          | 94·1   | 6+         | 66·5      | 5 (66·7)   |
| 18·1      | 5          | 92·9   | 5 (93·2)   | 65·9      | 6          |
| 17·3      | 5 (17·5)   | 92·3   | 5          | 65·6      | 5          |
| 17·0      | 6          | 91·7   | 6 } (91·1) | 65·2      | 6          |
| 16·1      | 5          | 90·6   | 5 }        | 64·6      | 5          |
| 15·7      | 6          | 90·2   | 6          | 64·2      | 6          |
| 15·3      | 5 }        | 89·9   | 6 }        | 64·0      | 6          |
| 14·4      | 5 } (14·7) | 89·2   | 5 }        | 63·2      | 5          |
| 14·3      | 5 }        | 88·7   | 4 }        | 62·8      | 6          |
| 13·9      | 5 } (13·5) | 88·2   | 5          | 62·3      | 6          |
| 13·2      | 5 }        | 87·5   | 6          | 61·9      | 6 } (61·7) |
| 12·7      | 5          | 87·3   | 6          | 61·4      | 5 }        |
| 12·1      | 6          | 86·3   | 6+         | 61·2      | 5          |
| 11·7      | 6          | 85·6   | 6+         | 60·4      | 6+ (60·2)  |
| 11·3      | 6          | 84·7   | 6+ }       | 59·8      | 6          |
| 10·9      | 6 } (10·7) | 84·3   | 5 }        | 59·6      | 6          |
| 10·3      | 4 }        | 84·0   | 6          | 59·2      | 6 } (59·0) |
| 09·9      | 6          | 83·6   | 5+ br.     | 58·7      | 5 }        |
| 09·6      | 6          | 82·1   | 5 } (81·8) | 58·5      | 5          |
| 08·6      | 6          | 81·6   | 5 }        | 57·1      | 5 (57·4)   |
| 07·1      | 6 (07·3)   | 80·9   | 6 } (80·4) | 56·5      | 6          |
| 06·8      | 6          | 80·2   | 5 }        | 56·1      | 6 }        |
| 06·0      | 5 (06·2)   | 79·1   | 6          | 55·9      | 5 }        |
| 05·5      | 6+         | 78·9   | 6          | 54·9      | 6          |
| 04·7      | 6+         | 78·7   | 6          | 54·8      | 6          |
| 03·6      | 6+         | 78·3   | 6 (78·0)   | 53·8      | 6          |

