singlet lines are

Element	Value of e/m
Zinc	$1.7570 \pm 0.0009 \times 10^7$
Cadmium	$1.7570 \pm 0.0008 \times 10^7$
Helium	$1.7564 \pm 0.0009 \times 10^7$
Neon	$1.7580 \pm 0.0014 \times 10^7$

By weighting the values according to their individual errors the average value of the specific charge of the electron is found to be $e/m = 1.7570 \pm 0.0007 \times 10^7$ e.m.u./g.

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August 20, 1934.

[1] L. E. Kinsler and W. V. Houston, Phys. Rev. **45**, 134 (1934).
[2] L. E. Kinsler and W. V. Houston, Phys. Rev. **45**, 104 (1934).

New Band Systems in Nitrogen

A new band system belonging to nitrogen has been discovered in the same tube that I have described on several occasions recently.[1] These bands degrade to the violet and consist of only one progression. They have been photographed on a small quartz Hilger spectrograph, and the wave-lengths of the band heads are approximately 2153, 2225, 2301 and 2381. The frequency differences between the lower vibrational levels correspond very closely to the frequency differences between the lower vibrational levels of the band system recently discovered by van der Ziel.[2] It is suggested therefore that the two band systems have a common lower electronic state. If we assume that these new bands originate on the $v'=0$ level of a new electronic state, and then calculate the difference between this new state and the initial state of the van der Ziel system, this difference corresponds very exactly with the difference between two of the new levels which form part of the Rydberg absorption series of N_2 discovered by Hopfield.[3, 4] These two levels correspond to the absorption bands 671.2 and 675.2, and the difference between them is 883 cm^{-1}, as compared with 881 cm^{-1} for the difference between the initial state of these new bands and the van der Ziel bands.

In addition to these bands there are present many other new bands. Of these the three bands 2740, 2635 and 2536 are similar in appearance, and probably form part of another system. Other fairly strong bands having wave-lengths 2359, 2397, 2421, 2452, 2459 are also present. A set of five bands between 2510 and 2530, and numerous new bands above 2600 are also present, but so far it has been impossible to arrange them into systems. It is suggested, however, that these bands originate on the other levels which were discovered by Hopfield. Further work is now in progress in an attempt to interpret these bands.

The new system recently reported by van der Ziel, two members of which were first observed by Appleyard, is very strongly excited in these experiments. It is of some interest to point out that the intensity distribution among these bands is not in agreement with the Franck-Condon principle. Thus, the band (1,1) is missing whereas the band (1,7) is very strong. Similar anomalies occur in the $v'=0$ sequence. The present writer has often called attention to a similar phenomenon in the first-positive system of nitrogen. It is therefore of some interest to report a similar phenomenon in another system of nitrogen.

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August 20, 1934.

[1] Kaplan, Phys. Rev. **44**, 783 (1933).
[2] van der Ziel, Physica **1**, 513 (1934).
[3] Hopfield, Phys. Rev. **36**, 789A (1930).
[4] Mulliken, Phys. Rev. **46**, 144 (1934).

New Bands in Nitrogen

At the Berkeley meeting of the American Physical Society I reported the discovery of some new members of the second-positive positive band system. The five strongest of these new bands could be easily recognized as three-headed and degraded to the red. The short wave-length heads were 4732, 4435, 4174, 3010 and 2864A. The first three bands were observed only at pressures below 0.1 mm, while the other two were present at all pressures. At the time of their discovery it was recognized that the frequency differences between corresponding heads in general indicated that the lower level of these bands coincided with the $B^3\Pi$ initial state of the well-known first-positive system. They were identified as members of the second-positive system originating on high vibrational states, since the enhancement of high-vibrational states was a characteristic of the tube in which these bands were observed. The different behavior of the three visible bands as contrasted with the two ultraviolet bands suggests, however, that my first explanation is incorrect, and that these bands are members of two separate systems in nitrogen. The three visible bands are then readily identified as the (v',12), (v',11) and (v',10) bands of a new system, and the two ultraviolet bands as (0,1) and (0,0).

It was remarked earlier that the bands possess three heads. The two shortest wave-length heads are nearer to each other than the two longest wave-length heads. In the case of the first-positive bands the two longest wave-length heads are closer to each other than the two shortest wave-length heads. This fact is an argument in favor of my identification of the lower level of these bands, since the $B^3\Pi$ state is the initial level for the first-positive bands.

The enhancement of the visible bands as the pressure is lowered is of interest, since several other new band systems of nitrogen are enhanced at lower pressures, e.g., the Appleyard-van der Ziel bands, the ultraviolet system which was reported by me in a recent letter in the *Physical Review*, and one which was reported in a letter in *Nature*.

It is also significant that the three visible bands end on the $v''=12$, 11 and 10 levels of the $B^3\Pi$ state. These three are enhanced in the nitrogen afterglow, and this may have something to do with their excitation. Further investigation with regard to all these new bands is now under way.

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