DESCRIPTION AND ANALYSIS OF THE SECOND SPECTRUM OF VANADIUM (V II)

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ABSTRACT

Wavelength measurements and intensity estimates are presented for 1,700 V II lines with wavelengths ranging from 7015.49 A in the red to 1313.82 A in the extreme ultraviolet. The main criterion for selecting these lines was enhancement in the spark as compared with the arc. Supplementary data on furnace-temperature classes and Zeeman patterns for many of these lines support their characterization of singly ionized vanadium atoms.

Analysis of all the available data resulted in the identification of 89 spectral terms, combinations of which account for 1,456, or 86 percent, of the observed lines. The identified terms include 31 singlets, 41 triplets, and 17 quintets. This is the first spectrum in which all theoretical terms arising from electron configurations d^3s and d^4 have been established (except the highest singlet in each set).

The lowest energy state of V+ ions is represented by $(3d^4)a\,^5D_0$, but the strongest emission lines involve $(3d^3\,4s)a\,^5F$, a metastable term. Without doubt, the most intense line of the V II spectrum is $(3d^3\,4s)a\,^5F_5-(3d^3\,4p)z\,^5G^{\circ}_6$, with wavelength of 3093.108 A, arising from a simple $s-p$ transition.

A great majority of the observed lines are explained as combinations of low (even) terms with middle (odd) terms resulting from the configurations $3d^3\,4p$ and $3d^2\,4s4p$. The first high (even) terms probably originate with $3d^3\,4d$ and $3d^3\,5s$, but only fragments of the former and none of the latter could be found.

Line intensities in multiplets, level separations in complex terms, and magnetic splitting factors (g-values) indicate that LS coupling predominates among the four electrons involved in the production of the V II spectrum. With few exceptions, the polyfold terms are regular, and many obey the Landé interval rule rather well. Zeeman-effect observations for 380 lines disclose the g-values for 143 atomic-energy levels. A comparison of observed and Landé g-sums for levels given by the $d^3\,4s$ configuration shows satisfactory compliance with the g-sum rule if the scale of the observations is increased 2 to 3 percent.

Guided by theoretical expectations and analogies with similar spectra, the electronic configurations responsible for the observed terms have been identified in nearly all cases.

Inability to establish any levels belonging to the $d^3\,5s$ configuration, in series with $d^3\,4s$, postpones a spectroscopic determination of the ionization potential of V+ ions until this spectrum has been studied under conditions which favor the emission of spectral series. For the present, the only value of this constant is an estimate of 14.1 volts by Russell.

CONTENTS

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I. INTRODUCTION

The structure of vanadium spectra was first adopted as a research problem by one of the present authors in 1923, and during that year the first regularities in the arc spectrum of vanadium were announced [1].[2] The first regularities among spark lines of vanadium were presented [2] in 1924. These were extended [3] in 1925 and 1926, until approximately 300 lines characteristic of singly ionized vanadium atoms were accounted for as combinations of identified spectral terms.

In those pioneer days of the quantum theory of atomic spectra, regularities in various complex spectra were eargerly sought, primarily for the purpose of testing the proposed alternation and displacement laws of spectral structure [4]. Thus the quartet and sextet multiplets that were found in the V I spectrum were the first regularities among fifth-group elements, and they verified the predictions of the alternation law. Similarly, discovery in the V II spectrum of triplet and quintet multiplets resembling those of the Ti I spectrum confirmed the displacement law.

Within a few years the quantum theory of atomic spectra became highly developed (as regards multiplet structure, interpretation of Zeeman patterns [5], correlation of terms with electron configurations [6]), and thus presented analytical spectroscopists with tools and a challenge to classify completely the most complex spectra. But any attempt to interpret a complex spectrum invariably entails much time and labor to observe, compile, and analyze the basic data. Details of exhaustive studies of the first spectrum of vanadium [7] were recently published.

Following 1926, the analysis of the second spectrum of vanadium rested a decade, until it was resumed and advanced to its present state by cooperation of the present authors. From the beginning the term analysis of the vanadium spark spectrum was handicapped by incompleteness and poor quality of wavelength and intensity values, so from time to time efforts were made to improve the fundamental data. Most of the new observing was done at the National Bureau of Standards, and the analysis was extended mainly at Princeton. Preliminary reports of these investigations were presented [8] at scientific meetings in 1938 and 1939; and since a stage has now been reached where further observational and analytical activities appear to be unprofitable, we are persuaded to publish our final results.

II. OBSERVATIONAL DATA

The analysis of the V II spectrum is based on observed facts consisting of wavelength measurements, intensity estimates, temperature classification, Zeeman effect, absorption and reversal data, all of which are presented in table 1.

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[2] Figures in brackets indicate the literature references at the end of this paper.

1. WAVELENGTH MEASUREMENTS

Spectroscopic observations of vanadium began in 1866, when Thalén [9] studied the spark spectrum and published the first measurements of the stronger lines. The first attempt to distinguish between arc and spark lines of vanadium was made in 1899 by Lockyer [10], who published a brief list of lines enhanced in the spark as compared with their intensities in the arc. The most extensive table of vanadium spark lines is that of Exner and Haschek [11] published in 1912. It lists 2,837 lines (2131.95 to 6753.3 A, Rowland's scale), but considerably less than half of them appear to be enhanced, and the errors in wavelength values are too large to permit safe use of the combination principle in seeking regularities. Inadequacy of existing data for the purpose of analyzing vanadium spark spectra was recognized in 1924, when a new list of 1,200 enhanced lines (2050 to 6500 A) was prepared from observations of juxtaposed arc and spark spectra [3]. These observations were made with vanadium chloride on graphite electrodes, and with spectrographs of moderate dispersion. These results were later displaced by improved ones obtained with pure metal electrodes and more powerful spectrographs. In 1932 Jerome K. Strauss of the Vanadium Corporation of America kindly presented the National Bureau of Standards with massive electrodes of pure vanadium metal for use in spectroscopic investigations. With these electrodes it became possible for the first time to obtain fully exposed spectrograms of vanadium free from impurity lines and undesired lines from graphite, copper, or other electrodes. The spark spectrum of vanadium was accordingly reobserved (2000 to 8500 A) with these pure-metal electrodes and the following spectrographs. The ultraviolet range 2000 to 2210 A was recorded on Schumann plates with a Littrow quartz spectrograph giving an average dispersion of about 1 A/mm in this range. An ultraviolet interval 2100 to 2800 A was photographed with a large quartz spectrograph of 3-m focus with 60-cm prism base which produced dispersions of 0.4 to 1.0 A/mm. The range 2500 to 5000 A was recorded in the second-order spectrum of a Rowland grating with 20,000 lines per inch, the average scale being 1.7 A/mm. The longer wave region (5000 to 8500 A) was investigated in the first-order spectrum of this grating. The spark for these observations (completed in 1936) was excited by a condensed discharge from an X-ray coil with a high-voltage rating of 50,000. In 1937 an aluminized Pyrex grating with 30,000 lines per inch was obtained from R. W. Wood, and with it the vanadium spark spectrum from 2500 to 8500 A was again observed with 50 percent greater dispersion and complete freedom from ghosts. For this last series of spectrograms the spark was operated by means of a 30,000-volt 60-cycle transformer, but the spectra were indistinguishable from those produced by the X-ray coil.

The schedule of exposures was invariably as follows: (1) Vanaduim conventional arc spectrum, 220 volts, 5-ampere d-c arc, 2 seconds to 1 minute; (2) iron arc spectrum, 1 second to 1 minute; (3) vanadium spark spectrum, primary current 110 volts, 5 to 8 amperes a-c, 0.006-μf capacity in parallel with the spark, 2 to 60 minutes. Relative exposure times were chosen so that fully exposed vanadium arc and spark spectrograms resulted in each spectral region with comparable intensities of high-level V I lines. Under such conditions the lines

enhanced in the spark spectrogram, or appearing only there, positively belong to ionized vanadium atoms. No special effort was made to distinguish between V II and V III lines, but relatively few, if any, of the latter occur above 2600 A. Below 2600 A the lines appearing only in sparks, and greatly enhanced at the electrodes, are generally found to represent V III and V IV spectra. These have been removed from our V II list.

All wavelength measurements were made relative to international secondary standards of iron in the same spectral order. As usual, the prism spectrograms were reduced with the Hartmann dispersion formula, and the grating spectrograms on the assumption of linear dispersion, small final corrections required by each spectrogram being determined from standards.

A variety of line types occur in the conventional spark spectrum, and obviously not all are measurable with equal precision. Especially difficult are the high-level lines, which in condensed sparks operated at atmospheric pressure always appear hazy and unsymmetrically shaded. Also many V II lines are widened by hyperfine structure which is noticeable with powerful spectrographs.

The visible and infrared spectra of atomic vanadium in atmospheric sources always appear on a background of molecular spectra arising from metallic oxides. Although the molecular spectra are relatively weaker in a disruptive spark than in a continuous arc discharge, they are nevertheless prominent enough in fully exposed spark spectrograms to obscure or falsify faint lines. It is likely that V II lines in general would be sharper, and fainter lines could be observed, in discharges in a partial atmosphere of inert gas; but the present description is confined to the conventional spark in air or in pure nitrogen.

A. G. Shenstone kindly made for the authors a spark spectrogram extending from 2172 to 1308 A in the extreme ultraviolet. The spark was operated in pure nitrogen, and the spectrum was recorded on a Schumann plate with a normal-incidence vacuum spectrograph having a 2-m glass grating ruled 30,000 lines per inch. The dispersion is 4.2 A/mm. This spectrogram was measured and reduced relative to Cu II and Fe III lines identified on the plate. Criteria for the separation of successive spectra of vanadium are lacking, except enhancements at the electrodes, which are assumed to characterize V III and V IV lines. Shorter than 2600 A, only lines believed to belong to the V II spectrum are retained in table 1, and even these are omitted when unclassified and fainter than 20 below 2000 A, or unclassified below 1550 A.

2. INTENSITIES

In this revised description of the V II spectrum an effort was made, for the first time, to assign relative intensities which bear some semblance to reality. The strongest V II line, 3093.11 A, is certainly thousands of times more intense than the faintest observed lines. For such an intensity range the scale of 10 to 1 allows only 10 classes of lines and permits no fine distinctions. Even the scale of 100 to 1 is inadequate, so in the present case we have adopted a scale of 2,500 to 1. Of course, the intensity values are only visual estimates of line strength based on image width and blackness; but since they are

usually averages from several fully exposed spectrograms, they are probably comparable over considerable intervals. No quantitative measurements of relative intensities in vanadium spark spectra have ever been made.

When relative intensities are carefully estimated on an open scale, different lines are found to show varying degrees of enhancement from arc to spark exposures. Low-level spark lines usually appear with considerable intensity in ordinary arcs, but high-level spark lines are either weak or nonexistent in light from the central part of an arc. In the spark, low-level lines often show self-reversal, whereas high-level lines are generally characterized by haziness and dissymmetry. Because degrees of enhancement (as well as other features of the lines) are significant in the analysis of spectral structure, both arc and spark intensities are presented in table 1.

3. TEMPERATURE CLASSES

As stated above, many lines of low or medium intensity in the arc are enhanced in a spark, and such intensity comparisons yield a trustworthy separation of lines due to neutral and to ionized atoms. An independent method of recognizing these enhanced lines is found in a comparison of the arc and high-temperature furnace spectra as studied by King. The enhanced lines are either absent or relatively weak in furnace spectra. In other words the furnace, the arc, and the spark are characterized mainly by differences in ionizing power; and lines belonging to ionized atoms in the arc can be identified either by enhancement in the spark or by diminishment in the furnace. Comparison of the spectra of vanadium excited in a vacuum furnace at various temperatures enabled King [12] to assign, to 1,600 lines (2340 to 6842 A) appearing in the arc spectrum, temperature-class numbers that correspond to successive stages of excitation. This classification was an important aid in the analysis of the V I spectrum [7]. Similar data pertinent to the V II spectrum are quoted in table 1. The assignment of lines to V II, based on arc and furnace comparisons, is confirmed in every case by our independent arc and spark comparisons.

4. ZEEMAN EFFECT

The Zeeman effect for several hundred vanadium lines (3665 to 6625 A) was published by Babcock [13] in 1911. These observations were improved and extended (to 2314 A), and in manuscript form were kindly lent to those actively engaged in multiplet analysis. With the consent of Babcock, the data for V I lines were recently published, together with their interpretation, in a term analysis of the first spectrum of vanadium [7]. The revised data for V II lines have not been published, but with Babcock's permission they are fully presented in table 1, together with their interpretation. Needless to say, these Zeeman patterns were most helpful in this term analysis of the V II spectrum, and they constitute overwhelming confirmation of the quantum numbers assigned to the terms. The observations quoted in table 1 are given in the usual form, that is, the component distances from the undisplaced line are in terms of a normal triplet separation, the p-components are in parentheses and are followed by the n-components, the strongest components being distinguished by bold-face type. The same is true for calculated patterns, except that in

some cases these are simplified to aid their comparison with the observations.

The calculated patterns are derived from the observed g values (table 5) resulting from Babcock's material quoted in table 1. When the observed components are wholly or partially resolved, the complete computed pattern is given; but when only blends of the components of a given polarization are measured, the calculated position of the blend is given. For the stronger lines this is assumed to coincide with the center of gravity of the theoretical group, as described in the formulas of Shenstone and Blair, and of Russell [14]. These cases are marked b in table 1. For weak lines it is probable that the measurement applies more nearly to the strongest component of the group, and such cases are marked s.

5. ABSORPTION AND SELF-REVERSAL

The absorption spectrum of vanadium vapor at 2,000° C was investigated by Gieseler and Grotrian [15] to determine the normal state of the atoms. They observed 52 absorption lines (2915 to 6252 A), all of which originated either from a low quartet F or a slightly higher sextet D term, and concluded that the normal state of neutral vanadium atoms is described by $(d^3 s^2)$ $^4F_{1\frac{1}{2}}$. The only laboratory absorption data extant for V II lines are those by King [16], who observed 10 enhanced lines (2672 to 2691 A) faintly absorbed in vanadium vapor near 2,600° C. All of these involve the lowest quintet D term, which is the ground state of the ion. No further laboratory observations of V II lines in absorption have been made, but additional information about the normal state of V $^+$ atoms is found in the phenomenon of self-reversal in the spark. Without exception, the lines which are observed to be more or less self-reversed involve either the low quintet D term or a slightly higher quintet F term, and there can be no doubt that the normal state of singly ionized vanadium atoms (V $^+$) is (d^4) $^5D_0$.

V II absorption lines are observed in the solar spectrum [17]. The strongest of those observed originate with $(d^3 s)$ ^5F, because the strongest combinations with (d^4) ^5D are shorter than 2900 A and therefore are not transmitted by the terrestrial atmosphere.

III. TERM ANALYSIS OF V II

Since the terms of the V II spectrum are deduced directly from observed properties of the lines, we present in the following order (1) a complete list of observational data, with the addition of term combinations for all classified lines, and calculated Zeeman patterns to compare with observed; (2) facts concerning the established spectral terms; (3) correlation of electron configurations and terms.

1. LINES OF THE V II SPECTRUM

Successive columns of table 1 contain the following data: (1) measured wavelength, (2) arc and spark intensity, (3) temperature class, (4) vacuum wave number, (5) term combination, and (6) observed and computed Zeeman patterns.

All wavelengths listed here are on the International Scale; those exceeding 2000 A are observed in a standard atmosphere, but shorter

than 2000 A they are vacuum values.   The vacuum wave numbers of the former are derived from Kayser's Table [18].

The letters a, b, c, etc., appearing with wavelengths in column 1 have the following meaning:

a=Blend with V I.
b=Zeeman pattern diffuse.
c=Short-wave member of observed Zeeman pattern double line.
d=Observed Zeeman pattern possible blend with V I.
e=Observed Zeeman pattern affected by superposed line.
f=Long-wave member of observed Zeeman pattern double line.
g=Observed Zeeman pattern affected by reversal.
h=Observed Zeeman pattern unsymmetrical; doubtful.
i=Observed Zeeman pattern blended.
j=Intensities in observed Zeeman pattern unsymmetrical.
k=Multiplet designation discordant with observed Zeeman pattern.
l=Short-wave n-component of observed Zeeman pattern blended.
m=Long-wave n-component of observed Zeeman pattern blended.
n=Long-wave n-component of observed Zeeman pattern weaker.
o=n-component of observed Zeeman pattern blended.
$*$=Line probably a blend.

Symbols accompanying some of the intensity estimates in column 2 have the following significance, as officially adopted by the International Astronomical Union [20]:

h=Hazy.
H=Very hazy.
I=V I.
p=Part of band structure.
l=Shaded to longer waves.
s=Shaded to shorter waves.
d=Double.
e=Enhanced at electrode.
r=Narrow self-reversal.
R=Wide self-reversal.
Bl=Blend.

In column 3, Roman numerals represent King's temperature class. The accompanying symbols are to be interpreted as follows:

a=Observed in absorption.
E=Enhanced line.
r=Self-reversal.

The term combinations in column 5 show the quantum theoretical interpretation of the observed lines, the notation being that which is in general use [19] and officially adopted by the International Astronomical Union [20].

Symbols accompanying the observed Zeeman patterns in column 6 have the following meanings: $w1$=slightly widened; $w2$=moderately widened; $w3$=greatly widened; while the apparent intensity distribution in such unresolved patterns is qualitatively represented by letters as follows:

For unresolved p-components $B=$ ◇◇; $D=$ ⊓; $E=$ ∧.
For unresolved n-components $A=$ ╱|╲; $B=$ ◇◇; $C=$ ⊓⊓.

As explained above, the letters b and s, appearing with calculated patterns in column 6, indicate blended- and strongest-component values, respectively. Comparison with values computed from Landé g-values may be made by referring to the tables of theoretical Zeeman effects published by Kiess and Meggers [21]. Some remarks on g-values and g-sums are reserved for presentation in connection with a discussion of V II terms (see next section).

TABLE 1.—*Second spectrum of Vanadium*

a=absorbed line.	R=Wide self-reversal.
h=Hazy.	r=Narrow self-reversal.
I=V I.	s=Shaded to shorter waves.
p=Band line.	e=Enhanced at electrode.
E=Enhanced line.	d=Double.
H=Very hazy.	II=V II.
l=Shaded to longer waves.	Bl=Blend.

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac cm^{-1}	Term combination	Zeeman effect	
λ_{air} A	Arc	Spark				Observed	Computed
7015.49		4h		14250.25			
6987.12		5h		14308.11			
6891.30		4h		14507.05			
6801.16		5		14699.33	$d\,^3P_2 - z\,^3P_2^{\circ}$		
6748.10		2h		14814.90			
6672.84		3h		14982.00	$b\,^1F_3 - y\,^3F_3^{\circ}$		
6517.27		15h		15339.62	$b\,^1F_3 - z\,^1F_3^{\circ}$		
6380.11		40h		15669.39	$b\,^1F_3 - z\,^1D_2^{\circ}$		
6226.29		10h		16056.50	$b\,^3D_2 - z\,^5F_2^{\circ}$		
6120.98		5		16332.74	$c\,^3P_0 - z\,^5F_1^{\circ}$		
6095.93		3		16399.86	$c\,^3P_1 - z\,^5F_1^{\circ}$		
6086.93		15h		16424.11	$b\,^3D_2 - z\,^3D_2^{\circ}$		
6083.82		10h		16432.50	$b\,^3D_1 - z\,^3D_1^{\circ}$		
6080.11		6		16442.53	$d\,^3F_4 - z\,^3H_4^{\circ}$		
6031.07		40		16576.23	$c\,^3P_2 - z\,^5F_3^{\circ}$		
6028.98		20		16581.94	$b\,^3D_3 - z\,^3D_3^{\circ}$		
6028.26		40		16583.95	$c\,^3P_1 - z\,^5F_2^{\circ}$		
6027.23		8		16586.79	$a\,^1S_0 - z\,^5F_1^{\circ}$		
6026.81		6		16587.94	$b\,^3D_2 - z\,^3D_3^{\circ}$		
5967.77		6		16752.05	$b\,^3D_2 - z\,^5D_2^{\circ}$		
5951.45		4		16797.99	$c\,^3P_0 - z\,^3D_1^{\circ}$		
5928.86		100		16861.99	$c\,^3P_2 - z\,^3D_3^{\circ}$	(0) 1.31	(0) 1.28b
5916.364		15		16897.60	$b\,^3D_3 - z\,^3D_2^{\circ}$		
5914.28		5		16903.56	$b\,^3D_2 - z\,^3D_1^{\circ}$		
5897.54		50		16951.54	$c\,^3P_1 - z\,^3D_2^{\circ}$	(0) 0.96	(0) 0.94b
5862.80	p	15+p?		17051.98	$a\,^1S_0 - z\,^3D_1^{\circ}$		
5819.93		80		17177.59	$c\,^3P_2 - z\,^5D_3^{\circ}$	(0) 1.50	(0) 1.58b
5791.47		15		17262.00			
5642.01		60h		17719.27	$c\,^1G_4 - y\,^1G_4^{\circ}$	(0) 0.97	(0.13) 0.98b
5562.02	p	4hp?		17974.10	$c\,^3D_2 - w\,^3F_3^{\circ}$		
5530.10		4		18077.85	$c\,^3D_3 - w\,^3F_3^{\circ}$		
5487.00		8		18219.85	$a\,^3D_1 - z\,^5F_1^{\circ}$		
5457.10		4		18319.67	$a\,^3D_3 - z\,^5F_2^{\circ}$		
5439.30		15		18379.62	$a\,^3D_2 - z\,^5F_2^{\circ}$		
5432.09		2		18404.02	$a\,^3D_1 - z\,^5F_2^{\circ}$		
5384.89		8		18565.33	$a\,^3D_3 - z\,^5F_3^{\circ}$	(0?) 1.29pw_1; nw_1 B?	(0.15) 1.27b
5357.35		2		18660.77	$a\,^3D_2 - z\,^3D_1^{\circ}$		
5350.37		5		18685.11	$a\,^3D_1 - z\,^3D_1^{\circ}$	(0.30) 0.37	(0.25) 0.36b
5349.75		3		18687.28	$a\,^3D_2 - z\,^3D_2^{\circ}$		
5341.22		2		18717.12	$c\,^1G_4 - y\,^1F_3^{\circ}$		
5332.65		9		18747.20	$a\,^3D_2 - z\,^3D_3^{\circ}$	(0) 1.15	(0.09) 1.10b
5322.81		5		18781.86	$c\,^1G_4 - x\,^3G_3^{\circ}$	(?) 1.49pw_2D; nw_2C	(0) 1.53b
5303.26		40		18851.09	$a\,^3D_3 - z\,^3D_3^{\circ}$	(0) 1.37	(0.05) 1.31b
5290.74	p	6+I		18895.70	$d\,^3F_2 - z\,^1F_3^{\circ}$	(0) 1.20	(0) 1.27b
5288.31		5		18904.39	$c\,^3F_3 - y\,^3F_3^{\circ}$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
5280.00		3?		18934.14	$c\ ^3F_2 - y\ ^3F_2^o$		
5275.65ᵃ	?	10+I		18949.75	$c\ ^3F_4 - y\ ^3F_4^o$	(0.61) 1.27	(0.23) 1.22
5263.99		15		18991.72	$b\ ^3H_4 - z\ ^3G_5^o$	(0) 0.88	(0) 0.79b
5249.22		1?		19045.16	$d\ ^3P_2 - y\ ^3D_3^o$		
5241.19		100h		19074.34	$c\ ^1G_4 - y\ ^1H_5^o$	(0) 1.16	(0) 1.17b
5232.82		2		19104.85			
5227.70		20		19123.56	$b\ ^3H_5 - z\ ^3G_5^o$		
5215.928		25		19166.72	$a\ ^3D_3 - z\ ^5D_3^o$	(?) 1.42pw₂ D	(0.44) 1.38b
5214.98	p	2		19170.21			
5202.94		2		19214.57	$a\ ^1D_2 - z\ ^3F_3^o$		
5199.68	p	4		19226.61	$a\ ^3D_2 - z\ ^5D_3^o$		
5191.59		2		19256.58	$d\ ^3F_2 - z\ ^1D_2^o$		
5157.28		2?		19384.69	$b\ ^3D_2 - z\ ^3F_2^o$		
5151.87		2		19405.03	$c\ ^3F_4 - z\ ^1G_4^o$		
5143.89		3		19435.14			
5132.19		2		19479.45	$b\ ^3D_1 - z\ ^3F_2^o$		
5106.233		5		19578.47	$b\ ^3D_2 - z\ ^3F_3^o$	(0?) 1.16pw₂ D; nw₂ A?	(0) 0.79b
5060.67	?	15		19754.74			
5048.91		15		19800.75	$d\ ^3F_2 - y\ ^3D_1^o$	(0) 0.73	(0) 0.76b
5047.308		10+I		19807.04	$b\ ^3D_3 - z\ ^3F_4^o$	(0) 1.05	(0) 1.10s
5019.855		100h		19915.36	$b\ ^1F_3 - y\ ^1G_4^o$	(0?) 1.02pw₂D	(0) 1.00b
5016.60		4		19928.28	$c\ ^1D_2 - x\ ^1D_2^o$		
4973.16		2		20102.34	$d\ ^3F_2 - y\ ^3D_2^o$		
4968.50		1		20121.20	$b\ ^1G_4 - z\ ^3G_5^o$		
4965.40		40		20133.76	$d\ ^3F_3 - y\ ^3D_2^o$	(0) 1.03	(0) 0.99b
4963.75		2		20140.46	$d\ ^3P_2 - z\ ^3S_1^o$	(?) 1.16pw₁ D; nw₁ A	(0) 1.14b
4947.58		40		20206.28	$c\ ^3F_2 - y\ ^3D_1^o$	(0?) 0.75 pw₂ D	(0) 0.76b
4912.38		2		20351.07	$d\ ^3P_2 - x\ ^3F_3^o$		
4884.06		50		20469.07	$c\ ^3F_3 - y\ ^3D_2^o$	(0?) 1.02pw₁ D	(0) 1.01b
4883.415		100		20471.77	$d\ ^3F_4 - y\ ^3D_3^o$	(?) 1.14pw₂ D	(0) 1.17b
4874.805		4		20507.93	$c\ ^3F_2 - y\ ^3D_2^o$		
4842.50		2h		20644.74	$c\ ^3D_2 - v\ ^3D_2^o$		
4839.08		3		20659.33	$d\ ^3P_2 - x\ ^3D_2^o$	(?) 1.15pw₁ D; nw₁ B?	(0.50) 1.24b
4823.396	3?	6		20726.50	$d\ ^3P_2 - x\ ^3D_3^o$	(?) 1.15pw₁ D	(0) 1.14b
4813.952ᵇ		50		20767.17	$c\ ^3F_4 - y\ ^3D_3^o$	(0) 1.15	(0) 1.19s
4813.00		1?		20771.27	$c\ ^3D_2 - v\ ^3D_1^o$		
4811.14		6		20779.30	$c\ ^3F_3 - y\ ^3D_3^o$	(0.64) 1.24nw₂	(0.21, 0.42, **0.63**), 0.64, 0.85, **1.06**, **1.27**, 1.48, 1.69
4810.17		1?		20783.49	$b\ ^3G_4 - z\ ^3D_3^o$		
4737.59		1		21101.89	$b\ ^3F_2 - z\ ^5G_2^o$		
4634.21		3h		21572.63	$d\ ^3F_2 - x\ ^3F_2^o$		
4627.48		1		21604.00	$d^3\ F_3 - x\ ^3F_2^o$		
4618.52		3		21645.91	$c\ ^1D_2 - x\ ^1F_3^o$		
4605.352		15		21707.80	$a\ ^3D_2 - z\ ^3F_2^o$		
4600.19		150		21732.16	$a\ ^3D_1 - z\ ^3F_2^o$	(0)0.77	(0)0.73b
4596.37		5h		21750.22	$d\ ^3F_3 - x\ ^3F_3^o$		
4590.505		7h		21778.01	$d\ ^3F_4 - x\ ^3F_3^o$	(?)1.44	(0)1.47b
4564.592	4	200		21901.64	$a\ ^3D_2 - z\ ^3F_3^o$	(0)0.97pw₁ D; nw₁A	(0)0.91b
4558.46		20		21931.10	$d\ ^3F_2 - x\ ^3D_1^o$		
4556.765		4		21939.26	$c\ ^3F_2 - x\ ^3F_2^o$		
4538.64		2		22026.87	$d\ ^3F_2 - x\ ^3D_2^o$		
4535.215		3h		22043.51	$d\ ^3F_4 - x\ ^3F_4^o$		
4532.188		40h		22058.23	$d\ ^3F_3 - x\ ^3D_2^o$	(0)1.02	(0)1.00b
4529.08		5?		22073.37	$c\ ^3F_4 - x\ ^3F_3^o$		
4528.51	3	300		22076.15	$a\ ^3D_3 - z\ ^3F_4^o$	(0?)1.13	(0)1.10b
4520.55		5	V E	22115.02			
4518.38		2h		22125.64	$d\ ^3F_2 - x\ ^3D_3^o$		
4517.35		3h		22130.69	$d\ ^3F_2 - z\ ^1P_1^o$		
4512.72		60h		22153.39	$d\ ^3F_4 - x\ ^3D_3^o$	(0)1.20	(0)1.18b
4483.50		2h		22297.77	$d\ ^3P_0 - x\ ^3P_1^o$		
4475.70		20h		22336.63	$c\ ^3F_2 - x\ ^3D_1^o$	(0)0.66	(0)0.69b