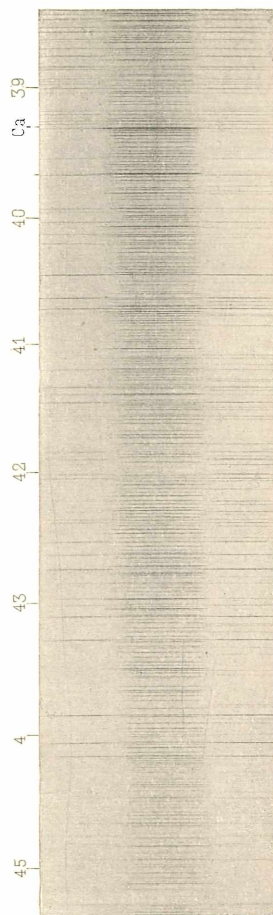
|        |            | $\lambda$ |            | $\lambda$ |            |
|--------|------------|-----------|------------|-----------|------------|
| 2452.9 | 6          | 2423.3    | 6 (23.7)   | 2395.1    | 6          |
| 52.0   | 6          | 22.5      | 6          | 94.4      | 6          |
| 50.3   | 6          | 22.3      | 6 (22.0)   | 93.2      | 6          |
| 49.7   | 5          | 21.1      | 5          | 93.0      | 5 (92.7)   |
| 48.6   | 6          | 20.6      | 5 } (20.3) | 91.8      | 6          |
| 48.2   | 5          | 20.0      | 6+ }       | 91.2      | 6          |
| 47.2   | 6          | 19.4      | 5 (19.1)   | 90.9      | 6          |
| 46.4   | 4 } (46.0) | 18.2      | 6          | 90.4      | 5 } (90.2) |
| 45.5   | 6 }        | 17.9      | 6          | 89.8      | 5 }        |
| 44.9   | 6          | 17.6      | 5          | 89.3      | 6          |
| 44.6   | 6          | 16.0      | 6 (16.5)   | 88.8      | 6          |
| 44.2   | 6          | 15.7      | 6          | 88.6      | 6 (88.4)   |
| 41.6   | 6          | 14.8      | 5          | 87.7      | 6+         |
| 41.4   | 6 (41.2)   | 14.2      | 6          | 86.5      | 6          |
| 39.9   | 6          | 13.3      | 6          | 86.2      | 6          |
| 39.4   | 6          | 12.8      | 6          | 85.5      | 6          |
| 38.3   | 6 (38.1)   | 11.9      | 6          | 85.3      | 5          |
| 37.4   | 5 } (37.1) | 11.6      | 6          | 83.5      | 6          |
| 36.6   | 6 }        | 11.4      | 6 } (11.3) | 82.7      | 6          |
| 35.9   | 6          | 11.2      | 6 }        | 82.4      | 6 } (82.1) |
| 35.4   | 6          | 10.5      | 5 (10.3)   | 82.0      | 6 }        |
| 35.0   | 5 } (34.9) | 09.5      | 6          | 81.8      | 6          |
| 34.4   | 6 }        | 09.3      | 6 (09.1)   | 81.4      | 6          |
| 34.2   | 6          | 08.3      | 5 } (08.1) | 81.2      | 6          |
| 33.1   | 6          | 07.8      | 5 }        | 80.9      | 6          |
| 32.9   | 6 (32.7)   | 07.2      | 6          | 80.4      | 6          |
| 32.2   | 6          | 06.6      | 6          | 80.3      | 6          |
| 31.6   | 6          | 06.3      | 6          | 79.7      | 6          |
| 30.7   | 6          | 06.0      | 6          | 75.9      | 6 (75.7)   |
| 29.8   | 6+         | 05.6      | 6          | 74.5      | 5 (74.3)   |
| 28.7   | 6          | 05.3      | 6 } (05.2) | 73.7      | 6          |
| 28.3   | 6          | 04.9      | 5 }        | 73.4      | 6          |
| 27.8   | 6          | 04.3      | 5          | 72.7      | 5 (72.5)   |
| 27.5   | 5 } (27.2) | 03.4      | 6          | 71.1      | 6          |
| 26.6   | 6 }        | 02.4      | 6          | 70.1      | 5          |
| 25.9   | 6+         | 2399.9    | 6          | 69.0      | 6          |
| 24.9   | 6          | 98.1      | 5 (97.9)   | 68.4      | 5 (68.2)   |
| 24.6   | 6          | 96.2      | 6          | 67.8      | 6          |
| 24.1   | 6          | 95.6      | 5 } (95.5) | 67.2      | 6          |
| 23.9   | 6 (23.7)   | 95.4      | 6 }        | 66.7      | 6          |

| $\lambda$ |              | $\lambda$ |            | $\lambda$ |              |
|-----------|--------------|-----------|------------|-----------|--------------|
| 2365·9    | 6 } (65·7)   | 2331·6    | 6          | 2259·4    | 6 (59·7)     |
| 65·5      | 6 }          | 28·4      | 6 (28·2)   | 58·4      | 6 } (57·7)   |
| 64·4      | 5            | 27·6      | 6+         | 57·4      | 6 }          |
| 64·1      | 6            | 26·7      | 6+         | 55·2      | 6 (54·9)     |
| 63·5      | 6            | 23·1      | 5 (22·9)   | 51·6      | 6            |
| 62·2      | 5 } (62·0)   | 19·0      | 6 } (18·5) | 50·9      | 6            |
| 61·7      | 6 }          | 18·0      | 6 }        | 50·2      | 6 } (49·7)   |
| 61·3      | 6 } (61·0)   | 14·7      | 6 (14·9)   | 49·5      | 6 }          |
| 59·4      | 6 }          | 14·2      | 6          | 45·9      | 6            |
| 58·9      | 5 (58·7)     | 13·0      | 6 (12·8)   | 45·3      | 6 (45·1)     |
| 58·1      | 6            | 09·9      | 6 (09·7)   | 43·8      | 6            |
| 57·4      | 6 } (57·1)   | 07·1      | 6          | 43·0      | 6+           |
| 56·9      | 6 }          | 01·9      | 6 (02·1)   | 41·4      | 6 } (41·0)   |
| 53·7      | 6            | 2299·4    | 6+         | 40·2      | 6+ }         |
| 53·5      | 6            | 98·9      | 6          | 35·6      | 6+br. (35·4) |
| 51·6      | 6            | 98·5      | 6          | 31·4      | 6 (31·2)     |
| 51·3      | 6            | 91·6      | 6+         | 27·0      | 6+           |
| 50·4      | 6 } (50·2)   | 90·8      | 6 (90·4)   | 26·1      | 6+ (25·9)    |
| 49·9      | 6 }          | 88·8      | 6 (89·1)   | 22·3      | 6            |
| 49·4      | 5 (49·1)     | 84·8      | 6+         | 21·7      | 6            |
| 48·2      | 5+br. (47·9) | 84·1      | 6+         | 15·5      | 6            |
| 45·0      | 6 (45·5)     | 83·4      | 6+ (83·6)  | 15·1      | 6            |
| 44·5      | 6            | 81·4      | 6          | 01·1      | 6            |
| 43·7      | 5            | 81·1      | 6          | 2198·9    | 6 (98·7)     |
| 41·4      | 6            | 80·7      | 6 (80·4)   | 98·2      | 6            |
| 36·8      | 6 (36·5)     | 78·3      | 6 (78·7)   | 97·7      | 6            |
| 36·0      | 6 (36·2)     | 75·3      | 6 (75·5)   | 96·0      | 6            |
| 35·2      | 6            | 70·5      | 6          | 94·9      | 6            |
| 34·7      | 6            | 66·5      | 6          | 86·0      | 6+           |
| 33·9      | 5 } (33·6)   | 64·6      | 6          | 61·2      | 6+ (60·7)    |
| 33·2      | 6 }          | 62·6      | 6          |           |              |
| 32·2      | 6 (32·0)     | 60·3      | 6 (59·7)   |           |              |

