## Letters to the Editor.

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### The Assignment of Lines and Term Values in Beryllium II and Carbon IV.

WE have already published briefly the methods by which we have recently been able to determine with certainty the degree of ionisation of the atoms giving rise to many of the lines of the spectra produced by our "hot sparks," and in the case of Boron III the method by which the "Term Values" have been worked out (Proc. Nat. Acad., May 15, 1924. See also forthcoming articles in *Physical Review* and *Phil. Mag.*).

The object of the present note is to make a preliminary report upon the application of the same methods to the determination of the chief characteristics of the spectra of the "stripped atoms" of beryllium and carbon ($Be_{II}$ and $C_{IV}$).

TABLE 1.

BERYLLIUM II.

| Int. | λ I.Å. Vac. | ν Vac. | | Term Values. |
|---|---|---|---|---|
| 1 | 1512·31 | 66124·0 | $(2p_2-3d)$ | $4f$ − 27438·5±3 |
| 2 | 1512·45 | 66117·9 | $(2p_1-3d)$ | $3d$ − 48826·1±3 |
| 1 | 1776·27 | 56297·7 | $(2p-3s)$ | $2p_1$ − 114943·7±3 |
| 1 | 4675·6 | 21387·6 | $(3d-4f)$ | $2p_2$ − 114950·3±3 |
| ? | 3132·086 | 31927·60 | $(2s-2p_2)$ | $2s$ − 146877·9±3 |
| ? | 3131·438 | 31934·21 | $(2s-2p_1)$ | $3s$ − 58649·3±3 |

TABLE 2.

CARBON IV.

| Int. | λ I.Å. Vac. | ν Vac. | | Term Values. |
|---|---|---|---|---|
| 2 | 384·4 | 260166 | $(2p-3d)$ | $3d$ − 195333±30 |
| 1 | 419·8 | 238197 | $(2p-3s)$ | $2p_1$ − 455445±100 |
| 4 | 1548·26 | 64588·6 | $(2s-2p_1)$ | $2p_2$ − 455553±100 |
| 4 | 1550·84 | 64481·2 | $(2s-2p_2)$ | $2s$ − 520034±100 |
| | | | | $3s$ − 217302±100 |

With the aid of the foregoing term values, and those which we have already published for stripped boron ($B_{III}$), it becomes possible to arrange tables for the stripped atoms $Li_I$, $Be_{II}$, $B_{III}$, $C_{IV}$, precisely similar to those which Pashen and Fowler have arranged for the series $Na_I$, $Mg_{II}$, $Al_{III}$, $Si_{IV}$. Such tables (3 and 4) follow.

TABLE 3.

$$(Z-s)=\sqrt{\frac{\nu \cdot n^2}{R}}.$$

(See equation 2, our paper "Some Conspicuous Successes of the Bohr Atom and a Serious Difficulty," forthcoming number *Phys. Rev.*

$\nu$ = term value.

R = Rydberg constant.

$n$ = total quantum number.)

| | 2s. | $2p_1$. | 3d. | 4f. |
|---|---|---|---|---|
| Li. | 1·259040 | 1·020736 | 1·000437 | 0·999843 |
| Be. | 2·313884 | 2·046944 | 2·001155 | 2·000200* |
| B. | 3·339489 | 3·064008 | 3·001886 | 3·000431 |
| C. | 4·353908 | 4·074566 | 4·002600* | |

TABLE 4.

| | 2s. | $2p_1$. | 3d. | 4f. |
|---|---|---|---|---|
| Li/1 | 43486·3 | 28582·5 | 12203·1 | 6856·1 |
| Be/4 | 36719·5 | 28735·9 | 12206·5 | 6859·6* |
| B/9 | 33993·1 | 28616·1 | 12207·8 | 6860·2 |
| C/16 | 32502·1 | 28465·3 | 12208·3* | |
| R/$n^2$ | 27433·0 | 27433·0 | 12192·3 | 6858·3 |

* Assumed.

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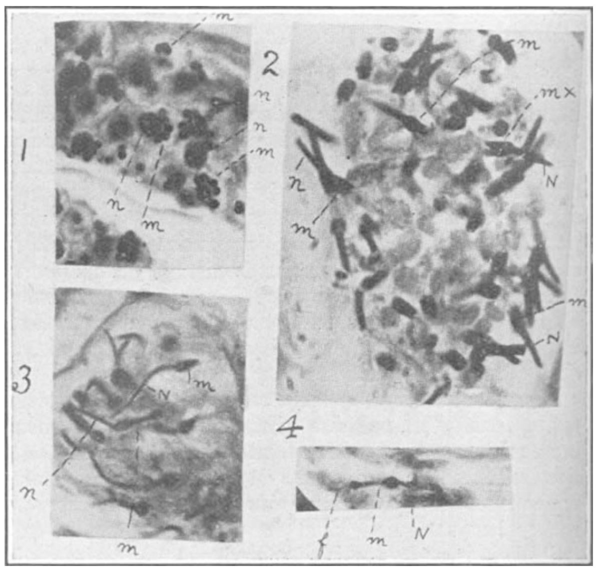
### The Scorpion Spermateleosis.

IN two recent letters to NATURE (July 12 and August 2) Mr. Vishwa Nath has referred to the results obtained by two of my students. Mr. Nath finds himself unable to support the statement of Prof. Bhattacharya and myself, that in the scorpion spermateleosis "the mitochondria form the sperm tail directly." It should be pointed out that the findings of Prof. Bhattacharya and myself directly support the previous work of Prof. E. B. Wilson, the distinguished American cytologist.




So far as we are concerned, our material is very clear and easy to study, and we feel sure that if Mr Nath examines his slides more carefully, he will find that Wilson has given the correct interpretation of the scorpion spermateleosis.

Herewith we give four photomicrographs of our material. In Fig. 1 the mitochondrial spheres of the spermatids (*m*), after becoming partially fused, elongate to form a number of leaf-like structures (the mitosome, nebenkern, etc.), shown well at *mx* in Fig. 2. The nucleus at this stage elongates rapidly (N), while the leaf-like mitochondria further elongate to form a club-shaped structure (Figs. 3 and 4) which eventually, becoming more attenuated, forms the tail as claimed by Wilson. In Fig. 4 the nucleus, N, is partly out of focus, but joins the mitosome at *m*, and passes back to the axial filament (*f*), which is embraced by the residual protoplasm containing the Golgi bead.