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air} A	Arc	Spark				Observed	Computed
4475.24		1		22338.92	$c\ ^3F_4 - x\ ^3F_4^\circ$		
4464.32		40h		22393.56	$c\ ^3F_3 - x\ ^3D_2$	(0)1.04	(0)1.02b
4456.53		3h		22432.71	$c\ ^3F_2 - x\ ^3D_2^\circ$		
4453.35		30h		22448.72	$c\ ^3F_4 - x\ ^3D_3^\circ$	(0)1.19	(0)1.22s
4440.41		5h		22514.14	$d\ ^3P_1 - x\ ^3P_0^\circ$		
4439.42		1		22519.16	$a\ ^1G_4 - z\ ^3F_4^\circ$		
4408.92		40H?		22674.94	$d\ ^3P_2 - x\ ^3P_2^\circ$		
4404.68		2		22696.77	$a\ ^3G_5 - z\ ^5F_5^\circ$		
4398.52		4h		22728.56	$a\ ^1F_3 - z\ ^1F_3^\circ$		
4370.27		3		22875.47	$a\ ^3G_5 - z\ ^5D_4^\circ$		
4366.91		5h		22893.08	$b\ ^3G_3 - z\ ^3G_3^\circ$	(0)1.05	(0.00)1.03b
4349.97		6h		22982.23	$b\ ^3G_4 - z\ ^3G_4^\circ$		
4346.89		3		22998.51	$b\ ^3P_2 - z\ ^5F_1^\circ$		
4331.79		2		23078.68	$a\ ^5P_2 - z\ ^5F_2^\circ$		
4331.55		6h		23079.96	$b\ ^3G_5 - z\ ^3G_5^\circ$	(0)1.18	(0.12)1.18b
4325.22		9h		23113.73	$b\ ^1F_3 - y\ ^1D_2^\circ$	(0)1.02	(0)1.02b
4322.02		4		23130.85	$b\ ^3F_3 - z\ ^5F_2^\circ$	(0)1.03	(0)1.04b
4316.258		2		23161.73	$a\ ^5P_1 - z\ ^5F_2^\circ$		
4313.30		2		23177.61	$a\ ^5P_3 - z\ ^5F_3^\circ$		
4304.15		2		23226.88	$d\ ^3F_3 - w\ ^3D_2^\circ$		
4301.130		40h		23243.19	$d\ ^3P_0 - y\ ^3S_1^\circ$	(0)1.94	(0)1.92
4288.78	2	5?		23310.12	$b\ ^3F_4 - z\ ^5F_3^\circ$		
4286.13	2?	3		23324.53	$a\ ^5P_2 - z\ ^5F_3^\circ$		
4278.893		60h		23363.98	$d\ ^3P_1 - y\ ^3S_1^\circ$	(0.45)1.44, 1.96	(0.44)1.48, 1.92
4270.64		2		23409.13	$a\ ^5P_3 - z\ ^3F_4^\circ$		
4264.50		1		23442.83	$a\ ^5P_1 - z\ ^3D_1^\circ$	(0.41, **1.21**) 0.36, 1.11, 1.82, 2.48	(0.70, **1.40**)0.38, **1.08, 1.78,** 2.48
4263.836		4h		23446.48	$a\ ^5P_2 - z\ ^3D_2^\circ$		
4260.75		9h		23463.47	$\{$ $a\ ^5P_3 - z\ ^3D_3^\circ$; $b\ ^3F_2 - z\ ^3D_1^\circ$ $\}$		
4257.02		15h		23484.02	$c\ ^3F_2 - w\ ^3D_1^\circ$	(0)0.76	(0)0.76b
4254.41	4?	15h		23498.43	$b\ ^3F_3 - z\ ^3D_2^\circ$	(?)1.07pw₃ D; nw₃ A Cr?	(0)1.04b
4248.820		4		23529.35	$a\ ^5P_1 - z\ ^3D_2^\circ$		
4242.894		30h		23562.21	$c\ ^3F_3 - w\ ^3D_2^\circ$	(0)0.98	(0)1.02b
4236.82		4		23595.99	$b\ ^3F_4 - z\ ^3D_3^\circ$	(0)1.02	(0)0.98b
4234.55		40h+I		23608.63	$c\ ^3F_4 - w\ ^3D_3^\circ$		
4234.251		7		23610.30	$a\ ^5P_2 - z\ ^3D_3^\circ$		
4232.065		80h		23622.50	$d\ ^3P_2 - y\ ^3S_1^\circ$	(**0,** 0.49) **1.01,** 1.40, 1.91	(**0,** 0.54)**0.84,** 1.38, 1.92
4231.165		4		23627.52	$a\ ^5P_3 - z\ ^3D_3^\circ$	(0)1.93	(0)1.85b
4225.228	1	120		23660.72	$b\ ^3G_3 - z\ ^3F_2^\circ$	(0)0.81	(0)0.87b
4224.51	4?	10		23664.74	$a\ ^5P_2 - z\ ^3D_1^\circ$	(**0,** 0.38)?nw₃ A	(**0,** 0.39)1.39, 1.78, **2.17**
4220.047		10		23689.77	$a\ ^5P_1 - z\ ^3D_0^\circ$	(0)2.47	(0)2.39
4209.74c		10		23747.77	$a\ ^5P_1 - z\ ^3D_1^\circ$	(?) 1.43, 2.47pw₃ B; nw₃ C	(1.00) 1.39, 2.39
4205.080	2	250		23774.09	$b\ ^3G_4 - z\ ^3F_3^\circ$	(0) 1.00	(0) 1.04b
4202.20		20		23779.06	$a\ ^5P_3 - z\ ^3D_3^\circ$	(?) 1.58, 2pw₁; nw₂ C	(0.38) 1.54b
4202.350	2	150		23789.53	$a\ ^5P_3 - z\ ^3D_2^\circ$	(?) 1.19pw₃ D; nw₃ A	(0) 1.17b
4195.83		1		23826.50	$b\ ^3F_3 - z\ ^5D_2^\circ$		
4190.89		10		23854.58	$b\ ^3G_3 - z\ ^3F_3^\circ$		
4190.40		15		23857.37	$a\ ^5P_1 - z\ ^3D_2^\circ$	(0) **0.41,** 1.42	(**0, 1.00**) **0.39,** 1.39, 2.39
4183.435	2	250		23897.09	$b\ ^3G_5 - z\ ^3F_4^\circ$	(0) 1.09	(0) 1.04b
4180.86	3	6?		23911.81	$b\ ^3F_4 - z\ ^5D_3^\circ$		
4179.062		3		23922.09	$b\ ^3F_4 - z\ ^5D_4^\circ$		
4178.390	1	60		23925.94	$a\ ^5P_2 - z\ ^3D_3^\circ$	(**0,** 0.41, 0.82) **0.61,** 1.00, 1.45, 1.86	(**0,** 0.31, 0.62) **0.85,** 1.16, 1.47, 1.78, 2.09
4175.87		3		23940.38		(0) 1.06	
4164.015		15		24008.54	$b\ ^3G_4 - z\ ^3F_4^\circ$	(0.72) 1.16pw₂ D; nw₂ A?	(0.63) 1.12b
4163.655		2		24010.62	$b\ ^1D_2 - y\ ^3F_2^\circ$		
4162.072		2		24019.75	$b\ ^1D_2 - y\ ^3F_3^\circ$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
4142. 90	5?	6+I		24130. 90	$d\ ^3P_2 - y\ ^1P_1^\circ$		
4140. 08		2		24147. 34		(0?) 0.59pw_2 D; nw_2 B	
4101. 00	4?	8+I		24377. 44	$b\ ^1D_2 - z\ ^1F_3^\circ$	(0) 0.94	(0) 0.95b
4085. 67^b		10h		24468. 91	$d\ ^3F_2 - y\ ^1F_3^\circ$	(?) 1.24pw_2 D; nw_2	(0) 1.21b
4080. 44		2		24500. 27	$d\ ^3F_3 - y\ ^1F_3^\circ$		
4075. 66		3		24529. 00	$a\ ^3H_5 - z\ ^5F_4^\circ$		
4067. 03		5		24581. 05	$a\ ^3P_2 - z\ ^5F_1^\circ$	(**0,** 1.16) 0.39, 1.50, **2.62**	(**0,** 1.14) 0.35, 1.49, **2.63**
4065. 070^b		100		24592. 90	$d\ ^3F_4 - x\ ^3G_5^\circ$	(0) 0.92	(0) 0.99b
4056. 270		7		24646. 26	$a\ ^3H_6 - z\ ^5F_5^\circ$	(?)0.98pw_3 D	(0) 0.94b
4053. 59		60l		24662. 55	$d\ ^3F_3 - x\ ^3G_4^\circ$	(0) 0.97	(0) 0.98b
4051. 34	50	100+I		24676. 24	$d\ ^3F_2 - x\ ^3G_3^\circ$		
4051. 06^d		20+I		24677. 95	$a\ ^3G_4 - z\ ^3G_5^\circ$	(0) 1.15	(0) 1.24b
4049. 03		3		24690. 32	$d\ ^3F_4 - x\ ^3G_4^\circ$		
4046. 269		50		24707. 17	$b\ ^1D^2 - z\ ^1D_2^\circ$	(0) 0.95	(0.11) 0.96b
4039. 574	1	20		24748. 12	$a\ ^3G_5 - z\ ^3G_4^\circ$	(0?) 1.78pw_3 D; nw_2 A	(0) 1.73s
4038. 545		2		24754. 43	$a\ ^1P_1 - y\ ^5D_0^\circ$	(0) 0.99	(0) 0.97
4036. 779	3	60	V E	24765. 25	$a\ ^3P_2 - z\ ^5F_2^\circ$	(0.38, **0.80**) 0.66, **1.08, 1.49**, 1.88	(0.41, **0.82**) 0.67, **1.08, 1.49**, 1.90
4035. 631	10	400	V E	24772. 30	$a\ ^3G_3 - z\ ^3G_3^\circ$	(0) 0.75	(0.26) 0.79b
4027. 30		1		24823. 54	$c\ ^3F_4 - y\ ^1F_3^\circ$		
4023. 388	12	600	V E	24847. 68	$a\ ^3G_4 - z\ ^3G_4^\circ$	{(0) 0.85} {(0) 1.02}	(0.10) 1.02b
4019. 05		7h		24874. 50	$c\ ^3F_2 - y\ ^1F_3^\circ$		
4017. 29		15h		24885. 39	$d\ ^3F_4 - y\ ^1H_5^\circ$		
4016. 82		20h		24888. 31	$c\ ^3F_4 - x\ ^3G_5^\circ$	(0?) 0.92pw_2 D; nw_2 A	(0) 0.95b
4008. 17	1	20		24942. 02	$a\ ^3G_3 - z\ ^3G_4^\circ$	(?) 1.91pw_3 D; nw_3 B	(0) 1.90s
4005. 712	15	800	V	24957. 32	$a\ ^3G_5 - z\ ^3G_4^\circ$	(0) 1.17	(0.08) 1.18b
4002. 940	4	80	V E	24974. 60	$a\ ^3P_1 - z\ ^5F_1^\circ$	(1.18) 0.29, **1.47**	(1.13) **0.35, 1.48**
4001. 17		2		24985. 65	$c\ ^3F_4 - x\ ^3G_4^\circ$		
3999. 195		30h		24997. 99	$c\ ^3F_3 - x\ ^3G_4^\circ$	(0) 0.95	(0) 0.96b
3997. 126	5	200	V E	25010. 93	$a\ ^3P_2 - z\ ^5F_3^\circ$	(?) 1.00pw_2 D; nw_2 A	(0) 0.99b
3991. 965		2		25043. 26	{$c\ ^3F_3 - x\ ^3G_3^\circ$} {$d\ ^3P_1 - y\ ^1D_2^\circ$}		
3991. 47		3		25046. 37	$a\ ^3P_2 - z\ ^3D_1^\circ$		
3989. 803	1	15		25056. 83	$a\ ^3G_4 - z\ ^3G_5^\circ$	(0) 1.64	(0) 1.57b
3985. 783		30		25082. 10	$c\ ^3F_2 - x\ ^3G_3^\circ$	(?) 1.02pw_2 D; nw_2 B	(0) 0.97b
3977. 732	2	60		25132. 87	$a\ ^3P_2 - z\ ^3D_2^\circ$	(0.36, **0.77**) 0.68, **1.10, 1.49**, 1.87	(0.41, **0.82**) 0.67, **1.08, 1.49**, 1.90
3973. 642	8	300		25158. 74	$a\ ^3P_1 - z\ ^5F_2^\circ$	(**0,** 0.47) **0.62,** 1.10, 1.51	(**0,** 0.40) **0.68,** 1.08, 1.48
3970. 15		5		25180. 87	$c\ ^3F_4 - y\ ^1H_5^\circ$		
3968. 11	5	150	V E	25193. 81	$a\ ^3P_0 - z\ ^5F_1^\circ$	(0) 0.34	(0) 0.35
3960. 37		1		25243. 05	$a\ ^1F_3 - y\ ^3H_4^\circ$		
3951. 968	10	500	V E	25296. 72	$a\ ^3P_2 - z\ ^3D_3^\circ$	(0) 1.17	(0) 1.15b
3948. 00		1		25322. 14			
3929. 734	2	50		25439. 84	$a\ ^3P_1 - z\ ^3D_1^\circ$	(1.21) 0.30, 1.45	(1.24) 0.24, 1.48
3926. 497	1	10		25460. 81	$a\ ^3P_2 - z\ ^5D_2^\circ$	(0) 1.44	(0.18) 1.44b
3926. 32		5		25461. 96	$a\ ^1H_5 - y\ ^3G_5^\circ$		
3916. 418	5	200	V E	25526. 33	$a\ ^3P_1 - z\ ^3D_2^\circ$	(**0,** 0.43) **0.64,** 1.02, 1.49	(**0,** 0.40) **0.68,** 1.08, 1.48
3914. 333	15	250		25539. 93	$a\ ^3G_3 - z\ ^3F_2^\circ$	(0) 0.84	(0) 0.83b
3907. 52		3		25584. 46	$b\ ^1D_2 - y\ ^3D_2^\circ$		
3903. 27	10	250	V E	25612. 32	$a\ ^3P_2 - z\ ^5D_3^\circ$	(0) 1.35	(0) 1.45b
3899. 140	8	200	V E	25639. 44	$a\ ^3G_4 - z\ ^3F_3^\circ$	(0) 1.01	(0) 0.97b
3896.155^e	20?	60+I		25659. 09	$a\ ^3P_0 - z\ ^3D_1^\circ$	(0) 0.27	(0) 0.24
3891. 25		4		25691. 43	$b\ ^3F_3 - z\ ^3G_3^\circ$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
λ_{air}A	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
3884.847	2	50	V E	25733.77	$a\,^3G_3 - z\,^3F_3$	(0.98) 0.94nw_3 D	(0.72) 0.88b
3883.43		2		25743.16	$b\,^3F_2 - z\,^3G_3$		
3883.208		5		25744.64	$a\,^3P_1 - z\,^5D_1$		
3881.04		2		25759.01	$a\,^1D_2 - z\,^3P_2$		
3878.715	10	300		25774.46	$a\,^3G_5 - z\,^3F_4$	(0) 1.08	(0) 1.07b
3875.67		5		25794.71	$b\,^3F_4 - z\,^3G_4$		
3866.744	3	60		25854.25	$a\,^3P_1 - z\,^5D_2$	(0) 1.40	(0) 1.34b
3865.72		5		25861.10	$b\,^3F_3 - z\,^3G_4$		
3863.81	?	60+I?		25873.88	$a\,^3G_4 - z\,^3F_4$		
3852.10		4		25952.53	$a\,^3F_2 - z\,^5G_2$		
3850.409		7		25963.93	$a\,^3P_0 - z\,^5D_1$	(0) 1.39	(0) 1.39
3849.758k		3		25968.32	$a\,^3G_3 - z\,^3F_3$	Unaffected	(0) 1.94b
3847.323	50?	100+I		25984.76	$a\,^1P_1 - z\,^1S_0$		
3831.017		6		26095.35	$a\,^3F_4 - z\,^5G_5$	(0) 1.07	(0) 1.04b
3829.655		5		26104.63	$a\,^3F_3 - z\,^5G_4$		
3829.53f		4		26105.49	$a\,^3F_2 - z\,^5G_3$	(0) 0?, 1.21	(0) 1.21b
3826.968		30		26122.96	$b\,^3D_2 - z\,^3P_2$	(0.48) 1.40nw_2 C	(0.41) 1.36b
3815.38	2	200		26202.30	$a\,^1H_5 - z\,^1H_5$	(0) 0.98	(0.37) 1.00b
3813.12		3		26217.83	$b\,^3D_1 - z\,^3P_2$		
3806.22		2		26265.36			
3804.38		2		26278.06			
3796.48	?	10+I?		26332.74	$a\,^1H_5 - z\,^1G_4$		
3794.366	1	50		26347.40	$c\,^3P_2 - z\,^3P_1$	(0) 1.24	(0) 1.28s
3787.235	3	150		26397.02	$c\,^3P_2 - z\,^3P_2$	(0.27) 1.47	(0.22) 1.42b
3778.357	2	100	V E	26459.04	$b\,^3F_3 - z\,^3F_2$	(0, 0.41, 0.84)−, 0.62, 1.06, 1.46, **1.90**	(**0**, 0.41, 0.82) 0.24, 0.65, 1.06, 1.47, **1.88**
3774.678		15		26484.83	$b\,^3D_2 - y\,^5D_3$	(0.48) ? nw_1 C?	(0.40) 1.36b
3773.80		5		26490.99	$b\,^3D_2 - y\,^5D_1$		
3772.962	1	80		26496.87	$c\,^3P_1 - z\,^3P_0$	(0) 1.33	(0) 1.35
3770.974	10	400	V E	26510.83	$b\,^3F_2 - z\,^3F_2$	(0) 0.62	(0.11) 0.62b
3767.720		40		26533.74	$c\,^3P_0 - z\,^3P_1$	(0) 1.47	(0) 1.44b
3761.20		1		26579.73	$b\,^3D_1 - y\,^5D_2$		
3760.24b	3	140		26586.52	$b\,^3F_4 - z\,^3F_3$	(0) 1.53	(0) 1.44b
3758.22	?	40+I		26600.81	$c\,^3P_1 - z\,^3P_1$	(?) 1.41 pw_1	(0.09) 1.40b
3751.222	2	150		26650.43	$c\,^3P_1 - z\,^3P_2$	(0) 1.49	(0) 1.54b
3750.88	8	600	V E	26652.86	$b\,^3F_3 - z\,^3F_3$	(0) 1.03	(0.10) 1.04b
3745.806	10	800	V E	26688.96	$a\,^3H_4 - z\,^3G_3$	(0) 0.84	(0) 0.82b
3743.610	2	40		26704.62	$b\,^3F_2 - z\,^3F_3$	(**0**, 0.39, 0.81) 0.20, 0.62, 1.01, 1.40, **1.80**	(**0**, 0.43, 0.86) 0.16, 0.59, 1.02, 1.45, **1.94**
3736.017	1	70		26758.89	$c\,^3P_2 - y\,^5D_2$	(0.26) 1.32	(0.11, **0.22**) 1.25, **1.36, 1.47,** 1.58
3735.158	1	30		26765.05	$c\,^3P_2 - y\,^5D_1$	(0) 1.30	(0) 1.29s
3733.607		4		26776.16	$b\,^3H_5 - z\,^3H_4$		
3732.760	10	800 l	V E	26782.23	$a\,^3H_5 - z\,^3G_4$	(0) 0.95	(0) 0.98s
3731.983		20		26787.82	$a\,^1S_0 - z\,^3P_1$		
3731.64		1		26790.28	$c\,^3P_1 - z\,^5P_2$		
3728.335	4	200	V E	26814.03	$b\,^3H_4 - z\,^3H_4$	(0) 0.77	(0.13) 0.80b
3727.351	15	1000 l	V E	26821.10	$b\,^3F_4 - z^3F_4$	(0) 1.18	(0.10) 1.20b
3724.984		2		26838.15	$c\,^3P_2 - y\,^5D_3$		
3722.16	?	Table+I		26858.51	$a\,^3H_4 - z\,^5F_2$		
3718.159	2	60	V E	26887.41	$b\,^3F_3 - z\,^3\;F_3$	(0)1.53pw_1D;nw_1B	(0) 1.46b
3715.476	20	1200 l	V E	26906.83	$a\,^3H_6 - z\,^3G_5$	(0) 1.03	(0) 1.47b
3712.533		8		26928.16	$a\,^1P_1 - y\,^3F_2$;	(0?) 0.44pw_1D	(0) 0.46b
3711.751		10		26933.83	$b\,^3H_6 - z\,^3H_5$	(0?) 1.51pw_1D; nw_1 B	(0) 1.46b
3711.118	1	50		26938.42	$c\,^3P_1 - y\,^5D_0$	(0)1.34	(0)1.35
3709.335		40		26951.37	$c\,^3P_0 - y\,^5D_1$	(0)1.39	(0)1.43
3705.41		5?		26979.92			
3703.832		7		26991.41	$a\,^3H_5 - z\,^3G_5$		
3700.96		30		27012.36	$c\,^3P_1 - y\,^5D_2$	(0)1.54	(0)1.53b
3700.337	2	200	V E	27016.90	$b\,^3H_5 - z\,^3H_5$	(0?)1.02	(0.00)1.01b
3700.126		40		27018.45	$c\,^3P_1 - y\,^5D_1$	(0)1.36	(0.08)1.39b
3697.72		1		27036.03	$c\,^3F_3 - y\,^1D_2$		
3695.158		8		27054.77	$\begin{cases} b\,^3H_4 - z\,^3H_3 \\ b\,^1D_2 - x\,^3F_2 \end{cases}$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
3690.70		1		27087.45	$a\ ^1F_3 - w\ ^3D_3^\circ$		
3674.691		30		27205.45	$a\ ^1S_0 - y\ ^5D_1^\circ$	(0)1.43	(0)1.43
3669.410[b]	3	300	V E	27244.61	$b\ ^3H_6 - z\ ^3H_6^\circ$	(0)1.11	(0.05)1.14b
3661.383[b]	2	200		27304.33	$a\ ^1F_3 - y\ ^1G_4^\circ$	(0)0.96	(0)1.04b
3658.266		10		27327.60	$b\ ^3H_5 - z\ ^3H_6^\circ$	(0?)1.51 pw₃ D; nw₂ A	(0)1.43b
3646.848		7		27413.16	$b\ ^1D_2 - x\ ^3D_1^\circ$	(0)1.21 pw₁; nw₁ B?	(0)1.17b
3645.905		30		27420.25	$b\ ^3P_1 - z\ ^3P_0^\circ$	(0)1.39	(0)1.40
3634.13		1		27509.09	$b\ ^1D_2 - z^3\ D_2^\circ$		
3632.126		15		27524.27	$b\ ^3P_1 - z\ ^3P_1^\circ$	(0)1.41	(0.04)1.42b
3631.482		10		27529.15	$b\ ^3P_0 - z\ ^3P_1^\circ$	(0)1.38 pw₂ D; nw₃ A	(0)1.44
3627.713	1	60		27557.75	$b\ ^3P_2 - z\ ^3P_1^\circ$	(0)1.37	(0)1.35b
3626.64		1		27565.90			
3625.608	1	50		27573.75	$b\ ^3P_1 - z\ ^3P_2^\circ$	(0)1.45	(0)1.52b
3623.03		1		27593.37	$b\ ^3P_0 - z\ ^5P_1^\circ$		
3622.289		10		27599.01	$a\ ^1D_2 - y\ ^3G_3^\circ$		
3621.203	2	150	V E	27607.29	$b\ ^3P_2 - z\ ^3P_2^\circ$	(0)1.41	(0.18)1.43b
3620.496		20		27612.68	$b\ ^1D_2 - z\ ^1P_1^\circ$	(0)1.01	(0)1.02b
3618.924[b]	2	200		27624.68	$a\ ^1P_1 - z\ ^1D_2^\circ$	(0)0.92	(0)0.91b
3611.58		10h		27680.85		(0)1.31	
3608.32		1		27705.85	$c\ ^1G_4 - w\ ^3G_4^\circ$		
3607.30		1		27713.69	$b\ ^3P_1 - z\ ^5P_2^\circ$		
3604.375		4		27736.18	$b\ ^3D_1 - z\ ^1S_0^\circ$	(0)0.59	(0)0.58
3602.94		3h		27747.22		(?) 1.22nw₁ A	
3598.72		3		27779.76			
3597.41		3		27789.88			
3593.323[b]	15	600	V E	27821.48	$a\ ^3F_4 - z\ ^5F_3^\circ$	(0?) 1.14	(0) 1.16s
3592.012[b]	20	800	V E	27831.64	$a\ ^3F_3 - z\ ^5F_2^\circ$	(0) 1.01	(0) 1.00b
3589.745[b]	25	1000	V E	27849.21	$a\ ^3F_2 - z\ ^5F_1^\circ$	(0?) 0.79	(0) 0.80b
3588.13		15		27861.75	$b\ ^3P_1 - y\ ^5D_0^\circ$	(0) 1.40	(0) 1.40
3578.636		15		27935.66	$b\ ^3P_1 - y\ ^5D_2^\circ$		
3577.857[d]	7	20+I?		27941.74	$b\ ^3P_1 - y\ ^5D_1^\circ$	(?) 1.28pw₁ D	(0.03) 1.42b
3577.644		3		27943.41	$b\ ^1G_4 - z\ ^3H_4^\circ$		
3577.220		10		27946.72	$b\ ^3P_0 - y\ ^5D_1^\circ$	(0) 1.45	(0) 1.43
3574.340	1	60		27969.24	$b\ ^3P_2 - y\ ^5D_2^\circ$	(0) 1.41	(0.16) 1.42b
3573.557		50		27975.36	$b\ ^3P_2 - y\ ^5D_1^\circ$	(0) 1.34	(0) 1.33s
3566.177	10	200		28033.26	$a\ ^3F_2 - z\ ^5F_2^\circ$	(0.38, 0.87) 0.26, 0.61, 1.04, 1.49	(0.43, **0.86**) 0.22, **0.65, 1.08**, 1.51
3563.71		3h		28052.66	$a\ ^3F_4 - z\ ^5F_4^\circ$		
3560.594	4	90		28077.21	$a\ ^3F_3 - z\ ^5F_2^\circ$	(0.50) 1.08nw₂ C	(0.20, 0.40, **0.60**) 0.64, 0.84, **1.04**, 1.24, 1.44, 1.64
3556.800	40	1500	V E	28107.16	$a\ ^3F_4 - z\ ^3D_3^\circ$	(0) 1.09	(0) 1.07b
3550.51		3		28156.95			
3549.030[c]		3		28168.70	$c\ ^3P_1 - z\ ^1S_0^\circ$	(0) 0.95?	(0) 1.35
3547.07		5		28184.26	$b\ ^1G_4 - z\ ^3H_5^\circ$		
3545.190[g]	30	1000	V E	28199.20	$a\ ^3F_3 - z\ ^3D_2^\circ$	(0) 0.97	(0) 0.96s
3542.480		4		28220.78	$a\ ^1D_2 - y\ ^3F_2^\circ$		
3541.341		50		28229.85	$a\ ^1D_2 - y\ ^3F_3^\circ$	(0)0.98	(0)0.96b
3538.238	3	50		28254.61	$a\ ^3F_4 - z\ ^5F_3^\circ$	(?)1.75pw₁ D; nw₁ C	(0) 1.76b
3534.14		2		28287.37	$a\ ^3P_2 - z\ ^3F_3^\circ$		
3532.285		20		28302.23	$a\ ^1F_3 - y\ ^1F_3^\circ$	(0.20)0.92	(0.08) 0.96b
3531.48		10		28308.68	$a\ ^3F_3 - z\ ^4F_3^\circ$		
3530.765	20	500	V E	28314.41	$a\ ^3F_2 - z\ ^3D_1^\circ$	(0, 0.47) 0.21, 0.62, **1.11**	(**0**, 0.41) 0.24, 0.65, **1.06**