F. Exner und E. Haschek: Ultraviolette Funkenspectra der Elemente.



1.

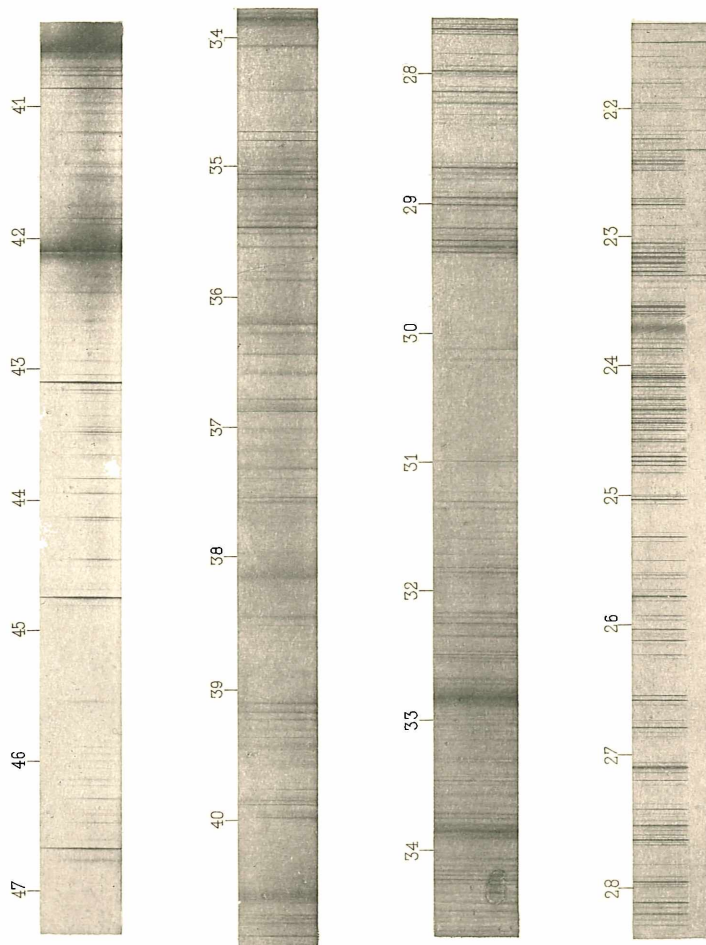


2.

Heliogravure und Druck der k. k. Hof- und Staatsdruckerei in Wien.



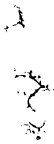
F. Exner und E. Haschek: Ultraviolette Funkenspectra der Elemente.



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Heliogravure und Druck der k. k. Hof- und Staatsdruckerei in Wien.