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air} A$	Arc	Spark				Observed	Computed
3530.45		10		28316.94	$a\,^3D_1 - z\,^3P^\circ_0$	(0)0.52	(0) 0.49
3527.867		10		28337.67	$b\,^3H_4 - y\,^3G^\circ_3$		
3524.713	10	200	VE	28363.02	$a\,^3F_2 - z\,^3D^\circ_3$	2p; nw 3	
3521.836	2	90	VE	28386.19	$a\,^3D_3 - z\,^3P^\circ_2$	(0)1.04pw₁ D; nw₁ A	(0) 1.12b
3520.547	1	15		28396.58	$a\,^3D_2 - z\,^3P^\circ_1$	(?)0.74pw₂ D; nw₂ A	(0) 0.82s
3520.022	5	120	VE	28400.98	$a\,^3F_2 - z\,^3D^\circ_2$	(0.27, **0.90**) 0.19, 0.60, 1.06, **1.52**	(0.43, **0.86**) 0.22, **0.65, 1.08**, 1.51
3517.298	40	800	VE	28422.82	$a\,^3F_4 - z\,^5D^\circ_3$	pw₃ D?; nw₃ A?	
3516.00		5		28433.31	$a\,^3F_4 - z\,^5D^\circ_4$		
3514.422		20		28446.08	$a\,^3D_2 - z\,^3P^\circ_2$	(0.66) 1.43 nw₃ C	(0.63) 1.30b
3513.877		15		28450.49	$b\,^3H_5 - y\,^3G^\circ_4$	(0) 0.93	(0) 0.97s
3512.13		3		28464.64	$a\,^1F_3 - x\,^3G^\circ_4$	(0) 1.09	(0) 1.10b
3511.42		3		28470.39	$a\,^3D_1 - z\,^3P^\circ_2$		
3509.684		2		28484.48			
3509.024	1	40		28489.83	$b\,^3H_6 - y\,^3G^\circ_5$	(0) 1.06	(0) 0.94b
3507.534	1	20		28501.94	$a\,^1P_1 - y\,^3D^\circ_2$	(0) 1.17	(0) 1.18b
3506.57		7		28509.77	$a\,^1F_3 - x\,^3G^\circ_3$	(0.47)? nw₂ D	(0.39) 0.90b
3504.432	20	400		28527.16	$a\,^3F_3 - z\,^5D^\circ_2$	(?) **0.29**, 0.67, 1.02, 1.36, 1.72 pw₃	(**0**, 0.35, 0.70) **0.34**, 0.69, 1.04, 1.39, 1.74
3499.823	2	20		28564.73	$a\,^3F_2 - z\,^3D^\circ_3$	(**0**, 0.66, 1.31) 0, 0.65, 1.30, 1.95, **2.63**	(**0**, 0.67, 1.34)− 0.02, 0.65, 1.32, 1.99, **2.66**
3497.39		4		28584.60	$b\,^3D_2 - y\,^3F^\circ_2$		
3497.031	2	200		28587.54	$a\,^1D_2 - z\,^1F^\circ_3$	(0) 0.96	(0) 0.92b
3493.163	8	150		28619.19	$a\,^3F_2 - z\,^5D^\circ_1$	(0, 0.75) **0**, 0.68, 1.38	(**0**, 0.74)−**0.09**, 0.65, 1.39
3489.947	1	20		28645.56	$b\,^3D_3 - y\,^3F^\circ_4$	(0) 0.88pw₁ D; nw₁ C	(0) 0.94s
3485.916	10	250		28678.69	$a\,^3F_3 - z\,^5D^\circ_3$	(1.07) 1.31pw₃ B; nw₃ B	(1.11) 1.26b
3484.65		3		28689.11	$a\,^3F_3 - z\,^5D^\circ_4$		
3484.32		2		28691.82	$a\,^1H_5 - y\,^3H^\circ_4$		
3479.837	5	80		28728.78	$a\,^3F_2 - z\,^5D^\circ_2$	(0.72, **1.50**) 0, 0.65, **1.37**, 2.11	(0.74, **1.48**)−0.09, **0.65, 1.39**, 2.13
3478.961		6		28736.02	$b\,^1D_2 - w\,^3D^\circ_3$	(0) 1.75pw₂ D; nw₂ B	(0) 1.75b
3477.514	2	40		28747.97	$a\,^3D_3 - y\,^5D^\circ_2$	(0) 1.08	(0) 1.13b
3476.252	1	20		28758.41	$a\,^3D_1 - y\,^5D^\circ_0$	(0) 0.49	(0) 0.49
3470.263	1	20		28808.04	$a\,^3D_2 - y\,^5D^\circ_2$	(0.64) 1.30 nw₂ C	(0.61) 1.30b
3469.528	2	50		28814.14	$a\,^3D_2 - y\,^5D^\circ_1$	(?) 0.95nw₂ A	(0) 0.98b
3467.33		2		28832.41	$a\,^3D_1 - y\,^5D^\circ_2$		
3466.59	1	20		28838.56	$a\,^3D_1 - y\,^5D^\circ_1$	(0.96) 0.47, **1.45**	(0.94) **0.49, 1.43**
3465.25	1	4		28849.72	$a\,^1P_1 - y\,^3P^\circ_2$		
3464.17		6		28858.71	$c\,^3P_2 - y\,^3F^\circ_2$	(1.35) ?nw₂ D	(1.31) 1.00b
3463.831		4		28861.53	$a\,^1H_5 - y\,^3H^\circ_6$		
3463.079		4		28867.80	$c\,^3P_2 - y\,^3F^\circ_3$		
3461.580		5		28880.30	$a\,^3F_2 - z\,^5D^\circ_3$		
3457.153	3	300		28917.28	$a\,^1D_2 - z\,^1D^\circ_2$	(0) 0.96 (0) 1.05	(0.16) 0.98b
3453.78		1		28945.52	$b\,^3D_3 - z\,^1F^\circ_3$		
3453.087	1	90		28951.33	$b\,^3D_2 - z\,^1F^\circ_3$	(0?) 0.71pw₂ D; nw₂ A	(0) 0.69b
3451.046		12		28968.45	$b\,^3H_4 - y\,^3F^\circ_3$		
3448.69		1		28988.24	$b\,^3H_5 - y\,^3F^\circ_4$		
3438.232		2		29076.40			
3436.393		2		29091.97	$b\,^3P_1 - z\,^1S^\circ_0$	(0) 1.41	(0) 1.40
3435.38		7		29100.55	$b\,^3D_3 - z\,^1G^\circ_4$		
3424.46		1		29108.34	$b\,^3D_3 - z\,^5S^\circ_2$		
3434.024 h		4		29112.04	$c\,^3P_1 - y\,^3F^\circ_2$	(0.12) —?	(0) 0.27b
3433.767		3		29114.22	$b\,^3D_2 - z\,^5S^\circ_2$		
3422.259		3h		29212.12		(0) 1.48	

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
3420.709		5		29225.35	$c\,^3P_2-z\,^1F_3^\circ$		
3420.15		2		29230.13	$b\,^3H_6-z\,^1H_5^\circ$		
3415.91		2		29266.41	$a\,^1H_5-x\,^3F_4^\circ$		
3414.879		3		29275.25	$b\,^3D_3-z\,^1D_2^\circ$		
3414.192	6	10+I		29281.14	$b\,^3D_2-z\,^1D_2^\circ$		
3410.46		1		29313.18	$b\,^3H_5-z\,^1H_5^\circ$		
3408.955		15		29326.12	$b\,^3H_4-z\,^1F_3^\circ$		
3406.06		7		29351.04	$b\,^3H_4-z\,^1H_3^\circ$	(0) 1.07	(0) 1.21b
3404.43		80l		29365.10	$c\,^1G_4-x\,^1G_4^\circ$	(0) 0.96	(0.07) 0.95b
3403.159		3		29376.06	$b\,^3D_1-z\,^1D_2^\circ$		
3401.997		2		29386.10	$a\,^1G_4-z\,^3H_5^\circ$	(0) 1.02	(0) 1.13b
3401.740		1		29388.32	$c\,^3P_2-z\,^5S_2^\circ$		
3394.92		1		29447.35	$b\,^3P_2-y\,^3G_3^\circ$		
3392.659	1	50		29466.97	$b\,^1G_4-y\,^3G_3^\circ$	(?) 1.41pw₂ B; nw₂ B	(0) 1.44b
3391.01		1		29481.31	$b\,^3H_4-z\,^1G_4^\circ$		
3385.790		3		29526.76	$b\,^1D_2-x\,^3P_1^\circ$		
3382.529	1	30		29555.22	$c\,^3P_2-z\,^1D_2^\circ$	(0.78) 1.13nw₂ C	(0.77) 1.15b
3372.666		3		29641.65	$c\,^3P_1-z\,^5S_2^\circ$		
3370.40		2		29661.58	$a\,^1I_6-y\,^3G_5^\circ$		
3367.666		3		29685.66	$a\,^1H_5-z\,^3I_6^\circ$		
3364.692		1		29711.90			
3361.506	2	60		29740.06	$b\,^1G_4-y\,^3G_5^\circ$	(?) 1.83pw₂ D; nw₂ B	(0) 1.70b
3359.50		2		29757.81	$a\,^1D_2-y\,^3P_1^\circ$		
3355.366	1	20		29794.47	$a\,^1D_2-y\,^3D_2^\circ$	(0.25) 1.07nw₁ ?	(0.16) 1.06b
3353.776	2	30		29808.60	$c\,^3P_1-z\,^1D_2^\circ$	(**0**, 0.37) nw₂ A	(**0**, 0.42) **0.51,** 0.93, 1.35
3351.53		1		29828.58	$b\,^1F_3-w\,^3G_3^\circ$		
3348.372		4		29856.71	$b\,^3D_2-y\,^3D_1^\circ$	(0, 0.85)	(**0**, 0.76) 0.49, 1.25, **2.01**
3345.899		70		29878.77	$c\,^1G_4-x\,^1F_3^\circ$	(0) 0.96	(0) 0.98b
3343.312		2		29901.79	$b\,^1F_3-w\,^3G_4^\circ$	(0) 1.11	(0) 1.08s
3337.845ᵇ	2	200		29950.87	$b\,^1D_2-y\,^1F_3^\circ$	(0) 0.86	(0) 0.84s
3335.482		10		29972.08	$a\,^1P_1-x\,^3F_2^\circ$	(?) 0.49pw₂; nw₂	(0) 0.54b
3333.608		2		29988.93	$a\,^3D_1-z\,^1S_0^\circ$		
3323.731		3		30078.05	$b\,^3P_2-y\,^3F_3^\circ$		
3321.539	3	150		30097.90	$b\,^1G_4-y\,^3F_3^\circ$	(0) 1.02	(0) 0.96b
3320.780		4		30104.78	$a\,^1D_2-y\,^3D_3^\circ$	(?) 1.75pw₃ D; nw₂ B	(0) 1.77s
3318.907		20		30121.76	$b\,^3D_2-y\,^3P_1^\circ$	(0) 1.08	(0) 1.11s
3317.912	1	20		30130.80	$c\,^3P_2-y\,^3D_1^\circ$	(**0**, 0.83) 0.49, 1.35, **2.18**	(**0**, 0.87) 0.49, 1.36, **2.23**
3317.295		2		30136.40	$a\,^3F_4-z\,^3G_3^\circ$		
3316.873		20		30140.24	$b\,^3D_1-y\,^3P_0^\circ$	(0) 0.59	(0) 0.58
3315.53ⁱ		5		30152.44	$b\,^3D_3-y\,^3D_2^\circ$	(0) 0.68	(0) 1.41b
3315.176ⁱ	2	50		30155.66	$b\,^1G_4-y\,^3F_4^\circ$	(0.67) 1.07nw₂	(0.67) 1.08b
3314.862ⁱ	1	50		30158.52	$b\,^3D_2-y\,^3D_2^\circ$	(?) 0.77pw₂; nw₂	(0.25) 1.18b
3308.480	1	20		30216.69	$b\,^3D_1-y\,^3P_1^\circ$	(0.86) 0.56, 1.43	(0.81) **0.58, 1.39**
3307.445		2		30226.15	$a\,^3D_3-y\,^3G_3^\circ$		
3304.474	1	40		30253.32	$b\,^3D_1-y\,^3D_2^\circ$	(**0**, 0.56) 0.56, 1.10, **1.68**	(**0**, 0.53) 0.58, 1.11, **1.64**
3301.66		10		30279.11		(0) 0.96	
3300.905		6		30286.03	$a\,^3D_2-y\,^3G_3^\circ$		
3298.738	5	130		30305.93	$a\,^3F_4-z\,^3G_4^\circ$	(0.66) 1.12	(0.63) 1.12b
3297.528		20		30317.05	$c\,^3P_0-y\,^3D_1^\circ$	(0) 0.46pw₁ D	(0) 0.49
3296.052		8		30330.62	$a\,^1P_1-x\,^3D_1^\circ$	(0.32) 0.77nw₁ ?	(0.34) 0.80b
3293.146		50		30357.39	$b\,^1F_3-x\,^1D_2^\circ$	(0) 0.97	(0) 0.97b
3291.04		5		30376.81	$a\,^3D_3-y\,^3G_4^\circ$		
3290.240	2	50		30384.20	$c\,^3P_1-y\,^3D_1^\circ$	(0.83) 0.51, **1.38**	(0.86) **0.49, 1.35**
3289.391	6	100		30392.04	$a\,^3F_3-z\,^3G_3^\circ$	(0.87) 1.06nw₃ B	(0.20, 0.40, **0.60**) 0.44, 0.64, **0.84,** **1.04,** 1.24, 1.44
3288.985		7		30395.79	$c\,^3P_2-y\,^3P_1^\circ$	(0) 1.37	(0) 1.34b

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
$\lambda_{air}A$	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
3288.324	1	20		30401.90	$a\ ^1I_6 - z\ ^1H_5^o$	(0) 1.00	(0) 1.01s
3287.08		6Hl		30413.41		(0) 0.59	
3285.672		3		30426.44	$a\ ^1P_1 - x\ ^3D_2^o$	(0) 1.16	(0) 1.16b
3285.022 ᵇ	2	50		30432.46	$c\ ^3P_2 - y\ ^3D_2^o$	(0.45) 1.24	(0.45) 1.24b
3282.534	5	150		30455.53	$b\ ^1G_4 - z\ ^1F_3^o$	(0) 0.93	(0) 1.00b
3281.755	1	10		30462.76	$b\ ^3D_3 - y\ ^3D_3^o$	(0) 1.26	(0.03) 1.26b
3281.120	2	40		30468.65	$b\ ^3D_2 - y\ ^3D_3^o$	(0) 1.32	(0) 1.31s
3279.844 ᵇ	8	300		30480.50	$b\ ^1G_4 - z\ ^1H_5^o$	(0) 1.00	(0) 0.89b
3277.71	2	30		30500.35	$b\ ^3D_3 - y\ ^3P_2^o$		
3277.448	1	15		30502.78	$a\ ^1F_3 - y\ ^1D_2^o$	(0) 0.91	(0) 0.96b
3277.082	1	10		30506.19	$b\ ^3D_2 - y\ ^3P_2^o$	(0.43) 1.43nw_1 ?	(0.47) 1.38b
3276.12	50	1500R		30515.15	$a\ ^3F_4 - z\ ^3G_3^o$	(0?) 1.08pw_3 D?; nw_2 A?	(0) 1.07s
3274.50	1–	10		30530.24	$a\ ^1P_1 - z\ ^1P_1^o$		
3271.124	40	1200R		30561.75	$a\ ^3F_3 - z\ ^3G_4^o$	(0?) 1.00pw_3 D?; nw_3 A?	(0) 1.00s
3270.115		10		30571.18	$a\ ^1S_0 - y\ ^3D_1^o$	(0) 0.53	(0) 0.49
3268.94		2		30582.17		(0) 1.21nw_1 ?	
3267.709	30	1000R		30593.69	$a\ ^3F_2 - z\ ^3G_3^o$	(0?) 1.24pw_3 D?; nw_3 A?	(0) 1.22s
3266.91		1?		30601.17	$b\ ^3D_1 - y\ ^3P_2^o$		
3265.893	5	100		30610.70	$b\ ^1G_4 - z\ ^1G_4^o$	(0) 1.00	(0.07) 0.97b
3263.33	?	20		30634.74	$b\ ^3G_4 - z\ ^3H_4^o$		
3261.80		5		30649.11	$c\ ^3P_1 - y\ ^3P_1^o$		
3259.684		3		30669.01	$a\ ^1G_4 - y\ ^3G_3^o$		
3257.893	2	100		30685.87	$c\ ^3P_1 - y\ ^3D_2^o$	(0) 1.02	(0) 0.99b
3254.773 ᵇ	8	300		30715.28	$b\ ^3G_3 - z\ ^3H_4^o$	(0) 0.90pw_2D;nw_2A	(0) 0.84s
3251.869	4	200		30742.71	$c\ ^3P_2 - y\ ^3D_3^o$	(0) 1.20	(0) 1.18b
3250.775	4	200		30753.06	$a\ ^1H_5 - y\ ^1G_4^o$	(0) 1.00	(0) 1.12b
3249.617	?	40+I?		30764.01	$b^3G_5 - z^3H_5^o$	(0.61) 1.11nw_2 C	(0.61) 1.08b
3249.464		4		30765.46	$b\ ^3P_2 - z\ ^1D_2^o$		
3247.908		4		30780.20	$c\ ^3P_2 - y^3P_2^o$		
3240.785		1		30847.85	$a^3D_3 - y\ ^3F_2^o$		
3239.833		8		30856.91	$a^3D_3 - y^3F_2^o$	(0.76) 1.02nw nw_3 C	(0.80) 1.15b
3237.876 ᵇ	10	350	V E	30875.56	$b\ ^3G_4 - z\ ^3H_5^o$	(0) 1.00	(0) 0.97b
3234.504		10		30907.74	$a\ ^3D_2 - y\ ^3F_2^o$	(0.96) ?nw_3 B?	(0.90) 0.88b
3233.772	3	80	V E	30914.75	$a\ ^3D_3 - y\ ^3F_3^o$	(0) 0.94pw_1; nw_1	(0) 0.82s
3233.546	1	40	V E	30916.91	$a^3D_2 - y^3F_3^o$	(0) 0.83	(0) 0.85b
3231.952	2	80	V E	30932.15	$a\ ^3D_1 - y\ ^3F_2^o$	(0) 0.81	(0) 0.77s
3230.919		4		30942.04	$a\ ^1G_4 - y\ ^3G_3^o$	(?) 1.79pw_2 D;nw_2C	(0) 1.76b
3233.546	1	40	V E	30916.91	$a^3D_2 - y^3F_3^o$	(0) 0.83	(0) 0.85b
3231.952	2	80	V E	30932.15	$a\ ^3D_1 - y\ ^3F_2^o$	(0) 0.81	(0) 0.77s
3230.919		4		30942.04	$a\ ^1G_4 - y\ ^3G_3^o$	(?) 1.79pw_2 D;nw_2C	(0) 1.76b
3226.924	1	40		30980.35	$b\ ^1D_2 - y\ ^1P_1^o$	(0) 0.93	(0) 0.93s
3221.380		2		31033.66	$c\ ^3P_1 - y\ ^3P_2^o$	(0) 1.50	(0) 1.59b
3217.121 ᵇ	15	400		31074.75	$b\ ^3G_5 - z\ ^3H_6^o$	(0) 1.08	(0) 1.06b
3214.750	6	120	V E	31097.66	$a\ ^3F_4 - z\ ^3F_3^o$	(0?) 1.46	(0) 1.52b
3208.345	6	100	V E	31159.74	$a\ ^3F_3 - z\ ^3F_2^o$	(?)1.81pw_3 D;nw_2 B	(0) 1.82s
3206.16		15Hl		31180.98			
3202.711		2		31214.55	$a\ ^3D_3 - z\ ^1F_3^o$		
3201.58		15Hl		21225.58		(0) 0.93	
3197.574		7		31264.70	$a\ ^1D_2 - x\ ^3F_2^o$	(0.60) ?nw_1 C	(0.61) 0.85b
3196.574	1	20		31274.48	$a\ ^3D_2 - z\ ^1F_3^o$	(0) 0.83	(0) 0.81b
3195.50		15Hl		31284.99		(0) 1.02	
3193.97	?	10?+I		31299.98	$a\ ^1G_4 - y\ ^3F_3^o$		
3193.200	1	20		31307.53	$b\ ^3P_1 - y\ ^3D_1^o$	(0.89) **0.47**, 1.42	(0.91) **0.49, 1.40**
3192.699	1	15		31312.44	$a\ ^3P_0 - y\ ^3D_1^o$	(0) 0.54	(0) 0.49
3190.686 ᵇ	30	500R	V E	31332.19	$a\ ^3F_4 - z\ ^3F_4^o$	(0) 1.22	(0.00) 1.22b
3189.76		3		31341.29	$b\ ^3P_2 - y\ ^1D_1^o$	(0.98) 1.38, **2.39**	(**0**, 0.89) 0.49, 1.38, **2.27**
3188.522	20	300R	V E	31353.46	$a\ ^3F_3 - z\ ^3F_2^o$	(0) 1.01	(0.05) 1.03b
3188.10	3	30		31357.61	$a\ ^1G_4 - y\ ^3F_3^o$	(0.67) ?nw_1	(0.77) 1.06b

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
3187.717	15	200R	V E	31361.38	$a\ ^3F_2-z\ ^3F_2^\circ$		
3186.86		10		31369.81	$a\ ^3D_3-z\ ^1G_3^\circ$		
3186.10		1		31377.29	$a\ ^3D_3-z\ ^5S_2^\circ$		
3182.674		20		31411.07	$a\ ^1D_2-x\ ^3F_3^\circ$		
3182.59		20		31411.89	$d\ ^3F_2-w\ ^3F_2^\circ$		
3179.416		8		31443.25	$d\ ^3F_3-w^3F_2^\circ$	(?)1.98pw₃ D	(0)1.99s
3177.696		6		31460.27	$d\ ^3F_2-w^3F_3^\circ$	(0?) 1.70pw₂ D; nw₂	(0) 1.66s
3174.531	1	60		31491.63	$d\ ^3F_3-w^3F_3^\circ$	(0) 1.00	(0.13) 1.02b
3174.077	2	30		31496.14	$b\ ^3P_1-y^3P_0^\circ$	(0) 1.41	(0) 1.40
3172.230		7		31514.48	$c\ ^3D_1-t^3D_1^\circ$	(0) 0.50	(0) 0.50:b
3171.739		9		31519.35	$d\ ^3F_4-w\ ^3F_3^\circ$	(0?) 1.51pw₁ D; nw₁B?	(0) 1.58b
3170.208		8		31534.58	$d^3F_3-w\ ^3F_2^\circ$?		
3169.21		2		31544.51	$a\ ^3D_3-z\ ^1D_2^\circ$?		
3168.127	4	40	V E	31555.29	$a\ ^3F_2-z\ ^3F_3^\circ$	(?) 1.83pw₃D; nw₃ B	(0) 1.76s
3167.49	1	30		31561.64	$b^1\ F_3-x\ ^1G_4^\circ$		
3167.420	1	40		31562.33	$d\ ^3F_4-w\ ^3F_4^\circ$	(0.42) 1.30	(0.43) 1.30b
3166.39		8		31572.60	$b\ ^3P_1-y\ ^4P_1^\circ$		
3165.89	1	30		31577.60	$b\ ^3P_0-y\ ^3P_1^\circ$	(0) 1.44	(0) 1.39
3164.82	4	40	V E	31588.26	$a\ ^3F_3-z\ ^3F_4^\circ$	(0?) 1.50pw₂D; nw₁B	(0) 1.49b
3163.76		10		31598.84	$c\ ^3D_2-t\ ^3D_3^\circ$	(0) 1.14	(0) 1.14:b
3163.024	2	30	V E	31606.20	$b\ ^3P_2-y\ ^3P_1^\circ$	(0) 1.41	(0) 1.38b
3162.714	2	30	V E	31609.29	$b\ ^3P_1-y\ ^3D_2^\circ$	(0.35) 0.77	(**0**, 0.29) **0.82**, 1.11, 1.40
3162.367		10		31612.76			
3161.313	1	30		31623.30	$a\ ^1D_2-x\ ^3D_1^\circ$	(0?) 1.29pw₁D; nw₁ B	(0) 1.22b
3160.781		15		31628.62	{ $b^3D_2-x\ ^3F_2^\circ$ / $a\ ^3D_1-z\ ^1D_2^\circ$ }	(**1.09** ...)?nw₃D	(9.57, **1.14**) 0.11, **0.68, 1.25,** 1.82 (**0**, 0.44) 0.49, 0.93, **1.37**
3159.365	1	20		31642.80	$b\ ^3P_2-y\ ^3D_2^\circ$	(?) 1.25, 2p; nw₂C	(0.49) 1.25b
3157.900	2	40		31657.48	$a\ ^1G^1-z\ ^1F_3^\circ$	(0) 0.91	(0) 0.92b
3157.70		3 H		31659.48			
3155.409	2	60	V E	31682.47	$a^1G_4-z\ ^1H_5^\circ$	(0) 0.98	(0) 0.95s
3154.80		1		31688.58	$c\ ^3D_2-t^3D\ _3^\circ$		
3151.319	2	100	V E	31723.59	$b\ ^3D_1-x\ ^3F_2^\circ$	(0) 0.72	(0) 0.73b
3148.738		15		31749.59	$c\ ^3D_3-t\ ^3D_3^\circ$	(0) 1.27	(0) 1.27:b
3146.818		10		31768.96	$b\ ^3D_3-x\ ^3F_3^\circ$	(0.56) 1.17nw₂	(0.49) 1.16b
3146.226	2	40 l		31774.94	$b\ ^3D_2-x\ ^3F_3^\circ$	(0) 0.95	(0) 0.89b
3145.971	3	20	V E	31777.51	$a\ ^5F_4-z\ ^5G_3^\circ$		
3145.337	6	30	IV E	31783.92	{ $a\ ^5F_5-z\ ^5G_4^\circ$ / $a\ ^5F_3-z\ ^5G_2^\circ$ }	{(**0**, 0.91, 1.79) 0.35, 1.17, 2.03, **2.94**	(**0**, 0.14, 0.28, 0.42, 0.56) 0.72, 0.86, 1.00, 1.14, 1.28, 1.42, 1.56, 1.70, **1.84** (**0.** 0.89, 1.78)– 0.58, 0.31, 1.20, 2.09 **2.98**
3144.700		20		31790.36	$b\ ^3H_6-y\ ^3H_5^\circ$	(?) 1.55pw₂D; nw₂C	(0) 1.54b
3143.477		15		31802.72	$b\ ^3H_5-y\ ^3H_4^\circ$	(?) 1.66pw₃ D?; nw₂ B	(0) 1.63b
3142.484	6	150	V E	31812.78	$a\ ^1G_4-z\ ^1G_4^\circ$	(0) 0.96	(0.03) 0.96b
3142.183	1	20		31815.82	$a\ ^1H_5-x\ ^3G_5^\circ$	(0.68) 1.25nw₂ C	(0.11, 0.22, 0.33, 0.44, 0.55) 0.60, 0.71, 0.82, 0.93, **1.04, 1.15,** 1.26, 1.37, 1.48, 1.59
3141.486	1	40	V E	31822.88	$a\ ^1D_2-z\ ^1P_1^\circ$	(0) 1.05	(0) 1.07b
3141.07		2		31827.09	$c\ ^3F_3-w\ ^3F_3^\circ$	(0) 1.02	(0.15) 1.03b
3139.733	4	160	V E	31840.65	$b\ ^3H_4-y\ ^3H_3^\circ$	(0) 0.77	(0.40) 0.76b
3138.05		20		31857.72	$c\ ^3F_4-w\ ^3F_4^\circ$		
3136.503	4	160		31873.43	$b\ ^3H_5-y\ ^3H_5^\circ$	(0) 0.99	(0.12) 1.00b

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
$\lambda_{air}A$	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
3134.928	5	200		31889.45	$b\,^3H_6-y\,^3H_5^o$	(0) 1.09	(0.48) 1.09b
3133.329	15	150r	III E	31905.72	$a\,^5F_2-z\,^5G_2^o$	(0.52, **1.39**) 0.32, 0.94, **1.62**	(0.66, **1.32**)−0.35, **0.31, 0.97**, 1.63
3132.793		3		31911.18	$b\,^3H_4-y\,^3H_5^o$		
3130.262	10	100R	III Er	31936.98	$a\,^5F_3-z\,^5G_3^o$	(?) 1.08*pw₃* D?; *nw₃* A?	(0.69) 1.07b
3128.686	1	20		31953.07	$b\,^3P_2-y\,^3D_3^o$	(0) 1.14	(0) 1.16b
3128.288	1	10		31957.13	$b\,^3P_1-y\,^3P_2^o$	(0) 1.53	(0) 1.56b
3126.79		2		31972.44	$b\,^3H_5-y\,^3H_6^o$		
3126.215	15	150R	III Er	31978.32	$a\,^5F_4-z\,^5G_4^o$	(0.69) 1.19*pw₃* D?; *nw₃* A?	(0.16, 0.32, 0.48, **0.64,**) 0.66, 0.82, 0.98, **1.14, 1.30,** 1.46, 1.62, 1.78
3125.282	30	600R	III Er	31987.87	$a\,^5F_1-z\,^5G_2^o$	pw 3D?; *nw₃* A?	
3125.01	2	20		31990.65	$b\,^3P_2-y\,^3P_2^o$	(0?) 1.45	(0.23) 1.44b
3122.887	3	100	V E	32012.40	$a\,^1H_5-z\,^1I_6^o$	(0) 0.93	(0) 0.93b
3121.138	10	80	IV E	32030.34	$a\,^5F_5-z\,^5G_6^o$	(0.62) 1.21*nw₂* C?	(0.60s) 1.22b
3120.726	3	50		32034.57	$b\,^3D_3-x\,^3F_2^o$	(0) 1.05	(0) 1.06b
3119.32		4		32049.00	$c\,^3P_2-x\,^3F_2^o$	(?) 0.75*pw₁* D; *nw₁* A	(0) 0.78b
3118.376	40	1000R	III Er	32058.71	$a\,^5F_2-z\,^5G_3^o$	(0?) 0.86	(0) 0.85s
3116.78		40		32075.12	$b\,^1F_3-x\,^1F_3^o$	(0) 0.97	(0.13) 0.97b
3116.11		2		32082.00	$b\,^3D_1-x\,^3D_1^o$		
3116.02		3		32082.95	$b\,^3D_2-x\,^3D_2^o$		
3115.16		2		32091.80	$c\,^3P_1-z\,^2S_1^o$		
3113.560	4	100	V E	32108.29	$a\,^1H_5-y\,^1H_5^o$	(0) 0.97	(0.04) 1.04b
3110.708	60	1500R	III Er	32137.73	$a\,^5F_3-z\,^5G_4^o$	(0.36) 0.83, **1.28**	(**0,** 0.06, 0.12, 0.18) **0.96,** 1.02, 1.08, 1.14, 1.20, 1.26, 1.32
3110.07		3?		32144.3	$b\,^3D_3-x\,^3D_3^o$	(0) 1.29	(0.02) 0.98b
3109.375	1	20		32151.51	$b\,^1D_2-y\,^1D_2^o$	(0) 0.96	
3108.704	2	30	V E	32158.45	$b\,^3G_4-y\,^3G_3^o$	(?) 1.70*pw₂* D; *nw₂* B	(**0,** 0.36, 0.72, 1.08) −0.05, 0.31, 0.67, 1.03, 1.39, 1.75, **2.11**
3106.829		3		32177.85	$b\,^3D_1-x\,^3D_2^o$	(?) 1.60*pw₂*	(0) 1.62s
3105.973		5		32186.72	$b\,^3D_2-z\,^1P_1^o$	(0?) 1.45*pw₂* D; *nw₁* B	(0) 1.42b
3105.39		5H		32192.76		(0) 1.21	
3104.906	2	25	V E	32197.78	$b\,^3G_5-y\,^3G_4^o$	(0) 1.34*nw*	(0) 1.44b
3102.295	80	2000R	III Er	32224.88	$a\,^5F_4-z\,^5G_5^o$	(?)0.65, 1.43	(**0,** 0.14, 0.28, 0.42, 0.56) **0.60,** 0.74, 0.88, 1.02, 1.16, 1.30, 1.44, 1.58, 1.72
3100.938	8	100	V E	32238.98	$b\,^3G_3-y\,^3G_2^o$	(0) 0.71	(0.23) 0.72b
3094.196	8	100	V E	32309.22	$b\,^3G_4-y\,^3G_3^o$	(0) 0.99	(0.03) 1.02b
3093.108ᵏ	100	2500R	III Er	32320.59	$a\,^5F_5-z\,^5G_6^o$	(0.50) **0.62,** 1.54, 2.44	
3089.633		4		32356.94	$c\,^3P_2-x\,^3D_2^o$	(0.45) 1.31 *nw₁*	(0.47) 1.23b
3086.507	2	30	V E	32389.71	$b\,^3G_3-y\,^3G_4^o$	(?) 1.77*pw₃* D; *nw₂* B	(0) 1.80s
3086.210	1−	10		32392.82	$a\,^3D_1-y\,^3P_0^o$	(0) 0.54	(0) 0.49
3085.47		1		32400.59	$a\,^3G_5-z\,^3H_4^o$		
3083.208	1	40	V E	32424.36	$c\,^3P_2-x\,^3D_3^o$	(0) 1.15	(0) 1.16b
3082.524	2	40	V E	32431.56	$b\,^3G_4-y\,^3G_5^o$	(0?) 1.55*pw₁* D; *nw₁* B	(0) 1.60b
3081.30	1−	10		32444.44	$a\,^1P_1-x\,^3P_1^o$		
3081.254	1	25	V E	32444.92	$a\,^3D_2-y\,^3P_1^o$	(0?) 1.02*pw₁* ?	(0) 1.00b
3081.01	1	20		32447.49	$c\,^3P_0-x\,^3D_1^o$	(0) 0.71	(0) 0.63
3079.75		1		32460.77	$c\,^3P_2-z\,^1P_1^o$		
3078.948		5		32469.23	$a\,^3D_1-y\,^3P_1^o$	(0.90) **0.46,1.37**	(0.90) **0.49,1.39**
3076.016ᵈ		25		32500.17	$a\,^3G_4-z\,^3H_4^o$	(0.85) 1.02*nw₂*	(0.22, 0.44, 0.66, **0.88**) 0.12, 0.34, 0.56, **0.78,1.00** 1.22, 1.44, 1.66
3075.58		5		32504.78	$d\,^3P_1-v\,^3D_2^o$	(0) 0.79	(0) 0.79b

See footnotes at end of table.

Table 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air} A	Arc	Spark				Observed	Computed
3075.474		2		32505.90	$a\ ^3D_1 - y\ ^3D_2^o$	(0) 0.46	(0) 0.46:
3075.043		3		32510.45	$d\ ^3P_0 - v\ ^3D_1^o$	(0.71) **0.59, 1.36**	(0.72) **0.63, 1.35**
3074.66		12		32514.50	$c\ ^3P_1 - x\ ^3D_1^o$		
3071.77		2h		32545.09	$c\ ^3D_3 - u\ ^3F_2^o$		
3070.12		25l		32562.58	$d\ ^3P_2 - v\ ^3D_3^o$	(0) 1.07nw_1	(0) 1.06b
3067.104	10	200	IV E	32594.60	$a\ ^3G_3 - z\ ^3H_4^o$	(0) 0.83	(0) 0.84b
3066.80		4		32597.83	$b\ ^3H_5 - z\ ^3I_6^o$		
3065.61	1	50		32610.49	$c\ ^3P_1 - x\ ^3D_2^o$	(0) 0.96	(0) 0.98b
3063.247	8	200	V E	32635.64	$b\ ^3H_4 - z\ ^3I_5^o$	(0) 0.87	(0) 0.88b
3062.702	2	20	V E	32641.45	$a\ ^3G_5 - z\ ^3H_6^o$	(0.67) 0.99nw_2 C	(0.65) 1.09b
3062.178		3		32647.03	$c\ ^3P_0 - z\ ^1P_1^o$	(0) 0.86	(0) 0.92
3057.08		2		32701.47	$a\ ^1S_0 - x\ ^3D_1^o$	(0) 0.61	(0) 0.63
3055.942		7		32713.65	$b\ ^3H_6 - z\ ^3I_6^o$	(0.76) 1.05nw_2 C	(0.78) 1.06b
3054.24		7h		32731.88	$a\ ^3D_3 - y\ ^3D_3^o$	(0) 1.22nw_1 A	(0.08) 1.28b
3053.894	3	80	V E	32735.59	$b\ ^3G_5 - y\ ^3F_4^o$	(0) 1.12	(0) 1.12b
3053.39	6	200	V E	32740.99	$a\ ^3G_4 - z\ ^3H_5^o$	(0) 0.93	(0) 1.01b
3051.308		3		32763.33	$d\ ^3P_2 - v\ ^3D_2^o$		
3050.735		15		32769.48	$a\ ^3D_2 - y\ ^3P_2^o$	(0) 1.13	(0) 1.09b
3048.891	3	70	V E	32789.30	$b\ ^3G_4 - y\ ^3F_3^o$	(0) 1.02	(0) 1.09b
3048.65		4		32791.89	$a\ ^3D_2 - y\ ^3D_3^o$		
3048.214	6	200	V E	32796.59	$b\ ^3H_5 - z\ ^3I_6^o$	(0) 0.96	(0) 0.90b
3043.54	?	40+I		32846.95	$b\ ^3G_4 - y\ ^3F_4^o$	(0.54) 1.14 pw_2 B; nw_2 C	(0.50) 1.11b
3042.27	3	80	IV E	32860.66	$b\ ^3G_3 - y\ ^3F_2^o$	(0) 0.77	(0) 0.89b
3041.42	2	60	V E	32869.84	$b\ ^3G_3 - y\ ^3F_3^o$	(?) 0.93, 2p; nw_2 C	(0.59) 0.88b
3039.767		2		32887.72	$a\ ^1D_2 - w\ ^3D_2^o$	(0) 1.13	(0.14) 1.06b
3038.520	1	30		32901.21	$a\ ^1S_0 - z\ ^1P_1^o$	(0) 0.87	(0) 0.92
3038.00		2H?		32906.84	$z\ ^3F_2^o - e\ ^5P_3$		
3036.07		2		32927.76	$b\ ^3G_3 - y\ ^3F_4^o$		
3035.14		3H		32937.85	$z\ ^3G_3^o - e\ ^5H_4$		
3034.41		4H		32945.78			
3033.821	8	300	V E	32952.17	$a\ ^3G_5 - z\ ^3H_4^o$	(0) 0.98	(0) 1.03b
3033.445	6	200	V E	32956.25	$b\ ^3H_6 - z\ ^3I_7^o$	(0) 1.02	(0) 1.02b
3032.187		3		32969.93	$b\ ^1G_4 - y\ ^3H_4^o$		
3029.56		7		32998.52	$a\ ^5P_3 - z\ ^3P_2^o$	(0) 1.72	(0) 1.76b
3028.042	1	50		33015.05	$b\ ^3P_1 - z\ ^3S_1^o$	(0.49) **1.35, 2.10**	(0.45) **1.40, 1.85**
3027.600	1–	15		33019.88	$b\ ^3P_0 - z\ ^3S_1^o$	(0) 1.85	(0) 1.85
3025.68		1		33040.83	$b\ ^1G_4 - y\ ^3H_5^o$		
3024.981	1	50		33048.46	$b\ ^3P_2 - z\ ^3S_1^o$	(?) **0.94**, 1.39, 1.89	(0, 0.47) **0.91**, 1.38, 1.85
3023.882	1	20		33060.47	$b\ ^3G_5 - z\ ^1H_5^o$	(0.82) 1.00nw_2	(0.86) 1.06b
3022.57	2	40		33074.82	$a\ ^5P_1 - z\ ^3P_0^o$	(0) 2.35	(0) 2.39
3022.146		4		33079.46	$b\ ^3P_1 - x\ ^3F_2^o$		
3020.65		6		33095.85	$a\ ^5P_2 - z\ ^3P_1^o$		
3020.25		7Hl		33100.23			
3019.09		3		33112.95	$b\ ^3P_2 - x\ ^3F_2^o$		
3018.96		3h		33114.37			
3016.775	6	120	V E	33138.35	$a\ ^5P_3 - z\ ^5P_2^o$	(?) 1.41	(0) 1.50s
3016.14		15		33145.33	$a\ ^5P_2 - z\ ^3P_2^o$		
3015.98		10		33147.09	$b\ ^3G_4 - z\ ^1F_3^o$		
3014.822	5	100	V E	33159.82	$a\ ^5P_2 - z\ ^5P_1^o$	(?) **1.03**, 1.71, 2.32	(0, 0.50) **1.28**, 1.78, 2.28
3013.102	3	80	V E	33178.75	$a\ ^5P_1 - z\ ^3P_1^o$	(?) 1.43, 2.35	(0.95) **1.44, 2.39**
3012.020	1	30		33190.67	$b\ ^3G_5 - z\ ^1G_4^o$	(?) 1.57nw_2 B	(0) 1.56b
3011.258		1		33199.07			
3008.610 j	2	70	V E	33228.28	$a\ ^5P_1 - z\ ^3P_2^o$	(?) **0.49**, 1.39, 2.31	(0, 0.91) **0.57**, 1.48, 2.39
3008.508		15		33229.41	$b\ ^3D_1 - w\ ^3D_1^o$		
3007.296	1	15		33242.80	$a\ ^5P_1 - z\ ^5P_1^o$	(?) 2.30	(0.11) 2.34b
3007.035		1		33245.69	$b\ ^3D_3 - w\ ^3D_2^o$		
3006.502		20		33251.58	$b\ ^3D_2 - w\ ^3D_2^o$	(?) 1.13	(0.27) 1.18b
3005.813		30		33259.20	$b\ ^3P_2 - x\ ^3F_3^o$	(?) 0.45nw_3 A	(0) 0.45s
3003.461	3	80	V E	33285.25	$a\ ^5P_2 - z\ ^5P_2^o$	(?) 1.69	(0.18) 1.73b
3001.93		2		33302.22	$b\ ^3G_4 - z\ ^1G_4^o$	(?) 0.96	(0.23) 1.00b

See footnotes at end of table.