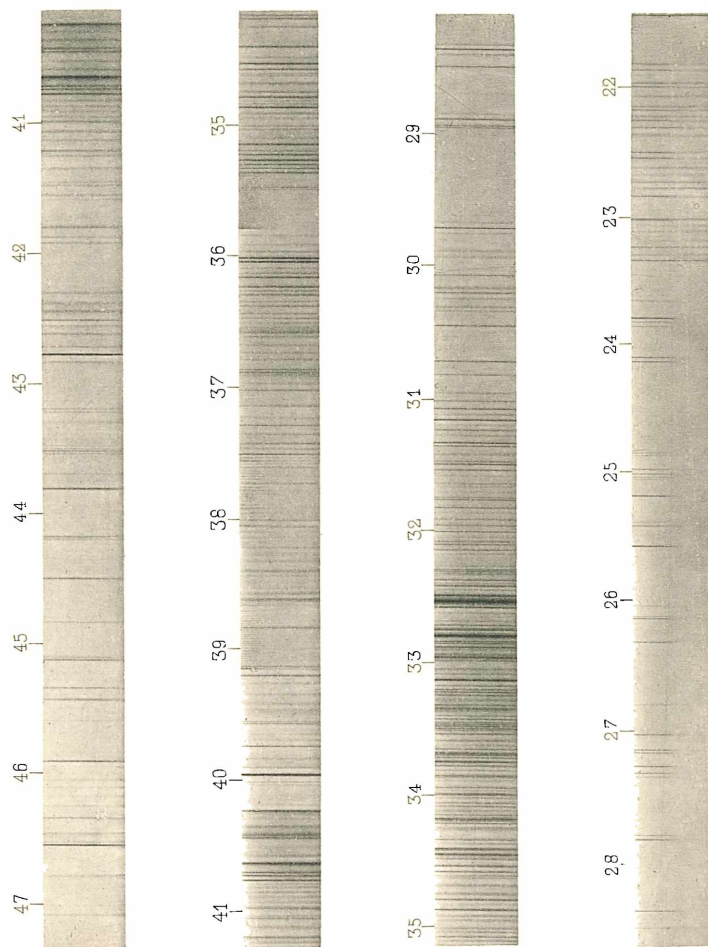
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5

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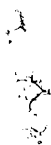
F. Exner und E. Haschek: Ultraviolette Funkenspectra der Elemente.



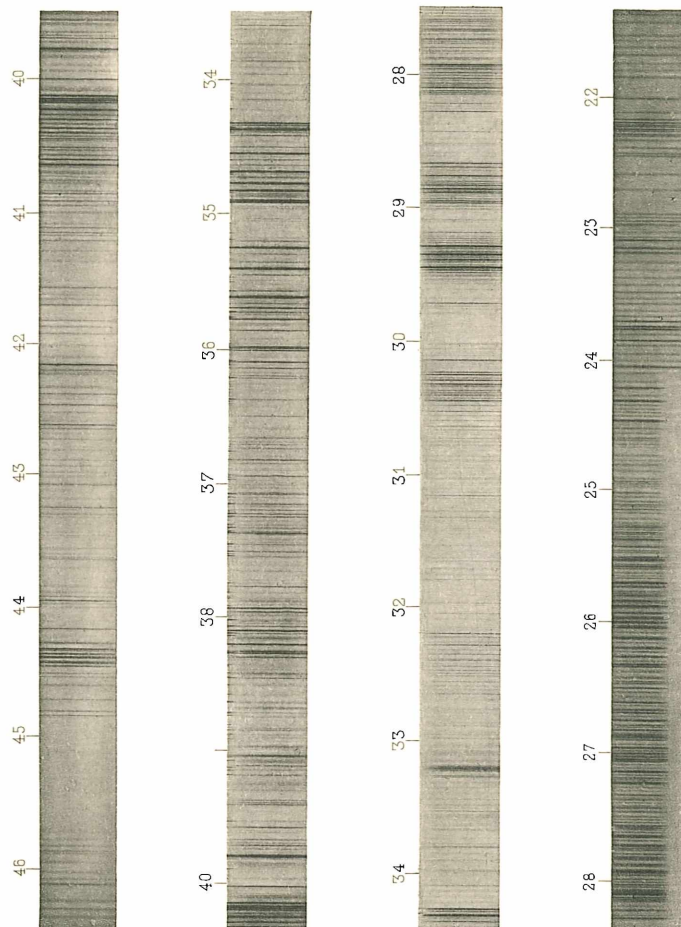
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Mangan.

Heliogravure und Druck der k. k. Hof- und Staatsdruckerei in Wien.

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Autor(en)/Author(s): Exner Franz, Haschek Eduard

Artikel/Article: [Über die ultravioletten Funkenspectra der Elemente 389-435](#)