TABLE 1.—Second spectrum of Vanadium—Continued

1	2		3	4	5	6	
λₐᵢᵣA	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
3001.754	1	30		33304.17	$b\,{}^3\mathrm{D} - w\,{}^3\mathrm{D}_3^\circ$	(?) 1.09	(0.28) 1.32b
3001.203	8	200	V E	33310.29	$a\,{}^5\mathrm{P}_3 - z\,{}^5\mathrm{P}_3^\circ$	(?) 1.56	(0.18) 1.58b
2997.945		6		33346.49	$b\,{}^3\mathrm{D}_1 - w\,{}^3\mathrm{D}_2^\circ$		
2996.70		3		33360.34	$a\,{}^5\mathrm{P}_3 - u\,{}^5\mathrm{D}_2^\circ$		
2995.999	3	60	IV E	33368.15	$a\,{}^5\mathrm{P}_1 - z\,{}^5\mathrm{P}_2^\circ$	(?) **0.96,** 1.69, 2.33	(**0,** 0.71) **0.97,** 1.68, 2.39
2994.540		60		33384.40	$d\,{}^3\mathrm{F}_2 - w\,{}^3\mathrm{G}_3^\circ$	(?) 0.77	(0) 0.77:b
2994.05		1		33389.86	$a\,{}^1\mathrm{P}_1 - y\,{}^3\mathrm{S}_1^\circ$		
2992.99		4		33401.69			
2992.378		2		33408.52	$c\,{}^3\mathrm{P}_2 - w\,{}^3\mathrm{D}_1^\circ$		
2991.737		3		33415.68	$d\,{}^3\mathrm{F}_3 - w\,{}^3\mathrm{G}_3^\circ$		
2989.74		10		33438.00	$b\,{}^3\mathrm{P}_1 - x\,{}^3\mathrm{D}_1^\circ$		
2989.594	2	40	V E	33439.63	$a\,{}^5\mathrm{P}_3 - y\,{}^5\mathrm{D}_3^\circ$	(?) 1.55nw_3 B?	(0.36) 1.55b
2989.306	1	15		33442.85	$b\,{}^3\mathrm{P}_0 - x\,{}^3\mathrm{D}_1^\circ$		
2988.027	3	80	V E	33457.17	$a\,{}^5\mathrm{P}_2 - y\,{}^5\mathrm{P}_3^\circ$	(?) 1.38nw_3	(0) 1.32b
2985.93		1		33480.66			
2985.184		60h		33489.03	$d\,{}^3\mathrm{F}_3 - w\,{}^3\mathrm{G}_4^\circ$	(?) 0.96	(0) 0.98b
2983.558		80h		33507.28	$a\,{}^5\mathrm{P}_2 - y\,{}^5\mathrm{D}_2^\circ$		
2983.009		10		33513.45	$\{ \begin{array}{l} b\,{}^3\mathrm{F}_2 - z\,{}^3\mathrm{H}_3^\circ \\ a\,{}^5\mathrm{P}_2 - y\,{}^5\mathrm{D}_1^\circ \end{array}$		
2982.75	2	40		33516.36	$a\,{}^5\mathrm{P}_1 - y\,{}^5\mathrm{D}_0^\circ$	(?) 2.35	(0) 2.39
2981.924		15		33525.64	$c\,{}^3\mathrm{P}_2 - w\,{}^3\mathrm{D}_2^\circ$	(?) 1.18nw_2	(0.47) 1.23b
2981.200	2	70	V E	33533.78	$b\,{}^3\mathrm{P}_1 - x\,{}^3\mathrm{D}_2^\circ$	(?) 0.72, 1.40nw_3 A	(**0,** 0.30) **0.80,** 1.10, 1.40
2979.47		4hl		33553.25			
2979.102		5		33557.40	$b\,{}^3\mathrm{G}_3 - z\,{}^1\mathrm{D}_2^\circ$		
2978.226	1	20		33567.27	$b\,{}^3\mathrm{P}_2 - x\,{}^3\mathrm{D}_2^\circ$	(?) 1.22nw_3	(0.50) 1.24b
2976.517	10	100	IV E	33586.54	$a\,{}^5\mathrm{P}_2 - y\,{}^5\mathrm{D}_3^\circ$		
2976.197	4	60	V E	33590.15	$a\,{}^5\mathrm{P}_1 - y\,{}^5\mathrm{D}_2^\circ$		
2975.650	3	50	V E	33596.32	$a\,{}^5\mathrm{P}_1 - y\,{}^5\mathrm{D}_1^\circ$		
2973.975		40		33615.24	$d\,{}^3\mathrm{F}_4 - w\,{}^3\mathrm{G}_5^\circ$		
2972.263	3	80	V E	33634.61	$b\,{}^3\mathrm{P}_2 - x\,{}^3\mathrm{D}_3^\circ$		
2971.998		4		33637.61	$b\,{}^3\mathrm{P}_1 - z\,{}^1\mathrm{P}_1^\circ$		
2971.571		8		33642.44	$b\,{}^3\mathrm{P}_0 - z\,{}^1\mathrm{P}_1^\circ$		
2970.427		6		33655.40			
2969.846		5		33661.98	$c\,{}^3\mathrm{P}_1 - w\,{}^3\mathrm{D}_1^\circ$		
2968.373	20	200	V E	33678.68	$a\,{}^5\mathrm{P}_3 - y\,{}^5\mathrm{D}_4^\circ$	(0, 0.67, 1.27, 2.00)—?	(**0,** 0.66, 1.32, 1.98) 0.30, 0.96, 1.62, 2.28, 2.94, 3.60, **4.26**
2968.02		7H		33682.69			
2967.545		5		33688.08	$b\,{}^3\mathrm{F}_4 - z\,{}^3\mathrm{H}_5^\circ$		
2963.86		4Hl		33729.96			
2963.249		9		33736.91	$a\,{}^1\mathrm{D}_2 - x\,{}^3\mathrm{P}_1^\circ$		
2962.014		5		33750.98	$c\,{}^3\mathrm{F}_3 - w\,{}^3\mathrm{G}_3^\circ$		
2960.777		6		33765.08	$b\,{}^1\mathrm{G}_4 - z\,{}^3\mathrm{I}_5^\circ$		
2959.55		1		33779.08	$c\,{}^3\mathrm{P}_1 - w\,{}^3\mathrm{D}_2^\circ$		
2958.61		20		33789.81	$c\,{}^3\mathrm{P}_2 - w\,{}^3\mathrm{G}_3^\circ$		
2957.520	8	100		33802.27	$a\,{}^5\mathrm{F}_2 - z\,{}^5\mathrm{F}_1^\circ$		
2956.645		2		33812.27	$c\,{}^3\mathrm{F}_4 - w\,{}^3\mathrm{G}_4^\circ$		
2955.584		30		33824.39	$c\,{}^3\mathrm{F}_3 - w\,{}^3\mathrm{G}_4^\circ$		
2953.45		1		33848.84	$a\,{}^1\mathrm{S}_0 - w\,{}^3\mathrm{D}_1^\circ$		
2952.07	15	150	IV Er	33864.67	$a\,{}^5\mathrm{F}_3 - z\,{}^5\mathrm{F}_2^\circ$		
2951.56		8h		33870.52			
2950.344	8	80	V E	33884.48	$a\,{}^5\mathrm{F}_1 - z\,{}^5\mathrm{F}_1^\circ$		
2949.172	1	40	V E	33897.94	$a\,{}^1\mathrm{P}_1 - y\,{}^1\mathrm{P}_1^\circ$		
2948.83		2		33901.87	$b\,{}^3\mathrm{H}_4 - y\,{}^1\mathrm{G}_4^\circ$		
2948.076	1	60		33910.54	$c\,{}^3\mathrm{F}_4 - w\,{}^3\mathrm{G}_5^\circ$		
2944.568	15	250	IV Er	33950.94	$a\,{}^5\mathrm{F}_4 - z\,{}^5\mathrm{F}_3^\circ$		
2943.631		3		33961.75	$d\,{}^3\mathrm{F}_2 - v\,{}^3\mathrm{D}_3^\circ$		
2942.37	3	15		33976.30	$a\,{}^3\mathrm{D}_1 - x\,{}^3\mathrm{F}_2^\circ$		
2941.485	6	100	IV E	33986.52	$a\,{}^5\mathrm{F}_2 - z\,{}^5\mathrm{F}_2^\circ$		
2941.372	10	200	IV E	33987.83	$a\,{}^5\mathrm{F}_5 - z\,{}^5\mathrm{F}_4^\circ$		
2938.259	1	20		34023.84	$a\,{}^3\mathrm{G}_4 - y\,{}^3\mathrm{G}_3^\circ$		
2937.030	1	15		34038.07	$a\,{}^3\mathrm{D}_3 - x\,{}^3\mathrm{F}_3^\circ$		
2934.394	6	60	V E	34068.65	$a\,{}^5\mathrm{F}_1 - z\,{}^5\mathrm{F}_2^\circ$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
2933.833	1	15	V E	34075.16	$a\,^3G_5 - y\,^3G_4^o$		
2932.323	3	60	V E	34092.71	$b\,^3D_3 - x\,^3P_2^o$		
2931.859	1	10		34098.10	$a\,^3D_2 - x\,^3F_3^o$		
2931.624	1	20		34100.84	$b\,^3D_2 - x\,^3P_1^o$		
2930.798	10	150	IV Er	34110.45	$a\,^5F_3 - z\,^5F_3^o$		
2930.132	1	25	V E	34118.20	$a\,^3G_3 - y\,^3G_3^o$		
2929.017		4		34131.19	$d\,^3F_2 - v\,^3D_2^o$		
2926.442	2	40		34161.23	$a\,^1D_2 - y\,^1F_3^o$		
2926.35		10h		34162.29	$d\,^3F_3 - v\,^3D_2^o$		
2925.51		3h		34172.10	$a\,^1G_4 - y\,^1H_4^o$		
2925.288	1	15	V E	34174.69	$a\,^3G_4 - y\,^3G_4^o$		
2924.633	30	250R	IV Er	34182.35	$a\,^5F_4 - z\,^5F_4^o$		
2924.017	40	300R	IV Er	34189.55	$a\,^5F_5 - z\,^5F_5^o$		
2923.340	1	20		34197.46	$a\,^3G_5 - y\,^3G_5^o$		
2920.377	10	100	IV E	34232.16	{ $a\,^5F_2 - z\,^5F_3^o$ / $a\,^5F_3 - z\,^3D_2^o$		
2919.989	6	50		34236.71	$a\,^5F_4 - z\,^3D_3^o$		
2919.681		6h		34240.32			
2918.21		15h		34257.58	$d\,^3F_2 - v\,^3D_1^o$		
2917.365	4	50	V E	34267.50	$a\,^5F_2 - z\,^3D_1^o$		
2917.230	1	7		34269.09	$a\,^3G_3 - y\,^3G_4$		
2915.875		40		34285.01	$c\,^3F_4 - v\,^3D_3^o$		
2915.330	5	30		34291.42	$b\,^3D_1 - x\,^3P_0^o$		
2914.87	?	10+I		34296.83	$a\,^3G_4 - y\,^3G_3^o$		
2914.298	2	40		34303.56	$a\,^3D_3 - x\,^3F_4^o$		
2913.716		2		34310.41	$a\,^3D_2 - x\,^3D_1^o$		
2913.04		3		34318.38			
2912.50		10Hl		34324.74			
2911.654		7		34334.71	$a\,^3D_1 - x\,^3D_1^o$		
2911.050	15	160r		34341.83	$a\,^5F_3 - z\,^5F_1^o$		
2910.380	15	150r		34349.74	$a\,^5F_1 - z\,^3D_1^o$		
2910.007	15	140r	IV Er	34354.14	$a\,^5F_2 - z\,^3D_2^o$		
2908.810	30	300R	IVEr	34368.28	$a\,^5F_5 - z\,^5D_4^o$	(1.00)0.68	(0)0.64s
2908.44	2	20		34372.65	$c\,^3P_2 - x\,^3P_2^o$		
2907.457l	10	120	IV E	34384.27	$a\,^5F_4 - z\,^5F_2^o$	(?)2.53 pw_3D; nw_2	(0)1.60b
2906.448	15	150r	IVEr	34396.21	$a\,^5F_3 - z\,^3D_3^o$		
2905.609	1	15	V E	34406.14	$a\,^3D_2 - x\,^3D_2^o$		
2905.307		1		24409.72			
2904.985		15		34413.53	$a\,^3D_3 - x\,^3D_3^o$		
2903.548		3		34430.56	$a\,^3D_1 - x\,^3D_2^o$		
2903.068	10	100	V E	34436.25	$a\,^5F_1 - z\,^3D_2^o$		
2902.54		1		34442.52			
2899.936		4		34473.44	$a\,^3D_2 - x\,^3D_3^o$		
2897.899		20		34497.67	$c\,^3F_3 - v\,^3D_2^o$		
2896.870		2		34509.93	$a\,^3D_2 - x\,^1P_1^o$		
2896.198 i	10	100	V E	34517.93	$a\,^5F_2 - z\,^5D_3^o$	(0?)?pw_2D;nw_1	(0)1.67b
2895.609		4		34524.96	$b\,^3D_2 - y\,^1F_3^o$		
2894.833		3		34534.21	$a\,^3D_1 - v\,^1P_1^o$		
2893.314	20	250	IV Er	34552.34	$a\,^5F_4 - z\,^5D_3^o$		
2892.650	15	200r	IV Er	34560.27	$a\,^5F_3 - z\,^5D_2^o$		
2892.434	10	150r	V Er	34562.85	$a\,^5F_4 - z\,^5D_4^o$		
2891.636	10	150r	IV Er	34572.39	$a\,^5F_2 - z\,^5D_1^o$	(0,0.69)?	(0,0.42)0.55,0.97, 1.39
2890.553		5		34585.34	$b\,^3P_1 - w\,^3D_1^o$		
2890.144	1	7		34590.24	$b\,^3P_0 - w\,^3D_1^o$		
2889.614	15	100	V E	34596.58	$a\,^5F_1 - z\,^5D_0^o$		
2888.244	5	80	V E	34612.99	$a\,^3G_5 - y\,^3F_4^o$		
2887.75		1		34618.91	$b\,^3P_2 - w\,^3D_1^o$		
2887.158		8		34626.01	$c\,^3P_1 - x\,^3P_2^o$		
2886.967	1	10		34628.30	$c\,^3P_1 - x\,^3P_1^o$		
2884.776	20	150	V E	34654.60	{ $a\,^5F_1 - z\,^5D_1^o$ / $a\,^3G_4 - y\,^3F_3^o$	}(0) 0.64	{ — / (0) 1.02b
2884.064		6		34663.15	$c\,^3F_2 - v\,^3D_1^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
2882.493	15	120	V E	34682.04	$a\ ^5F_2-z\ ^5D^o_3$		
2880.802	1	15		34702.40	$b\ ^3P_1-w\ ^3D^o_2$	(0) 1.53	(0) 0.95b
2880.026	10	150	V E	34711.75	$a\ ^5F_3-z\ ^5D^o_3$		
2879.158	6	40	V E	34722.22	$a\ ^5F_3-z\ ^5D^o_4$		
2879.013		2		34723.96	$c\ ^3P_1-x\ ^3P^o_0$	(0) 0.68	(0) 1.35
2878.299		3		34732.58	$b\ ^3D_2-x\ ^3G^o_3$		
2878.028	1	7		34735.84	$b\ ^3P_2-w\ ^3D^o_2$		
2877.689	4	60		34739.94	$a\ ^3G_2-y\ ^3F^o_2$		
2876.939	1	9		34749.00	$a\ ^3G_3-y\ ^3F^o_2$		
2875.687	3	30	V E	34764.12	$a\ ^5F_1-z\ ^5D^o_2$		
2874.205		5		34782.04	$a\ ^3P_2-z\ ^3P^o_1$		
2873.180	1	30		34794.45	$b\ ^3P_2-w\ ^3D^o_3$		
2872.806		1		34798.99	$c\ ^3P_2-y\ ^1F^o_3$		
2871.543		3		34814.29	$b\ ^1G_4-w\ ^3D^o_3$		
2871.463		4		34815.26	$a\ ^1S_0-x\ ^3P^o_1$		
2870.111	1	9		34831.66	$a\ ^3P_2-z\ ^3P^o_2$		
2869.957	1	10		34833.52	$a\ ^5F_2-z\ ^5D^o_3$		
2869.131	4	150		34843.56	$b\ ^3H_6-x\ ^3G^o_5$		
2864.517	1	30		34899.68	$b\ ^3H_4-y\ ^1F^o_3$		
2863.79		2H		34908.54			
2862.91		1h		34919.27			
2862.310		20		34926.58	$b\ ^3H_5-x\ ^3G^o_5$		
2861.401		5		34937.68	$a\ ^3G_5-z\ ^1H^o_5$		
2857.44		1		34986.11	$a\ ^3H_5-z\ ^3H^o_6$		
2855.298	1	40		35012.35	$a\ ^3G_4-z\ ^1F^o_3$		
2854.335	4	120	V E	35024.16	$b\ ^3H_5-x\ ^3G^o_4$	(0) 1.06	(0) 0.99b
2853.761		4		35031.21	$b\ ^1G_4-y\ ^1G^o_4$		
2852.540	1	30		35046.20	$b\ ^3D_2-y\ ^3S^o_1$		
2851.260		15		35061.94	$b\ ^3H_4-x\ ^3G^o_4$		
2850.765	1	20	V	35068.02	$a\ ^3G_5-z\ ^1G^o_4$		
2850.685	1	25		35069.01	$a\ ^1P_1-y\ ^1D^o_2$		
2850.477		1		35071.57	$a\ ^3P_1-z\ ^3P^o_0$		
2849.055	2	40		35089.07	$b\ ^3F_2-y\ ^3G^o_3$		
2847.573	3	100	V	35107.33	$b\ ^3H_4-x\ ^3G^o_3$		
2846.29		1		35123.16	$b\ ^3H_5-z\ ^1I^o_6$		
2845.241	2	50	V	35136.10	$b\ ^3H_6-y\ ^1H^o_5$		
2844.833		3		35141.14	$b\ ^3D_1-y\ ^3S^o_1$		
2844.22		4Hl		35148.72	{ $z\ ^5D^o_2-e\ ^5P_1$ $d\ ^3F_3-x\ ^1G^o_4$		
2843.82		9Hl		35153.66	$z\ ^5D^o_3-e\ ^5P_2$		
2842.699	1	4		35167.52	$a\ ^3G_4-z\ ^1G^o_4$		
2842.287		6Hl		35172.62			
2842.043		2		35175.64	$a\ ^3P_1-z\ ^3P^o_1$		
2841.039	3	50	V E	35188.07	$b\ ^3F_3-y\ ^3G^o_4$		
2840.825		3		35190.72	$a\ ^1D_2-y\ ^1P^o_1$		
2840.593		6		35193.59	$a\ ^3P_2-y\ ^5D^o_2$		
2840.10		10		35199.70	$a\ ^3P_2-y\ ^5D^o_1$		
2838.531		4		35219.16	$b\ ^3H_5-y\ ^1H^o_5$		
2838.053	4	10		35225.09	$a\ ^3P_1-z\ ^3P^o_2$		
2836.527	4	80	V E	35244.03	$b\ ^3F_4-y\ ^3G^o_3$		
2835.47		4		35257.18	$b\ ^3H_4-y\ ^1H^o_3$		
2835.35		6H		35258.67	{ $z\ ^5D^o_1-e\ ^5P_1$ $z\ ^5D^o_1-e\ ^5D_3$?		
2834.55		30Hl		35268.62	$z\ ^5D^o_3-e\ ^5D_3$?		
2831.60		10H		35305.36	$z\ ^5D^o_3-e\ ^5P_2$		
2830.97		3Hl		35313.22	$z\ ^5D^o_2-e\ ^5D_2$?		
2830.70		3Hl		35316.58	$z\ ^5D^o_0-e\ ^5P_1$		
2830.402	1	40		35320.30	$c\ ^3P_4-y\ ^3S^o_1$		
2826.89		5Hl		35364.18			
2825.86		50Hl		35377.07	$z\ ^5D^o_4-e\ ^5P_3$		
2825.02		5Hl		35387.59	$z\ ^5D^o_3-e\ ^5P_3$		
2824.444		4		35394.81	$a\ ^3P_0-z\ ^3P^o_1$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air} A$	Arc	Spark				Observed	Computed
2822.44		80Hl		35419.93	$z\,^5D_4^\circ - e\,^5D_4$?		
2822.15		20Hl		35423.58			
2821.124	1	15		35436.46	$a\,^3G_3 - z\,^1D_2^\circ$		
2819.444	1	20		35457.57	$a\,^3D_2 - w\,^3D_1^\circ$		
2818.52		5Hl		35469.19	$z\,^3D_2^\circ - e\,^5P_2$		
2817.506	2	60	V E	35481.96	$a_1^3D_1 - w\,^3D_1^\circ$		
2815.547		3		35506.64	$c\,^3P_0 - y\,^3S_1^\circ$		
2815.032		5		35513.14	$a\,^3P_1 - y\,^5D_0^\circ$		
2814.903	1	15		35514.77	$a\,^3D_2 - w\,^3D_2^\circ$		
2812.71		3H		35542.46			
2812.164		6		35549.36	$b\,^3P_1 - x\,^3P_2^\circ$		
2811.982		5		35551.66	$b\,^3P_1 - x\,^3P_1^\circ$		
2811.597		7		35556.52	$b\,^3P_0 - x\,^3P_1^\circ$		
2810.272	5	100	VE	35573.29	$a\,^3D_3 - w\,^3D_3^\circ$		
2810.158	3	60		35574.73	$a\,^3D_2 - w\,^3D_2^\circ$		
2809.513	1	15		35582.90	$b\,^3P_2 - x\,^3P_2^\circ$		
2809.184		1		35587.06	$\begin{cases} a\,^3P_1 - y\,^5D_2^\circ \\ d\,^3F_3 - y\,^5G_2^\circ? \end{cases}$		
2808.701		4		35593.18	$a\,^3P_1 - y\,^5D_1^\circ$		
2808.237		25		35599.06	$a\,^3D_1 - w\,^3D_2^\circ$		
2808.023		4		35601.78	$b\,^3F_4 - y\,^3F_3^\circ$		
2806.79		3H		35617.42	$c\,^3F_2 - x\,^5D_2^\circ$		
2806.544		4		35620.54	$b\,^3G_5 - y\,^3H_5^\circ$		
2805.544	1	30		35633.24	$a\,^3D_2 - w\,^3D_3^\circ$		
2804.443		4		35647.23	$b\,^3P_1 - x\,^3P_0^\circ$		
2803.469	5	150	V E	35659.61	$b\,^3F_4 - y\,^3F_4^\circ$		
2802.796	3	100	V E	35668.17	$b\,^3F_3 - y\,^3F_3^\circ$		
2800.95		20Hl		35691.68	$z\,^5D_4^\circ - e\,^5F_4$		
2800.05		4Hl		35703.15	$z\,^3D_3^\circ - e\,^5P_3$		
2799.451	5	100	V E	35710.79	$b\,^3F_2 - y\,^3F_2^\circ$		
2798.755	4	80	V E	35719.67	$b\,^3G_5 - y\,^3H_6^\circ$		
2797.795	3	70		35731.92	$b\,^3G_4 - y\,^3H_5^\circ$		
2797.017	3	60	V E	35741.86	$b\,^3G_3 - y\,^3H_4^\circ$		
2795.72		4H		35758.44	$z\,^5D_3^\circ - e\,^5G_4$		
2795.39		3H		35762.66	$\begin{cases} z\,^5F_3^\circ - e\,^5D_2? \\ z\,^5D_4^\circ - e\,^5F_5? \end{cases}$		
2794.83		15H		35769.83			
2794.29		5H		35776.74	$z\,^5D_2^\circ - e\,^5G_3$		
2792.45		6Hl		35800.31	$z\,^5D_4^\circ - e\,^5F_5$?		
2791.63		10H		35810.83			
2791.50	1	7		35812.50	$a\,^3P_0 - y\,^5D_1^\circ$		
2788.66		3H		35848.96			
2787.95		20h		35858.09			
2787.32		2h		35866.20			
2787.00		10H		35870.32	$\begin{cases} z\,^5F_5^\circ - e\,^5F_4 \\ z\,^5F_3^\circ - e\,^5D_3? \end{cases}$		
2785.83		5H		35885.38	$z\,^5D_4^\circ - e\,^5G_5$		
2784.25		60H		35905.74			
2783.94		30H		35909.74			
2782.95		6H		35922.52	$\begin{cases} c\,^3F_3 - y\,^5G_2^\circ? \\ a\,^1F_3 - 1_4^\circ \end{cases}$		
2782.56		5H		35927.55			
2781.48		100H		35941.50	$z\,^5F_5^\circ - e\,^5F_5$?		
2780.09		5+H		35959.47	$b\,^3F_4 - z\,^1F_3^\circ$		
2778.60		80H		35978.75			
2778.16		2		35984.45	$b\,^3F_4 - z\,^1H_5^\circ$		
2777.748	8	80		35989.78	$a\,^5P_3 - z\,^5S_2^\circ$		
2776.24*		6H		36009.33	$b\,^3P_2 - y\,^1F_3^\circ$		
2775.770	2	70	V	36015.43	$a\,^1I_6 - x\,^3G_5^\circ$		
2774.976	2	30		36025.74	$b\,^3F_3 - z\,^1F_3^\circ$		
2774.718	2	60		36029.08	$b\,^1G_4 - y\,^1F_3^\circ$		
2774.28	5	100	V E	36034.77	$a\,^3H_4 - y\,^3G_3^\circ$		
2772.01		60Hl		36064.28	$z\,^5F_5^\circ - e\,^5G_5$		
2771.41		40Hl		36072.09	$z\,^5F_4^\circ - e\,^5F_4$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2770.99		4		36077.55	$t\ ^3F_2 - z\ ^1F_3^o$		
2769.731		20		36093.95	$b\ ^1G_4 - z\ ^3G_5^o$		
2768.566	5	100	V E	36109.14	$a\ ^2H_5 - y\ ^3G_4^o$		
2768.150	2	15		36114.57	$b\ ^3F_4 - z\ ^1G_4^o$		
2767.10		30 *Hl*		36128.27	$z\ ^5F_2^o - e\ ^5G_4$		
2766.460	4	60		36136.62	$a\ ^5P_2 - z\ ^5S_2^o$		
2765.676	6	150+*Hl*	V E	36146.87	$\{\ a\ ^3H_6 - y\ ^3G_5^o$ / $z\ ^5F_2^o - e\ ^5G_6$		
2764.28		4*Hl*		36165.12			
2762.714		3		36185.62	$a\ ^3H_4 - y\ ^3G_4^o$		
2762.52		3*H*		36188.16			
2761.34		3*H*		36203.63			
2760.710	3	60	V E	36211.89	$a\ ^1I_6 - z\ ^1I_6^o$		
2760.122	3	40	V E	36219.60	$a\ ^5P_1 - z\ ^5S_2^o$		
2759.60		15*Hl*		36226.45	$z\ ^5F_3^o - e\ ^5G_3$		
2759.22		1		36231.44	$a\ ^3H_5 - y\ ^3G_5^o$		
2759.08		2		36233.28	$a\ ^1G_4 - y\ ^1G_4^o$		
2758.810		15		36236.83	$b\ ^1G_4 - x\ ^3G_3^o$		
2758.53		9*Hl*		36240.50	$\{\ b\ ^3F_2 - z\ ^5S_2^o$ / $a\ ^5F_5 - z\ ^3G_4^o$		
2756.58		20*Hl*		36266.14	$z\ ^5F_4^o - e\ ^5G_5$		
2756.38		4*h*		36268.77	$a\ ^1S_0 - y\ ^1P_1^o$		
2755.05		10*Hl*		36286.28			
2753.407	7	150	V E	36307.93	$a\ ^1I_6 - y\ ^1H_5^o$		
2752.11		15*Hl*		36325.04			
2751.79		10*Hl*		36329.26			
2750.29		8*Hl*		36349.08	$\{\ c\ ^3F_4 - y\ ^5G_3^o?$ / $d\ ^3F_4 - y\ ^5G_4^o?$		
2749.97		7*H*		36353.30	$z\ ^5F_2^o - e\ ^5G_2$		
2749.48		8*H*		36359.78	$z\ ^5F_3^o - e\ ^5G_4$		
2747.462	2	80		36386.49	$b\ ^1G_4 - y\ ^1H_5^o$		
2745.893	1	6		36407.28	$b\ ^3F_2 - z\ ^1D_2^o$		
2744.80		1*h*		36421.77	$a\ ^3D_2 - x\ ^3P_2^o$		
2744.54	1	4		36425.22	$a\ ^5F_3 - z\ ^3G_3^o$		
2743.768	3	20	V	36435.47	$a\ ^5F_4 - z\ ^3G_4^o$		
2742.670	6	30	V E	36450.06	$a\ ^5F_5 - z\ ^3G_5^o$		
2742.43	4	25	V E	36453.25	$a\ ^5D_1 - z\ ^5F_1^o$		
2741.563	1	4		36464.78	$a\ ^5D_3 - z\ ^5F_2^o$		
2740.98		7*Hl*		36472.53	$z\ ^5F_2^o - e\ ^5G_3$		
2739.715	10	100	V E	36489.37	$a\ ^5D_0 - z\ ^5F_1^o$		
2739.18		8*Hl*		36496.50			
2736.69	1	10		36529.70	$a\ ^3G_4 - y\ ^3D_3^o$		
2736.12		4*H*		36537.31	$z\ ^5F_1^o - e\ ^5G_2$		
2734.27		15*Hl*		36562.03			
2733.906	5	25	V E	36566.90	$a\ ^5D_2 - z^5F_2^o$		
2733.00		5*Hl*		36579.02			
2732.92	1	5		36580.09	$a\ ^5D_4 - z\ ^5F_3^o$		
27232.17		10*Hl*		36590.13			
2731.12		4*H*		36604.20			
2730.60		2*h*		36611.17			
2729.64		1		36624.04	$a\ ^3G_3 - y\ ^3D_3^o$		
2728.644	20	150	V E	36637.41	$a\ ^5D_1 - z\ ^5F_2^o$		
2727.929	1	6		36647.02	$a\ ^3H_5 - y\ ^3F_4^o$		
2726.544*	1	40		36665.63	$a\ ^3H_4 - y\ ^3F_3^o$		
2724.61		5*H*		36691.65			
2724.40		2		36694.48			
2723.455		10		36707.22			
2723.218	5	20	V E	36710.41	$a\ ^5D_3 - z\ ^5F_3^o$		
2722.258		3		36723.35	$a\ ^3H_4 - y\ ^3F_4^o$		
2722.095		1		36725.55	$b\ ^3D_2 - y\ ^1D_2^o$		
2720.77		2		36743.44	$a\ ^3P_1 - z\ ^1S_0^o$		
2717.464		5		36788.13	$a\ ^3D_3 - y\ ^1F_3^o$		
2715.676	30*r*	180*rs*	V E	36812.35	$\{\ a\ ^5D_2 - z\ ^5F_3^o$ / $a\ ^5D_4 - z\ ^5F_4^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2714.42		10H		36829.39			
2714.205	10	50	V E	36832.30	$a\ ^5D_3 - z\ ^3D_2^o$		
2713.050	8	40	V E	36847.98	$a\ ^5D_2 - z\ ^3D_1^o$		
2712.81		7Hl		36851.24			
2712.21		30Hl		36859.39			
2711.740	15	100	V E	36865.78	$a\ ^5D_4 - z\ ^3D_3^o$		
2710.17	2	15		36887.14	$a\ ^3H_6 - z\ ^1H_5^o$		
2709.10		6H		36901.70			
2708.91		1?		36904.29	$d\ ^3P_2 - u\ ^3D_3^o$		
2707.86	10	100	V E	36918.60	$a\ ^5D_1 - z\ ^3D_1^o$		
2706.70	20	150r	V E	36934.42	$a\ ^5D_2 - z\ ^3D_3^o$		
2706.17	30	200r	V Ers	36941.66	$a\ ^5D_3 - z\ ^5F_4^o$		
2705.220	7	40	V E	36954.63	$a\ ^5D_0 - z\ ^3D_1^o$		
2703.15		3		36982.93	$b\ ^3F_2 - y\ ^3D_1^o$		
2702.185	30	200r	V E	36996.13	$a\ ^5D_3 - z\ ^3D_3^o$		
2701.535	4	10	V	37005.03	$a\ ^5D_1 - z\ ^3D_2^o$		
2700.944	40	300r	V Ers	37013.13	$a\ ^5D_4 - z\ ^5F_5^o$		
2700.20		1?		37023.33	$a\ ^3H_4 - z\ ^1F_3^o$		
2699.63		4Hl		37031.14			
2697.201		10		37064.49	$d\ ^3F_2 - v\ ^3F_2^o$		
2696.51		20H		37073.99			
2694.74*	2	20H		37098.34	$a\ ^5D_2 - z\ ^3D_3^o$		
2694.65		10H		37099.58			
2694.47	1	5		37102.06	$a\ ^3H_5 - z\ ^1G_4^o$		
2693.00	2	5H+I		37122.31			
2690.792	20	200	V Ea	37152.77	$a\ ^5D_2 - z\ ^5D_1^o$		
2690.252	15	150	V Ea	37160.22	$a\ ^5D_3 - z\ ^5D_2^o$		
2689.883	10	100	V Ea	37165.32	$a\ ^5D_1 - z\ ^5D_0^o$		
2688.717	10	100	V Ea	37181.44	$a\ ^5D_4 - z\ ^5D_3^o$		
2687.960	60r	300r	V Ea	37191.91	$a\ ^5D_4 - z\ ^5D_4^o$		
2685.689	4	30		37223.36	$a\ ^5D_1 - z\ ^5D_1^o$		
2685.41		1?		37227.22	$\begin{cases} a\ ^5P_1 - y\ ^3P_1^o \\ a\ ^5F_4 - z\ ^3F_3^o \end{cases}$		
2685.138	10	20+I	V E	37230.99	$a\ ^1G_4 - y\ ^1F_3^o$		
2684.78		15H		37235.96			
2683.09	15	100	V Ea	37259.41	$a\ ^5D_0 - z\ ^5D_1^o$		
2682.875	15	100	V Ea	37262.40	$a\ ^5D_2 - z\ ^5D_2^o$		
2682.535	1	6		37267.12	$a\ ^5F_5 - z\ ^3F_4^o$		
2681.29		1		37284.42	$b\ ^3F_2 - y\ ^3D_2^o$?		
2680.822		1		37290.93	$\begin{cases} a\ ^1F_3 - w\ ^3G_4^o \\ d\ ^3F_4 - v\ ^3F_3^o \end{cases}$		
2680.470	1	8		37295.83	$a\ ^1G_4 - x\ ^3G_5^o$	(0)1.64	(0)1.55b
2679.327	30	200r	V Ea	37311.74	$a\ ^5D_3 - z\ ^5D_3^o$		
2678.572	10	100r		37322.25	$a\ ^5D_3 - z\ ^5D_2^o$		
2677.804	25	150r	V Ea	37332.95	$a\ ^5D_1 - z\ ^5D_2^o$		
2677.00		1		37344.17	$a\ ^5P_3 - y\ ^3D_2^o$		
2676.33		7H		37353.52	$z\ ^5G_6^o - e\ ^5H_6$		
2676.05		9H		37357.42	$z\ ^5G_5^o - e\ ^5H_4$		
2675.17		2h		37369.71			
2674.28		3h		37382.15			
2673.955	1	4		37386.69	$a\ ^5F_3 - z\ ^3F_3^o$		
2673.25	1	50H		37396.55			
2672.005	20	150r	V Ea	37413.97	$a\ ^5D_2 - z\ ^5D_3^o$		
2670.237	2	40		37438.74	$a\ ^1G_4 - x\ ^3G_3^o$		
2668.595		4		37461.78	$a\ ^5F_4 - z\ ^3F_4^o$		
2668.01		10H		37469.99	$c\ ^3F_2 - v\ ^3F_2^o$		
2667.532		4		37476.71	$b\ ^3F_4 - y\ ^3D_3^o$		
2666.79		10H		37487.13	$z\ ^5G_5^o - e\ ^5H_5$		
2666.50		1		37491.21	$a\ ^5P_3 - y\ ^3D_3^o$		
2665.490		2		37505.42	$d\ ^3F_3 - v\ ^3F_3^o$		
2665.277		3		37508.41	$a\ ^5F_2 - z\ ^3F_3^o$		
2663.837		2h		37528.69	$a\ ^5P_2 - y\ ^3P_2^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
λ_{air}A	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
2663.526		4h		37533.07	$d\ ^3F_4 - v\ ^3F_4^o$		
2663.25	2e	250H		37536.96	$z\ ^5G_6^o - e\ ^5H_7$		
2661.47		30H		37562.06			
2661.243		3		37565.27			
2659.60	2	25		37588.47	$a\ ^1G_4 - y\ ^1H_5^o$		
2658.97	3d	30		37597.37	$\left\{ \begin{array}{l} a\ ^3G_4 - y\ ^3H_5^o \\ a\ ^3G_5 - y\ ^3H_6^o \end{array} \right.$		
2658.49		7Hl		37604.16	$z\ ^5G_4^o - e\ ^5H_4$		
2657.97		1		37611.52	$a\ ^5P_1 - y\ ^3P_2^o$		
2657.295	1	10		37621.07	$a\ ^3G_3 - y\ ^3H_4^o$		
2655.68	2e	200H		37643.95	$z\ ^5G_5^o - e\ ^5H_6$		
2654.89		2		37655.15			
2654.39		3H		37662.24			
2652.76		20H		37685.38			
2651.57		5H		37702.30	$z\ ^5G_3^o - e\ ^5H_3$		
2650.41		3h		37718.80			
2650.136		1		37722.70	$b\ ^3G_4 - y\ ^1G_4^o$		
2649.37	1e	150H		37733.60	$z\ ^5G_4^o - e\ ^5H_5$		
2648.475	1	30		37746.35	$a\ ^1F_3 - x\ ^1D_2^o$		
2646.225		2		37778.44			
2645.840	6	80		37783.94	$a\ ^3G_3 - x\ ^3F_2^o$		
2644.363	1	100Hl		37805.04	$z\ ^5G_3^o - e\ ^5H_4$		
2643.69		4H		37814.67		(0)0.48	
2643.11		2		37822.96	$a\ ^3P_2 - z\ ^5S_2^o$		
2642.72		6		37828.55	$c\ ^3F_4 - v\ ^3F_4^o$		
2642.212 i	5	80		37835.82	$a\ ^3G_4 - x\ ^3F_3^o$	$2p;nw_2$ A	
2640.86		80H		37855.19	$z\ ^5G_2^o - e\ ^5H_3$		
2639.29		2		37877.70	$a\ ^3D_2 - y\ ^1P_1^o$		
2638.74		2		37885.60			
2638.52		7H		37888.76			
2637.886		2		37897.86	$a\ ^3F_3 - z\ ^3P_2^o$		
2637.623		2h		37901.64			
2637.25		6H		37907.00			
2636.40		2H		37919.22			
2636.00		5H		37924.98	$z\ ^5G_2^o - e\ ^5P_1$		
2635.640	1	10		37930.16	$a\ ^3G_3 - x\ ^3F_2^o$		
2635.43		7H		37933.18	$^5G_6^o - e\ ^5G_5$		
2634.37		3H		37948.44			
2633.91		3H		37955.07			
2633.28		2H?		37964.15	$a\ ^1F_3 - v\ ^3D_2^o$		
2632.96		3H		37968.76			
2631.484		3		37990.06	$a\ ^3P_2 - z\ ^1D_2^o$		
2630.665	10	150		38001.88	$a\ ^3G_5 - x\ ^3F_4^o$	(?) 3?p; nw_2 B	(0) 1.15b
2629.72 i		60H		38015.54	$z\ ^5G_5^o - e\ ^5G_6$	(0) nw_1	
2628.75 m		30H		38029.56		(1.06) 1.83	
2628.09		4H		38039.11			
2627.32		1		38050.26	$a\ ^3F_2 - z\ ^3P_1^o$		
2626.42		2H?		38063.30	$b\ ^1F_3 - w\ ^1G_4^o$		
2625.01		4H?		38083.74			
2624.860		15H		38085.92	$z\ ^5G_4^o - e\ ^5G_4$		
2623.792	1	15+H		38101.42	$a\ ^3G_4 - x\ ^3F_4^o$		
2622.74		50H		38116.71			
2621.80		40H		38130.37		(?) 0.92nw_1 A	
2620.06 i	2?	3		38155.69		(0) 2.29	
2619.48		5H		38164.14			
2618.63		1h?		38176.52	$b\ ^3P_1 - y\ ^1D_2^o$		
2618.40		3H		38179.88			
2617.10		9H		38198.84	$z\ ^5G_4^o - e\ ^5G_3$		
2616.66		10H		38205.27	$z\ ^5G_3^o - e\ ^5D_4$?		
2616.24	3	40		38211.40	$a\ ^3G_4 - x\ ^3D_3^o$		
2615.89		2		38216.51	$a\ ^3P_1 - z\ ^5S_2^o$		

See footnotes at end of table.

Table 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2615. 40 [l]		40H		38223. 67	$z\,^5G_5^\circ - e\,^5G_5$	(0) 2.33	
2614. 395	1	10		38238. 36	$a\,^3G_3 - x\,^3D_2^\circ$		
2612. 26		15H		38269. 61			
2611. 51		7H		38280. 60	$z\,^5G_3^\circ - e\,^5G_2$		
2611. 24		10H		38284. 56			
2610. 61		30H		38293. 80			
2609. 80		5		38305. 68	$\begin{cases} a\,^3G_3 - x\,^3D_3^\circ \\ z\,^5G_5^\circ - e\,^5G_6 \end{cases}$		
2609. 60		3		38308. 62			
2608. 66		1		38322. 42	$a\,^3F_4 - y\,^1D_2^\circ$		
2608. 00		20H		38332. 12	$z\,^5G_4^\circ - e\,^5G_4$		
2607. 41		3H		38340. 79			
2605. 70		7H		38365. 95			
2604. 51		1		38383. 48	$a\,^3P_1 - z\,^1D_2^\circ$		
2603. 40		15H		38399. 84	$z\,^5G_3^\circ - e\,^5G_3$		
2602. 94		15H		38406. 63			
2602. 32		6H		38415. 78			
2601. 08		25H		38434. 09	$z\,^5G_2^\circ - e\,^5G_2$		
2600. 60		4H		38441. 19			
2600. 03		2H?		38449. 61			
2598. 65		2H		38470. 03	$z\,^5G_4^\circ - e\,^5G_5$		
2597. 21 [k, n]		6h		38491. 36	$\begin{cases} c\,^3F_3 - u\,^3D_2^\circ \\ c\,^3F_2 - u\,^3D_1^\circ \end{cases}$	(0)2.36	
2594. 43		3h		38532. 60	$z\,^5G_3^\circ - e\,^5G_4$		
2593. 91		2H		38540. 32	$b\,^3F_3 - y\,^3H_4^\circ$		
2593. 64		1?		38544. 33	$b\,^3F_4 - y\,^3H_5^\circ$?		
2592. 215		4		38565. 52	$a\,^3P_2 - y\,^3D_1^\circ$		
2591. 10		3H		38582. 12			
2590. 55		5H		38590. 31			
2590. 17		4H		38595. 97			
2588. 789		3h		38616. 56			
2588. 48		3H		38621. 17			
2588. 128		3		38626. 42	$c\,^3F_4 - u\,^3D_3^\circ$		
2587. 37		5H		38637. 73			
2585. 87	2	10+Fe		38660. 15			
2584. 951	3	80		38673. 89	$b\,^3G_5 - x\,^3G_5^\circ$		
2583. 58		2H		38694. 41			
2583. 007	2	20		38702. 99	$b\,^3F_3 - x\,^3F_2^\circ$		
2581. 839		4		38720. 50	$b\,^3G_4 - y\,^1F_3^\circ$		
2578. 451		8		38771. 37	$b\,^3G_5 - x\,^3G_4^\circ$		
2577. 682	3	40		38782. 94	$b\,^3F_4 - x\,^3F_3^\circ$		
2577. 528		3		38785. 26	$\begin{cases} a\,^1H_5 - w\,^3F_4^\circ \\ b\,^3G_4 - x\,^3G_5^\circ \end{cases}$		
2576. 478 [o]	1	20		38801. 06	$b\,^3G_3 - y\,^1F_3^\circ$	(0.41)?	(0.46)0.85
2574. 520	4	60		38830. 57	$a\,^3P_2 - y\,^3P_1^\circ$		
2573. 20		4H		38850. 49			
2572. 71		4H		38857. 89			
2572. 096		2		38867. 16	$a\,^3P_2 - y\,^3D_2^\circ$		
2571. 059	2	50		38882. 84	$b\,^3G_4 - x\,^3G_4^\circ$		
2568. 31		3		38924. 45			
2568. 065		3		38928. 17	$b\,^3G_4 - x\,^3G_3^\circ$		
2567. 45		15H		38937. 49			
2566. 602		15		38950. 36	$a\,^1F_3 - x\,^1G_4^\circ$		
2566. 033	1	7		38958. 99	$a\,^3P_1 - y\,^3D_1^\circ$		
2565. 743		2		38963. 39	$b\,^3G_3 - x\,^3G_4^\circ$		
2565. 543	1	15		38966. 43	$b\,^3G_5 - y\,^1H_5^\circ$		
2565. 24		3		38971. 03	$d\,^3F_2 - v\,^3G_3^\circ$		
2562. 760	1	30		39008. 74	$b\,^3G_3 - x\,^3G_3^\circ$		
2561. 65		2h		39025. 65	$\begin{cases} a\,^5D_3 - z\,^3G_3^\circ \\ a\,^5P_3 - x\,^3D_3^\circ \end{cases}$		
2560. 149		4		39048. 53	$\begin{cases} b\,^3F_4 - x\,^3F_4^\circ \\ a\,^3D_2 - y\,^1D_2^\circ \end{cases}$		
2559. 088		2		39064. 71	$a\,^5D_4 - z\,^3G_4^\circ$		
2556. 43		1		39105. 33	$a\,^5P_2 - x\,^3D_2^\circ$		
2555. 905	2	40		39113. 36	$b\,^3F_2 - x\,^3D_1^\circ$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
2554. 22		$15H$		39139. 16			
2554. 06		$10H$		39141. 61			
2553. 668	4	40		39147. 62	$a\,^3P_1-y\,^3P_0^o$		
2553. 028	3	40		39157. 43	$b\,^3F_3-x\,^3D_2^o$		
2552. 960	4	60		39158. 48	$b\,^3F_4-x\,^3D_3^o$		
2552. 264		$2h$		39169. 15			
2551. 724	1	15		39177. 44	$a\,^3P_2-y\,^3D_3^o$		
2550. 580		3		39195. 01	$a\,^5D_3-z\,^3G_4^o$		
2549. 653		10		39209. 26	$b\,^3F_2-x\,^3D_2^o$		
2549. 272	8	120		39215. 12	$a\,^3P_2-y\,^3P_2^o$		
2548. 685	3	60		39224. 15	$a\,^3P_1-y\,^3P_1^o$		
2546. 311		5		39260. 72	$a\,^3P_1-y\,^3D_2^o$		
2545. 696		2		39270. 20	$d\,^3F_3-v\,^3G_4^o$		
2545. 460	2	15		39273. 85	$a\,^5D_4-z\,^3G_5^o$		
2544. 29		$10H$		39291. 90	$a\,^5P_1-z\,^1P_1^o$		
2542. 935	2	15		39312. 84	$b\,^3F_2-z\,^1P_1^o$		
2542. 46		$20Hl$		39320. 18			
2539. 20		$20Hl$		39370. 66	$a\,^1H_5-1_4^o$		
2537. 619		20		39395. 19	$b\,^1D_2-x\,^1D_2^o$		
2536. 854		2		39407. 07	$a\,^3G_3-w\,^3D_2^o$		
2536. 65		$2h$		39410. 24			
2534. 519	5	80		39443. 37	$a\,^3P_0-y\,^3P_1^o$		
2534. 263		9		39447. 35	$a\,^3H_6-y\,^3H_5^o$		
2533. 969	$1-$	9		39451. 93			
2533. 365	1	15		39461. 34	$a\,^3H_5-y\,^3H_4^o$		
2531. 902		$4+H?$		39484. 14			
2531. 616		3		39488. 60	$a\,^3G_5-y\,^1G_4^o$		
2528. 833	10	220		39532. 05	$a\,^3H_5-y\,^3H_5^o$		
2528. 466	10	200		39537. 79	$a\,^3H_4-y\,^3H_4^o$		
2527. 903	15	250		39546. 59	$a\,^3H_6-y\,^3H_6^o$		
2523. 953	5	100		39608. 48	$\left\{ \begin{array}{l} a\,^3H_4-y\,^3H_3^o \\ a\,^3P_1-y\,^3P_2^o \end{array} \right.$		
2523. 61		1		39613. 86	$d\,^3F_4-v\,^3G_5^o$		
2522. 513	2	20		39631. 09	$a\,^3H_5-y\,^3H_6^o$		
2522. 392		6		39632. 99	$a\,^3F_4-y\,^3G_4^o$		
2521. 370		$4h$		39649. 05			
2520. 408		2		39664. 19			
2517. 97		$2h$		39702. 59			
2515. 722	1	9		39738. 06	$a\,^3F_3-y\,^3G_3^o$		
2514. 633	7	200		39755. 27	$a\,^3F_4-y\,^3G_5^o$		
2513. 322		1		39776. 00			
2512. 812		$2h$		39784. 08			
2508. 854		4		39846. 84	$a\,^3H_4-x\,^3F_3^o$		
2508. 26		$2h$		39856. 27	$a\,^5D_4-z\,^3F_3^o$		
2506. 215	10	200		39888. 79	$a\,^3F_3-y\,^3G_4^o$		
2505. 236		$2h$		39904. 38			
2504. 94		$2h$		39909. 09	$c\,^3F_4-v\,^3G_5^o$		
2504. 290		$7h$		39919. 45			
2503. 018	9	180		39939. 74	$a\,^3F_2-y\,^3G_3^o$	(0)0. 76	(0)0. 71s
2500. 076		4		39986. 73	$a\,^5D_3-z\,^3F_3^o$		
2497. 002		4		40035. 96	$a\,^3H_5-x\,^3F_4^o$		
2494. 721	$2h$	$4h$		40072. 56			
2494. 562	$2h$	$3h$		40075. 11			
2493. 576	3	15		40090. 96	$a\,^5D_4-z\,^3F_4^o$		
2488. 616	$1-$	6		40170. 86	$a\,^3F_4-y\,^3F_4^o$		
2485. 490		3		40221. 37	$a\,^5D_3-z\,^3F_4^o$		
2483. 064	4	120		40260. 67	$b\,^3F_3-w\,^3D_1^o$		
2482. 307	5	150		40272. 94	$a\,^3P_2-z\,^3S_1^o$		
2479. 518^l	7	180		40318. 24	$b\,^3F_4-w\,^3D_3^o$	(0)0. 93	(0)0. 92b
2479. 043	8	200		40325. 96	$b\,^3F_3-w\,^3D_2^o$		
2478. 621	2	20		40332. 83	$a\,^3H_4-z\,^3I_5^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2478.340		1		40337.40	$a\ ^3P_2 - x\ ^3F_2^0$		
2476.963		1		40359.82	$a\ ^3F_3 - y\ ^3F_2^0$		
2476.295		5h		40370.71	$a\ ^3H_6 - z\ ^3I_5^0$		
2475.865	2	30		40377.72	$b\ ^3F_2 - w\ ^3D_2^0$		
2475.451	2	20		40384.48	$b\ ^3F_3 - w\ ^3D_3^0$		
2472.870		5		40426.62	$a\ ^3F_3 - y\ ^3F_4^0$		
2471.119	2	25		40455.27	$a\ ^3H_5 - z\ ^3I_6^0$		
2469.388		5		40483.62	$a\ ^3P_2 - x\ ^3F_3^0$		
2468.654	1	8		40495.66	$a\ ^3F_4 - z\ ^1H_5^0$		
2465.270	5	150		40551.24	$a\ ^3G_5 - x\ ^3G_5^0$		
2464.65		1		40561.44	$a\ ^3F_2 - y\ ^3F_2^0$		
2464.094	1	15		40570.59	$a\ ^3F_2 - y\ ^3F_3^0$		
2463.157		3		40586.03	$a\ ^3G_4 - y\ ^1F_3^0$		
2461.495	3	40		40613.43	$a\ ^3H_6 - z\ ^3I_7^0$		
2460.73		1		40626.05	$a\ ^3F_4 - z\ ^1G_4^0$		
2459.358	1	15		40648.71	$a\ ^3G_5 - x\ ^3G_4^0$		
2459.233		5		40650.77	$a\ ^3G_4 - x\ ^3G_5^0$		
2458.288	3	50		40666.40	$a\ ^3P_1 - z\ ^3S_1^0$		
2457.803		5		40674.43			
2457.446	1	30		40680.34	$a\ ^3G_3 - y\ ^1F_3^0$		
2456.508		3		40695.87	$a\ ^3P_2 - x\ ^3D_1^0$		
2454.654		2		40726.60	$a\ ^3F_3 - z\ ^1F_3^0$		
2453.857		3		40739.83	$a\ ^1H_5 - w\ ^3G_4^0$		
2453.346	4	80		40748.32	$a\ ^3G_4 - x\ ^3G_4^0$		
2452.773		4		40757.84			
2450.734	1	20		40791.74	$a\ ^3P_2 - x\ ^3D_2^0$		
2450.619	1−	9		40793.65	$a\ ^3G_4 - x\ ^3G_3^0$		
2450.236		10h		40800.03			
2448.46		5H		40829.63			
2447.608	1	20		40843.84	$a\ ^3G_5 - y\ ^1H_5^0$		
2446.697	2	30		40859.04	$a\ ^3P_2 - x\ ^3D_3^0$		
2445.336		4		40881.78	$a\ ^3F_3 - z\ ^1G_4^0$		
2445.107		6		40885.61	$a\ ^3P_0 - z\ ^3S_1^0$		
2444.967	2	60		40887.95	$a\ ^3G_3 - x\ ^3G_3^0$		
2441.664		4h		40943.26	$a\ ^3G_4 - y\ ^1H_5^0$		
2439.774		4h		40974.97			
2438.039		10h		41004.13			
2436.570		5H		41028.85			
2434.94		5?		41056.31	$a\ ^3F_3 - z\ ^1D_2^0$		
2432.976	2	20		41089.46	$a\ ^3P_1 - x\ ^3D_1^0$		
2431.59		4		41112.87	$b\ ^1D_2 - x\ ^1F_3^0$		
2427.316	1	20		41185.26	$a\ ^3P_1 - x\ ^3D_2^0$		
2423.030		6		41258.10	$a\ ^3F_2 - z\ ^1D_2^0$		
2408.430	2	15		41508.19	$a\ ^3P_0 - z\ ^1P_1^0$		
2407.592		5		41522.64	$a\ ^3H_5 - y\ ^1G_4^0$		
2406.989		5		41533.04	$b\ ^3F_4 - y\ ^1F_3^0$		
2405.817		2		41553.27	$b\ ^3D_3 - w\ ^3F_4^0$		
2403.240	1	9		41597.82	$b\ ^3F_4 - x\ ^2G_5^0$		
2400.892	1	40h		41638.50			
2400.166		4		41651.09	$b\ ^3F_2 - y\ ^1F_3^0$		
2397.622		6		41695.28	$b\ ^3F_4 - x\ ^3G_4^0$		
2396.927		4H		41707.37			
2394.92		2h?		41742.32	$c\ ^3P_2 - w\ ^3F_2^0$		
2393.814	1	8		41761.61	$b\ ^3F_3 - x\ ^3G_4^0$		
2392.698		8h		41781.08			
2392.17		2h		41790.30	$c\ ^3P_2 - w\ ^3F_3^0$		
2391.226*		10h		41806.80	$b\ ^3F_3 - x\ ^3G_3^0$		
2390.470		15h		41820.02			
2389.696	10	100		41833.56	$a\ ^3F_2 - y\ ^3D_1^0$		
2389.144		2		41843.23	$a\ ^3P_2 - w\ ^3D_1^0$		
2388.260		5		41858.72	$b\ ^3F_2 - x\ ^3G_3^0$	(0)1.32	(0)1.28s
2387.93		3h		41864.50			
2386.45		2		41890.46	$b\ ^3F_4 - y\ ^1H_5^0$		
2384.996		6h		41916.00			
2383.995	10	80		41933.60	$a\ ^3F_3 - y\ ^3D_2^0$	(0)0.96	(0)0.97b

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}Å	Arc	Spark				Observed	Computed
2383.432		6H		41943.50			
2382.032	8	60+Fc?		41968.15			
2380.910	12	120		41987.92	$a\ ^3F_4 - y\ ^3D_3^o$		
2379.149	10	100		42019.00	$a\ ^3P_2 - w\ ^3D_3^o$		
2376.33		1		42068.84	$a\ ^5P_2 - y\ ^3S_1^o$		
2374.649	1	6		42098.62	$a\ ^3F_2 - y\ ^3P_1^o$		
2374.31		2H?		42104.63	$a\ ^1F_3 - u\ ^3D_2^o$		
2372.584	4	20		42135.26	$a\ ^3F_2 - y\ ^3D_2^o$		
2372.168		15H		42142.65			
2366.883	3	20		42236.73	$a\ ^3P_1 - w\ ^3D_1^o$		
2366.490	4	25		42243.75	$a\ ^3F_3 - y\ ^3D_3^o$		
2364.390		2		42281.27	$a\ ^3F_3 - y\ ^3P_2^o$		
2362.632	2	20		42312.73	$a\ ^1P_1 - x\ ^1D_2^o$		
2360.334	5	50		42353.92	$a\ ^3P_1 - w\ ^3D_2^o$		
2357.810	6	60		42399.25	$a\ ^1H_5 - x\ ^1G_4^o$	(0)1.30nw₂	(0)1.24b
2357.532		3H		42404.25			
2356.209		3H		42428.06			
2355.232		4		42445.66	$a\ ^3F_2 - y\ ^3D_3^o$		
2354.656	2	20		42456.04	$a\ ^3P_0 - w\ ^3D_1^o$		
2353.16		1?		42483.03	$a\ ^3F_2 - y\ ^3P_2^o$		
2352.177	10	100		42500.78	$a\ ^3H_6 - x\ ^3G_5^o$		
2351.24		6H		42517.72			
2347.507	1	8		42585.31	$a\ ^3H_5 - x\ ^3G_5^o$		
2346.868	5	25		42596.92	$a\ ^3H_4 - y\ ^1F_3^o$		
2342.142	10	60+h		42682.86	$a\ ^3H_5 - x\ ^3G_4^o$	(0) 1.03	(0) 1.02b
2341.358		4		42697.15	$a\ ^3H_6 - z\ ^1I_6^o$		
2337.956		4		42759.27	$a\ ^3H_4 - x\ ^3G_4^o$		
2336.098	4	30		42793.28	$a\ ^3H_6 - y\ ^1H_5^o$		
2335.480	6	40		42804.60	$a\ ^3H_4 - x\ ^3G_3^o$		
2335.326	2	10		42807.42	$a\ ^3P_2 - x\ ^3P_2^o$		
2335.204		2		42809.66	$a\ ^3P_2 - x\ ^3P_1^o$		
2330.144	1	12		42902.62			
2321.855		1		43055.76	$a\ ^3F_4 - y\ ^3H_4^o$		
2314.99		2h?		43183.44			
2314.055		3		43200.88	$a\ ^3P_1 - x\ ^3P_2^o$		
2313.939	1	9		43203.04	$a\ ^3P_1 - x\ ^3P_1^o$		
2312.299		2		43233.68	$a\ ^3P_2 - y\ ^1F_3^o$		
2311.91		1?		43240.96	$a\ ^3F_3 - y\ ^3H_4^o$		
2309.072		10		43294.10	$a\ ^3F_4 - x\ ^3F_3^o$		
2308.831		5		43298.62	$a\ ^3P_1 - x\ ^3P_0^o$		
2304.785		7h		43374.62			
2303.238	2	10		43403.75	$a\ ^3F_3 - x\ ^3F_2^o$		
2302.256		5		43422.26	$a\ ^3P_0 - x\ ^3P_1^o$		
2295.504	4	20		43549.97	$a\ ^3F_3 - x\ ^3F_3^o$		
2294.992	7	40		43559.68	$a\ ^3F_4 - x\ ^3F_4^o$		
2292.588	5	30		43605.36	$\left\{\begin{array}{l} a\ ^3F_2 - x\ ^3F_2^o \\ a\ ^1D_2 - x\ ^1D_2^o \end{array}\right.$		
2291.381		3h		43628.32			
2289.219	4	70		43669.53	$a\ ^3F_4 - x\ ^3D_3^o$		
2284.920	1	15		43751.68	$a\ ^3F_2 - x\ ^3F_3^o$		
2284.748		10		43754.97	$a\ ^3P_2 - y\ ^3S_1^o$		
2283.766		40		43773.79			
2283.469		7		43779.48	$a\ ^3D_3 - w\ ^3F_3^o$		
2282.863		6		43791.10	$a\ ^3D_2 - w\ ^3F_2^o$		
2281.601	2	60		43815.32	$\left\{\begin{array}{l} a\ ^3F_3 - x\ ^3F_4^o \\ a\ ^3D_1 - w\ ^3F_3^o \\ b\ ^3H_4 - w\ ^3G_3^o \end{array}\right.$		
2281.235	2	60		43822.35	$a\ ^3D_3 - w\ ^3F_4^o$		
2280.581		4		43834.91			
2280.338		60		43839.58	$a\ ^3D_2 - w\ ^3F_3^o$		
2279.762		20		43850.66	$b\ ^3H_5 - w\ ^3G_4^o$		
2279.376	1	15		43858.08	$a\ ^3F_3 - x\ ^3D_2^o$		
2278.972	1	40		43865.86	$b\ ^3H_6 - w\ ^3G_5^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
λ_{air}A	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
	Arc	Spark				Observed	Computed
2278.098		4h		43882.69			
2277.792		1		43888.58	$b\ ^3H_4 - w\ ^3G_4^\circ$		
2275.883		7		43925.39	$a\ ^3F_3 - x\ ^3D_3^\circ$		
2275.586		7		43931.12	$a\ ^5F_3 - z\ ^3P_2^\circ$		
2274.658		1		43949.04	$b\ ^3H_5 - w\ ^3G_5^\circ$		
2273.89		2		43963.88	$a\ ^3F_2 - x\ ^3D_1^\circ$		
2273.616		9		43969.18	$b\ ^3D_2 - x\ ^1D_2^\circ$		
2273.024		40h		43980.63	$\begin{cases} a\ ^5F_1 - z\ ^3P_0^\circ \\ b\ ^3D_3 - v\ ^3D_3^\circ \end{cases}$		
2272.437		1		43991.99	$d\ ^3F_2 - w\ ^1F_3^\circ$		
2271.848	1	10		44003.40	$a\ ^5F_2 - z\ ^3P_1^\circ$		
2271.185		8		44016.24			
2269.293		3		44052.94	$a\ ^5F_2 - z\ ^3P_2^\circ$		
2268.55		1		44067.36	$a\ ^5F_2 - z\ ^5P_1^\circ$		
2268.361		4		44071.03	$a\ ^5F_3 - z\ ^5P_2^\circ$		
2267.712		3		44083.65	$a\ ^5F_4 - z\ ^5P_3^\circ$		
2267.612		5		44085.59	$a\ ^5F_1 - z\ ^3P_1^\circ$		
2263.612		3		44163.48	$a\ ^3F_2 - z\ ^1P_1^\circ$		
2262.70		2		44181.28	$b\ ^3D_3 - v\ ^3D_2^\circ$		
2262.404		9h		44187.06	$b\ ^3D_2 - v\ ^3D_2^\circ$		
2261.850		10h		44197.89			
2261.084	5	30		44212.85	$a\ ^5F_4 - y\ ^5D_3^\circ$		
2258.814	?	50+I		44257.28	$a\ ^5F_5 - y\ ^5D_4^\circ$		
2258.64		2		44260.69	$c\ ^3P_2 - v\ ^3D_3^\circ$		
2256.984		20+I?		44293.17	$a\ ^5F_3 - y\ ^5D_2^\circ$		
2255.95		1?		44313.46	$b\ ^3D_2 - v\ ^3D_1^\circ$		
2252.953	1−	7		44372.41	$a\ ^5F_3 - y\ ^5D_3^\circ$		
2251.550		7		44400.05			
2251.114		6		44408.65	$b\ ^3D_1 - v\ ^3D_1^\circ$		
2250.800		5		44414.85	$a\ ^5F_2 - y\ ^5D_2^\circ$		
2250.490		5		44420.96	$a\ ^5F_2 - y\ ^5D_1^\circ$		
2250.382		3		44423.10	$a\ ^5F_1 - y\ ^5D_0^\circ$		
2248.913		4		44452.11	$a\ ^5F_4 - y\ ^5D_4^\circ$		
2248.45		1		44461.26	$c\ ^3P_2 - v\ ^3D_2^\circ$		
2246.65		1?		44496.88	$\begin{cases} a\ ^5F_1 - y\ ^5D_2^\circ \\ c\ ^3P_1 - x\ ^1D_2^\circ? \end{cases}$		
2246.332		3		44503.18	$a\ ^5F_1 - y\ ^5D_1^\circ$		
2243.468		4h		44559.98			
2229.985	3	80		44829.37	$a\ ^3F_4 - w\ ^3D_3^\circ$		
2224.845		1		44932.93			
2220.214	3	100		45026.65	$a\ ^3F_3 - w\ ^3D_2^\circ$		
2219.408		3		45043.00	$d\ ^3F_2 - t\ ^3D_1^\circ?$		
2217.32		8		45085.41	$\begin{cases} a\ ^3F_3 - w\ ^3D_3^\circ \\ d\ ^3F_2 - t\ ^3D_2^\circ \end{cases}$		
2215.786		9h		45116.62	$d\ ^3F_3 - t\ ^3D_2^\circ$		
2211.38		2h?		45206.50	$d\ ^3F_3 - t\ ^3D_3^\circ$		
2211.16		2		45211.00			
2210.305	1−	8		45228.48	$a\ ^3F_2 - w\ ^3D_2^\circ$		
2210.029	1	10		45234.13	$d\ ^3F_4 - t\ ^3D_3^\circ$		
2205.70		2		45322.90	$a\ ^1D_2 - x\ ^1F_3^\circ$		
2199.660		7		45447.34	$c\ ^3F_2 - t\ ^3D_1^\circ?$		
2199.443		10		45451.82	$c\ ^3F_3 - t\ ^3D_2^\circ$		
2198.524	2	20		45470.82	$b\ ^3P_2 - v\ ^3D_3^\circ$		
2195.69		15		45529.50	$c\ ^3F_4 - t\ ^3D_3^\circ$		
2195.10		2		45541.74	$c\ ^3F_3 - t\ ^3D_3^\circ$		
2194.84		8		45547.13	$d\ ^3F_2 - u\ ^3F_2^\circ$		
2193.34		2		45578.27	$d\ ^3F_3 - u\ ^3F_2^\circ$		
2192.91		2h		45587.21			
2190.48		8		45637.78	$b\ ^3P_1 - v\ ^3D_2^\circ$		
2190.22	2	30		45643.20	$b\ ^3G_5 - w\ ^3F_4^\circ$		
2188.86		2		45671.56	$b\ ^3P_2 - v\ ^3D_2^\circ$		
2186.94	2	20		45711.65	$b\ ^3G_4 - w\ ^3F_3^\circ$		
2185.96	3	40		45732.14	$d\ ^3F_2 - 2^3_2$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2185. 39	4	50		45744. 06	$\begin{cases} b\ ^3G_3 - w\ ^3F_2^o \\ d\ ^3F_2 - u\ ^3F_3^o \end{cases}$		
2184. 89		2		45754. 53	$b\ ^3G_4 - w\ ^3F_4^o$		
2184. 41		2		45764. 58	$b\ ^3P_1 - v\ ^3D_1^o$		
2184. 17		5		45769. 61	$b\ ^3P_0 - v\ ^3D_1^o$		
2183. 08		2		45792. 46	$b\ ^3G_3 - w\ ^3F_3^o$		
2175. 833		5		45944. 96			
2171. 840		25		46029. 42	$d\ ^3F_4 - u\ ^3F_4^o$		
2171. 12		2		46044. 4	$\begin{cases} a\ ^3F_4 - y\ ^1F_3^o \\ b\ ^3D_3 - y\ ^5G_2^o \end{cases}$		
2170. 38		15		46060. 4			
2170. 05		10H		46067. 4	$c\ ^3F_4 - u\ ^3F_3^o$		
2168. 56		0h		46099. 0	$c\ ^3F_3 - 2_3^o$		
2168. 08		10		46109. 2	$a\ ^3F_4 - x\ ^3G_5^o$		
2167. 69		8		46117. 5	$c\ ^3F_2 - u\ ^3F_3^o$		
2166. 15		20h		46150. 3			
2164. 38		15		46188. 1			
2163. 68		20h		46203. 0			
2161. 48		20		46250. 0	$a\ ^3D_3 - v\ ^3D_3^o$		
2160. 55		5		46269. 9			
2159. 53		0h		46291. 8	$a\ ^3D_2 - x\ ^1D_2^o$		
2159. 13		0hFe II?		46300. 4	$\begin{cases} a\ ^5F_4 - y\ ^3F_3^o \\ a\ ^3F_3 - y\ ^1F_2^o \end{cases}$		
2158. 36		0H		46316. 9	$a\ ^3D_1 - x\ ^1D_2^o$?		
2157. 05		8		46345. 0			
2155. 61		15		46375. 9	$a\ ^1G_4 - y\ ^5F_5^o$		
2154. 42		0		46401. 6	$a\ ^3F_4 - y\ ^1H_5^o$		
2151. 812	5	50		46457. 79			
2151. 032	5	50		46474. 64			
2150. 835	6	60		46478. 89			
2149. 386		8		46510. 22	$a\ ^3D_2 - v\ ^3D_2^o$		
2148. 42	15	40		46531. 1	$a\ ^5D_3 - z\ ^5P_2^o$		
2148. 00		8		46540. 3			
2147. 52		20		46550. 6	$a\ ^5D_1 - z\ ^3P_0^o$		
2145. 990	10	40		46583. 8	$a\ ^5D_2 - z\ ^3P_1^o$		
2145. 37*		0h		46597. 3	$a\ ^5F_1 - y\ ^3F_2^o$?		
2144. 10		5 V I?		46624. 9	$a\ ^5F_4 - z\ ^1H_5^o$		
2143. 706		5		46633. 44	$a\ ^5D_2 - z\ ^5P_2^o$		
2143. 038	30	60		46647. 98	$a\ ^5D_2 - z\ ^5P_1^o$		
2142. 74	1	4		46654. 5	$a\ ^5D_1 - z\ ^3P_1^o$		
2142. 40		3		46661. 9	$a\ ^3D_1 - v\ ^3D_1^o$		
2141. 973	40	100		46671. 17	$a\ ^5D_3 - z\ ^5P_2^o$		
2141. 70	0	4h?		46677. 1	$b\ ^1G_4 - x\ ^1G_4^o$		
2140. 064	60	150		46712. 79	$a\ ^5D_4 - z\ ^5P_3^o$		
2139. 798	40	100		46718. 60	$a\ ^5D_1 - z\ ^5P_1^o$		
2138. 17	30	60		46754. 2	$a\ ^5D_0 - z\ ^5P_1^o$		
2137. 31	50	100		46773. 0	$a\ ^5D_2 - z\ ^5P_2^o$		
2134. 12	100	200		46842. 9	$a\ ^5D_3 - z\ ^5P_3^o$		
2133. 04		60		46866. 6			
2131. 85	30	80		46892. 8	$a\ ^5D_3 - y\ ^5D_2^o$		
2130. 85		0		46914. 8	$a\ ^5F_3 - z\ ^1G_4^o$		
2130. 42		5		46924. 2	$a\ ^1D_2 - v\ ^3F_3^o$		
2129. 477	10	40		46945. 01	$a\ ^5D_2 - z\ ^5P_3^o$		
2128. 241	1	7		46972. 26	$a\ ^5D_3 - y\ ^5D_3^o$		
2127. 34	1	5		46992. 2	$a\ ^5D_1 - y\ ^5D_0^o$		
2126. 932	6	20		47001. 17	$a\ ^5D_2 - y\ ^5D_1^o$		
2126. 585		25h		47008. 84			
2124. 00		5d?		47066. 0	$a\ ^5D_1 - y\ ^5D_2^o$		
2123. 62	3	10		47074. 5	$a\ ^5D_2 - y\ ^5D_3^o$		
2123. 340	20	60		47080. 67	$a\ ^5D_4 - y\ ^5D_3^o$		
2122. 11	1?	1		47108. 0	$a\ ^5D_0 - y\ ^5D_1^o$		
2121. 54		10		47120. 6	$b\ ^3D_2 - v\ ^3F_2^o$		
2119. 562		15		47164. 58			

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
2119. 15		40h		47173. 7			
2118. 84	1	25		47180. 6			
2118. 43*		30h		47189. 8	$b\,^1G_4-x\,^1F_3^o$		
2117. 482	4	12		47210. 90	$a\,^5D_3-y\,^5D_4^o$		
2117. 293		25		47215. 12	$b\,^3D_1-v\,^3F_2^o$		
2114. 30		15		47281. 9	$b\,^3D_3-v\,^3F_3^o$		
2114. 03		30		47288. 0	$b\,^3D_2-v\,^3F_3^o$		
2111. 04		15		47354. 9			
2110. 48		5		47367. 5			
2109. 27		8		47394. 7	$c\,^3P_2-v\,^3F_2^o$		
2107. 40		10h		47436. 7	$a\,^3D_3-x\,^1G_4^o$		
2103. 70	8	80		47520. 2	$a\,^3G_5-w\,^3F_4^o$		
2103. 53	10	30		47524. 0	$b\,^3D_3-v\,^3F_4^o$		
2101. 86	tr	20		47561. 8	$c\,^3P_2-v\,^3F_3^o$		
2101. 17	5	50		47577. 4	$a\,^3G_4-w\,^3F_3^o$		
2100. 25		0		47598. 2	$b\,^3G_5-w\,^3G_4^o$		
2099. 47		0		47615. 9	$a\,^3D_1-x\,^5D_2^o$		
2099. 16	3	30		47622. 9	$a\,^3G_3-w\,^3F_3^o$		
2098. 60		0		47635. 6	$b\,^3G_4-w\,^2G_3^o$		
2098. 00		5d?		47649. 2	$c\,^3P_1-v\,^3F_2^o$?		
2097. 03		2		47671. 3	$a\,^3G_3-w\,^3F_3^o$		
2095. 94	0	25		47696. 1	$b\,^3G_5-w\,^3G_5^o$		
2095. 37	5	15		47709. 0	$b\,^3G_4-w\,^3G_4^o$		
2095. 05		15		47716. 3	$b\,^3G_3-w\,^3G_3^o$		
2091. 81		2h		47790. 2	$b\,^3G_3-w\,^3G_4^o$		
2090. 33	tr	25		47824. 1	$a\,^1F_3-w\,^1F_3^o$		
2087. 92		20		47879. 3	$a\,^1G_4-x\,^1G_4^o$		
2087. 54		15		47888. 0			
2079. 29		10H		48077. 9			
2077. 79	tr?	40H		48112. 7			
2077. 58	tr?	15H		48117. 5	$d\,^3F_2-w\,^1D_2^o$		
2076. 87	30	60h		48134. 0			
2076. 52	0?	0??		48142. 1	$b\,^3D_2-u\,^3D_1^o$		
2075. 13		15		48174. 3	$b\,^3D_3-u\,^3D_2^o$		
2074. 87	0h	25		48180. 4	$b\,^3D_2-u\,^3D_2^o$		
2072. 43	tr	30		48237. 1	$b\,^3D_1-u\,^3D_1^o$		
2070. 79		15		48275. 3	$b\,^3D_1-u\,^3D_2^o$		
2068. 80	10	60		48321. 7	$b\,^3D_2-u\,^3D_3^o$		
2068. 54	0	15		48327. 8	$b\,^3D_2-u\,^3D_3^o$		
2066. 83		8h		48367. 8	$d\,^3F_2-3_3^o$		
2065. 76	10	40		48392. 8	$a\,^1G_4-x\,^1F_3^o$		
2064. 78		2		48415. 8	$c\,^3P_2-u\,^3D_1^o$		
2063. 12		20		48454. 7	$c\,^3P_2-u\,^3D_2^o$		
2062. 00		10		48481. 0			
2061. 56	tr	15		48491. 4			
2058. 34	10	40		48567. 2	$b\,^3F_4-w\,^3F_4^o$		
2057. 36	8	25		48590. 4	$b\,^3F_3-w\,^3F_3^o$		
2057. 20	5	15		48594. 1	$b\,^3F_2-w\,^3F_2^o$		
2056. 89		15		48601. 5	$\{\begin{array}{l} c\,^3P_2-u\,^3D_3^o \\ c\,^3P_0-u\,^3D_1^o \end{array}$		
2055. 55		8		48633. 1	$b\,^3F_3-w\,^3F_4^o$		
2055. 15		5		48642. 6	$b\,^3F_2-w\,^3F_3^o$		
2054. 85	10	70		48649. 7			
2054. 27		0h		48663. 4	$a\,^1D_2-v\,^3G_3^o$		
2054. 01		0		48669. 6	$c\,^3P_1-u\,^3D_1^o$		
2052. 38		10		48708. 2	$c\,^3P_1-u\,^3D_2^o$		
2051. 79		30h		48722. 2	$c\,^3F_4-3_3^o$		
2051. 27		5h		48734. 6	$c\,^3F_3-3_3^o$		
2049. 67		5h		48772. 6	$\{\begin{array}{l} b\,^3P_2-v\,^3F_2^o? \\ c\,^3F_2-3_3^o \end{array}$		
2048. 75	tr	15		48794. 5			
2046. 12		0		48857. 2	$a\,^1S_0-u\,^3D_1^o$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
2044. 28	2h	5		48901. 2	$a\ ^1H_5 - w\ ^1G_4^\circ$		
2039. 29		60		49020. 9	$a\ ^5P_3 - 1_4^\circ$		
2037. 83		50		49056. 0			
2037. 50		25		49063. 9			
2035. 78		15		49105. 4			
2035. 06		60		49122. 7			
2033. 50		10		49160. 4			
2031. 40		30h		49211. 2			
2028. 88		15		49272. 3			
2025. 47		15		49355. 3	$a\ ^3G_3 - y\ ^5F_2^\circ$		
2024. 84		0??		49370. 6	$a\ ^3G_3 - v\ ^5F_4^\circ$?		
2023. 56	10	50		49401. 9	$b\ ^3H_4 - v\ ^3G_3^\circ$		
2022. 66		15h		49423. 9			
2021. 83		5		49444. 1	$a\ ^3D_2 - v\ ^3F_2^\circ$		
2021. 38		10h		49455. 1			
2020. 83	0	15		49468. 6	$a\ ^3D_1 - v\ ^3F_2^\circ$		
2020. 54	0h	10		49475. 7	$a\ ^3G_5 - w\ ^3G_4^\circ$		
2019. 47	tr	10		49501. 9	$a\ ^3G_4 - w\ ^3G_3^\circ$		
2017. 46		2		49551. 2	$a\ ^3D_2 - v\ ^3F_3^\circ$		
2017. 32		2		49554. 6	$a\ ^3H_5 - w\ ^3F_4^\circ$		
2016. 53	15	60		49574. 1	$\begin{cases} a\ ^3G_5 - w\ ^3G_5^\circ \\ a\ ^3G_4 - w\ ^3G_4^\circ \end{cases}$		
2015. 74	tr	20		49593. 5	$\begin{cases} a\ ^3G_3 - w\ ^3G_3^\circ \\ b\ ^3P_1 - u\ ^3D_1^\circ \end{cases}$		
2015. 56	tr	20		49597. 9	$b\ ^3P_0 - u\ ^3D_1^\circ$		
2015. 02	0h	15		49611. 2	$a\ ^3D_2 - v\ ^3F_3^\circ$		
2014. 18	20	90		49631. 9	$\begin{cases} b\ ^3P_1 - u\ ^3D_2^\circ \\ a\ ^3G_5 - y\ ^5F_5^\circ \\ b\ ^3H_5 - v\ ^3G_4^\circ \end{cases}$		
2012. 84	tr	20		49664. 9	$b\ ^3P_2 - u\ ^3D_2^\circ$		
2012. 64	0h	10		49669. 9	$\begin{cases} b\ ^3H_4 - v\ ^3G_4^\circ \\ a\ ^3G_3 - w\ ^3G_4^\circ \end{cases}$		
2010. 15	3	5h		49731. 4	$a\ ^3G_4 - y\ ^5F_5^\circ$		
2007. 66	tr	25		49793. 0	$a\ ^3D_3 - v\ ^3F_2^\circ$		
2006. 88	10	80		49812. 4	$b\ ^3P_2 - u\ ^3D_3^\circ$		
2006. 08		0??		49832. 3	$b\ ^1G_4 - u\ ^3D_3^\circ$		
2005. 88		15		49837. 2			
2004. 77	15	90		49864. 8	$b\ ^3H_6 - v\ ^3G_5^\circ$		
2004. 03		0		49883. 2	$b\ ^3G_4 - x\ ^1F_3^\circ$?		
2002. 82		0		49913. 4	$a\ ^5F_5 - z\ ^3I_6^\circ$		
2001. 65	tr	40		49942. 5			
2001. 43		10		49948. 0	$b\ ^3H_5 - v\ ^3G_5^\circ$		
2001. 14	tr	30		49955. 3			
2000. 78		5		49964. 2	$b\ ^3G_3 - x\ ^1F_3^\circ$?		
2000. 14		10h		49980. 2			
λVac							
1995. 02		0		50124. 8	$a\ ^3G_3 - x\ ^1D_2^\circ$		
1992. 80		30		50180. 7			
1987. 82		3		50306. 4			
1984. 05	10	90		50402. 0			
1982. 41		8		50443. 7	$a\ ^3D_3 - u\ ^3D_2^\circ$		
1982-21		0		50448. 7	$b\ ^3F_4 - w\ ^3G_3^\circ$		
1981. 53		8		50466. 1	$a\ ^3D_2 - u\ ^3D_1^\circ$		
1980. 59	0	25		50490. 0	$a\ ^3D_1 - u\ ^3D_1^\circ$		
1980. 04	0	40		50504. 0	$a\ ^3D_2 - u\ ^3D_2^\circ$		
1978. 96	0	20		50531. 6	$b\ ^1G_4 - v\ ^3G_3^\circ$		
1977. 60	1	0??I?		50566. 3	$b\ ^3F_3 - w\ ^3G_3^\circ$		
1976. 62	0	60		50591. 4	$a\ ^3D_3 - u\ ^3D_3^\circ$		
1972. 62		20		50694. 0	$b\ ^3H_4 - x\ ^1H_5^\circ$		
1960. 98		2		50994. 9	$b\ ^3F_4 - v\ ^3D_3^\circ$		
1950. 77		0		51261. 8	$\begin{cases} b\ ^3F_3 - v\ ^3D_2^\circ? \\ b\ ^3G_5 - y\ ^5G_6^\circ? \end{cases}$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
1945.64	3	30		51397.0	$b\,^3G_3-v\,^3F_2$		
1945.35		30Bl Fe III?		51404.6	$a\,^3H_5-y\,^5F_4$		
1943.99		tr		51440.6	$\left\{\begin{array}{l} a\,^3G_4-x\,^3D_3 \\ b\,^3F_2-v\,^3D_1 \end{array}\right.$		
1942.35	8	40		51484.0	$b\,^3G_4-v\,^3F_3$		
1941.40	10	30		51509.2	$a\,^3H_5-w\,^3G_4$		
1941.27	10	30		51512.7	$a\,^3H_4-w\,^3G_3$		
1940.86	10	40		51523.6	$a\,^3H_6-w\,^3G_5$		
1939.32		8		51564.5	$b\,^3G_3-v\,^3F_3$		
1938.70		8		51581.0	$a\,^3H_6-y\,^5F_5$		
1938.50		10		51586.3	$a\,^3H_4-w\,^3G_4$		
1937.68		7		51608.1	$a\,^3H_5-w\,^3G_5$		
1937.44	10	60		51614.5	$b\,^3G_5-v\,^3F_4$		
1933.97		30		51707.1			
1933.28		10		51725.6	$b\,^3G_4-v\,^3F_4$		
1932.99		3		51733.3	$a\,^1G_4-v\,^3G_3$		
1932.55		0h		51745.1	$a\,^1I_6-x\,^1H_5$		
1929.61	10	60		51823.9	$b\,^1G_4-x\,^1H_5$		
1924.87		30		51951.6	$a\,^1F_3-w\,^1D_2$		
1921.24		15he?		52049.7	$b\,^3H_4-w\,^1G_4$		
1920.36		12		52073.6	$a\,^5D_2-z\,^3S_1$?		
1919.35		20		52101.0	$a\,^5P_3-x\,^5D_2$		
1917.79		15		52143.4	$a\,^1F_3-3^3$		
1915.71		tr		52200.0	$a\,^1F_3-3^3$		
1914.91	0	15		52221.8	$a\,^5P_2-x\,^5D_1$		
1913.70	8	50		52254.8	$a\,^5P_3-x\,^5D_3$		
1913.10	2	20		52271.2	$a\,^5P_1-x\,^5D_0$		
1912.39	8	40		52290.6	$a\,^5P_2-x\,^5D_2$		
1911.88	6	40		52304.5	$a\,^5P_1-x\,^5D_1$		
1909.36	8	40		52373.6	$a\,^5P_1-x\,^5D_2$		
1908.32	10	40h		52402.1	$a\,^5P_2-x\,^5D_3$		
1907.79	15	50		52416.7	$a\,^5P_3-x\,^5D_4$		
1904.54		tr		52506.1	$b\,^3F_2-x\,^3D_3$		
1903.86		5?		52524.9	$b\,^3G_4-u\,^3D_3$?		
1897.70		1		52695.4	$\left\{\begin{array}{l} a\,^3P_2-v\,^3D_3 \\ b\,^3F_4-x\,^1F_3 \end{array}\right.$		
1885.90		10		53025.1	$a\,^1G_4-x\,^1H_5$		
1883.98	6	20		53079.1	$a\,^3F_4-w\,^3F_4$		
1880.43		40e?		53179.3	$b\,^1G_4-w\,^1G_4$		
1878.90		10		53222.6	$b\,^3G_4-v\,^3G_5$		
1878.19		0		53242.7	$a\,^3F_3-w\,^3F_2$		
1877.85		tr		53252.4	$a\,^1H_5-u\,^3F_4$		
1877.00		10		53276.5	$a\,^3G_3-v\,^3F_2$		
1876.47	3	10		53291.6	$a\,^3F_3-w\,^3F_3$		
1876.06	3	20		53303.2	$b\,^3G_3-v\,^3G_3$		
1874.97		1		53334.2	$a\,^3F_3-w\,^3F_4$		
1874.45		12		53349.0	$a\,^3G_4-v\,^3F_3$		
1873.39		10		53379.2	$b\,^3G_5-v\,^3G_4$		
1871.08	3	12		53445.1	$a\,^3F_2-w\,^3F_2$		
1869.47	10	50		53491.1	$\left\{\begin{array}{l} a\,^3G_5-v\,^3F_4 \\ b\,^3H_4-v\,^3G_4 \end{array}\right.$		
1867.47		20		53548.4			
1866.68		5		53571.0	$b\,^3G_3-v\,^3G_4$		
1865.99		3		53590.9	$a\,^3G_4-v\,^3F_3$		
1865.68		2hd?		53599.8	$b\,^1D_2-w\,^1D_2$		
1862.76		25		53683.8	$a\,^1D_2-w\,^1F_3$		
1862.37	8	30		53695.0	$b\,^3G_5-v\,^3G_5$		
1858.50		2		53806.8	$b\,^3G_4-v\,^3G_5$		
1848.80		0Bl Fe II?		54089.1	$a\,^3P_2-x\,^5D_3$		
1843.43		5		54246.7	$b\,^3F_2-v\,^3F_2$		
1842.68		0h		54268.8	$a\,^3P_1-x\,^5D_0$		
1839.54		20		54361.4	$b\,^3F_3-v\,^3F_3$		
1838.86		25		54381.5	$a\,^1G_4-w\,^1G_4$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
$\lambda_{air}A$	Arc	Spark				Observed	Computed
1837.76		tr		54414.1	$b\ ^3F_2 - v\ ^3F_3^\circ$		
1833.58		10		54538.1	$b\ ^3F_4 - v\ ^3F_4^\circ$		
1828.84		50		54679.5			
1823.61		25		54836.3			
1817.09		tr		55033.0	$a\ ^3F_4 - w\ ^3G_4^\circ$		
1816.30		20h		55057.0			
1815.32		2hd?		55086.7	$a\ ^3D_4 - v\ ^3G_3^\circ?$		
1814.93		5		55098.5	$b\ ^3G_2 - t\ ^3D_1^\circ$		
1813.87		8		55130.7	$a\ ^3F_4 - w\ ^3G_5^\circ$		
1811.51		tr		55202.6	$\begin{cases} a\ ^5P_3 - u\ ^3D_3^\circ \\ a\ ^5P_2 - u\ ^3D_2^\circ \end{cases}$		
1810.57		3e		55231.2	$b\ ^3D_2 - t\ ^3D_3^\circ?$		
1810.31		tr		55239.2	$a\ ^1D_2 - u\ ^3F_2^\circ$		
1809.81		8d?		55254.4	$\begin{cases} b\ ^3F_3 - u\ ^3D_2^\circ \\ a\ ^3G_5 - v\ ^3G_4^\circ? \end{cases}$		
1809.36		10e		55268.2	$b\ ^3F_2 - u\ ^3D_1^\circ$		
1808.66		0		55289.6	$a\ ^3F_3 - w\ ^3G_4^\circ$		
1807.15		1		55335.7	$b\ ^3F_4 - u\ ^3D_3^\circ$		
1806.49		8h		55356.0	$a\ ^3G_4 - v\ ^3G_3^\circ$		
1804.53		0h		55416.1	$\begin{cases} a\ ^3F_2 - w\ ^3G_3^\circ \\ c\ ^3P_2 - t\ ^3D_2^\circ \end{cases}$		
1801.61		0		55505.9	$\begin{cases} a\ ^3F_4 - v\ ^3D_3^\circ \\ c\ ^3P_2 - t\ ^3D_3^\circ \end{cases}$		
1800.13		0h		55551.5	$b\ ^1G_4 - w\ ^1F_3^\circ$		
1799.97		3		55556.5	$a\ ^5D_2 - y\ ^3S_1^\circ$		
1799.47		12		55571.9	$a\ ^3G_5 - v\ ^3G_5^\circ$		
1796.80		20		55654.5			
1796.52		3h		55663.2	$a\ ^5D_0 - y'\ ^3S_1^\circ$		
1796.26		0		55671.2	$a\ ^3G_4 - v\ ^3G_3^\circ$		
1795.38		0		55698.5	$b\ ^3D_1 - u\ ^3F_2^\circ$		
1794.62		50		55722.1			
1793.13		3		55768.4	$b\ ^3D_2 - u\ ^3F_3^\circ$		
1792.49		5		55788.3	$b\ ^3D_2 - 2_3^\circ$		
1789.61		5h		55878.1	$c\ ^3P_2 - u\ ^3F_2^\circ?$		
1788.30		25		55919.0			
1786.91		0		55962.5	$a\ ^3F_3 - v\ ^3D_2^\circ$		
1785.07		5		56020.2	$b\ ^3D_1 - u\ ^3F_3^\circ$		
1780.52		5h		56163.4	$\begin{cases} a\ ^3F_2 - v\ ^3D_2^\circ \\ b\ ^3H_4 - 2_3^\circ \end{cases}$		
1776.48		tr?		56291.1	$a\ ^3F_2 - v\ ^3D_1^\circ$		
1773.00		tr		56401.6	$b\ ^3H_4 - u\ ^3F_4^\circ$		
1767.02		0		56592.5	$b\ ^3P_1 - t\ ^3D_2^\circ$		
1766.21		0		56618.4	$b\ ^3F_4 - v\ ^3G_5^\circ$		
1763.20		0		56715.1	$b\ ^3P_2 - t\ ^3D_3^\circ$		
1760.11		25		56814.6			
1759.00		tr		56850.5	$a\ ^3P_2 - u\ ^3D_1^\circ$		
1757.76		20		56890.6			
1748.99		5		57175.9	$a\ ^3F_2 - x\ ^5D_1^\circ$		
1739.33		10l		57493.4	$a\ ^3D_3 - t\ ^3D_3^\circ?$		
1737.02		0H		57569.9	$a\ ^3F_4 - y\ ^5G_3^\circ?$		
1729.78		10e		57810.8	$a\ ^1D_2 - w\ ^1D_2^\circ$		
1722.62		10e		58051.1	$a\ ^3D_3 - 2_3^\circ$		
1716.50		0		58258.1	$a\ ^3F_4 - y\ ^5G_3^\circ?$		
1715.57		2		58289.7	$a\ ^3D_3 - u\ ^3F_4^\circ$		
1711.66		0		58422.8	$b\ ^3D_2 - 3_3^\circ$		
1700.47		3		58807.3	$a\ ^3F_4 - v\ ^3F_3^\circ$		
1697.90		2		58896.3	$a\ ^3F_3 - v\ ^3F_2^\circ$		
1693.49		12		59049.7	$a\ ^3F_4 - v\ ^3F_4^\circ$		
1693.09		10		59063.6	$a\ ^3F_3 - v\ ^3F_3^\circ$		
1692.11		10		59097.8	$a\ ^3F_2 - v\ ^3F_2^\circ$		
1687.36		1h		59264.2	$a\ ^3F_2 - v\ ^3F_3^\circ$		
1686.19		1		59305.3	$a\ ^3F_3 - v\ ^3F_4^\circ$		
1682.17		0		59447.0	$a\ ^5F_2 - w\ ^3F_3^\circ$		
1681.22		5		59480.6	$a\ ^5F_1 - w\ ^3F_2^\circ$		
1677.88		3		59599.0	$a\ ^5F_5 - 1_4^\circ$		

See footnotes at end of table.

TABLE 1.—*Second spectrum of Vanadium*—Continued

1	2		3	4	5	6	
	Intensity		Temp. class	Wave No. vac	Term combination	Zeeman effect	
λ_{air}A	Arc	Spark				Observed	Computed
1674.09	8			59733.9			
1672.44		15		59792.9	$a\,^5F_4 - 1_2^4$		
1670.90	5			59848.0	$a\,^3F_4 - u\,^3D_3^o$		
1670.01		10		59879.9	$b\,^3G_2 - u\,^3F_2^o$		
1667.88		5		59956.4	$a\,^3F_3 - u\,^3D_2^o$		
1667.66		10		59964.3	$b\,^3G_4 - u\,^3F_3^o$		
1665.42		8e		60044.9	$b\,^3G_3 - u\,^3F_3^o$		
1664.87	0			60064.7	$b\,^3G_3 - 2_3^o$		
1663.80	0			60103.4	$a\,^3F_3 - u\,^3D_3^o$		
1663.60		15		60110.6	$b\,^3G_5 - u\,^3F_4^o$		
1663.34	3			60120.0	$a\,^3F_2 - u\,^3D_1^o$		
1662.28	0			60158.3	$a\,^3F_2 - u\,^3D_2^o$		
1661.27	60			60194.9			
1660.53	8			60221.7	$b\,^3G_4 - u\,^3F_4^o$		
1643.43		30		60848.3	$\begin{cases} a\,^5F_4 - y\,^5F_3^o \\ a\,^5F_3 - y\,^5F_2^o \end{cases}$		
1643.02		30		60863.5	$\begin{cases} a\,^5F_5 - y\,^5F_4^o \\ a\,^5F_2 - y\,^5F_2^o \end{cases}$		
1640.86		30		60943.7	$a\,^5F_1 - y\,^5F_1^o$		
1640.15		35		60970.0	$a\,^5F_2 - y\,^5F_2^o$		
1639.13		40		61008.0	$a\,^5F_3 - y\,^5F_3^o$		
1637.93		10		61052.7	$a\,^5F_1 - y\,^5F_2^o$		
1637.77		50		61058.6	$a\,^5F_4 - y\,^5F_4^o$		
1637.55		5		61066.8	$a\,^5F_5 - w\,^3G_5^o$		
1636.02		40		61123.9	$a\,^5F_5 - y\,^5F_5^o$		
1635.86		20		61129.9	$a\,^5F_3 - y\,^5F_3^o$		
1634.98		tr		61162.8	$a\,^5F_4 - w\,^3G_4^o$		
1633.51		25		61217.9	$a\,^5F_3 - y\,^5F_4^o$		
1630.82		20		61318.8	$a\,^5F_4 - y\,^5F_5^o$		
1619.18		10		61759.7	$a\,^3G_2 - u\,^3F_2^o$		
1617.35		10		61829.5	$a\,^3G_4 - u\,^3F_3^o$		
1613.40	0			61980.9	$a\,^5F_1 - x\,^1D_2^o$		
1613.20		15		61988.6	$a\,^3G_5 - u\,^3F_3^o$		
1587.40		50		62996.1	$a\,^5F_5 - x\,^5D_3^o$		
1586.58		40		63028.7	$a\,^5F_4 - x\,^5D_3^o$		
1585.361		30		63077.1	$a\,^5F_3 - x\,^5D_2^o$		
1584.06		15		63128.9	$a\,^5F_2 - x\,^5D_1^o$		
1582.80	8			63179.2	$a\,^5F_1 - x\,^5D_0^o$		
1582.57		15		63188.4	$\begin{cases} a\,^5F_4 - x\,^5D_4^o \\ a\,^5F_3 - x\,^5D_3^o \end{cases}$		
1582.32	8			63198.3	$a\,^5F_2 - x\,^5D_2^o$		
1581.99	8			63211.5	$a\,^5F_1 - x\,^5D_1^o$		
1573.78	0			63541.3	$a\,^5F_2 - y\,^5G_2^o$?		
1571.74	2			63623.8	$a\,^5F_1 - y\,^5G_2^o$?		
1565.98	8			63857.8	$a\,^5F_3 - y\,^5G_3^o$?		
1562.98	10			63980.3	$a\,^5F_2 - y\,^5G_3^o$?		
1558.76	15			64153.6	$a\,^5F_3 - y\,^5G_4^o$?		
1556.05	0			64265.3	$a\,^5D_4 - v\,^3D_3^o$		
1553.09	15			64387.8	$a\,^5F_4 - y\,^4G_3^o$?		
1550.47	0			64496.6	$\begin{cases} a\,^5D_5 - v\,^3D_3^o \\ a\,^3P_2 - 2_3^o \end{cases}$		
1547.20	15			64632.9	$a\,^5F_5 - y\,^5G_3^o$?		
1358.40	3			73616.0	$a\,^5F_1 - u\,^3F_2^o$		
1313.82	0			76113.9	$a\,^5D_2 - u\,^3F_2^o$		

a Blend with V I.
b Zeeman pattern diffuse.
c Violet member of observed Zeeman pattern double line.
d Observed Zeeman pattern possible blend with V I.
e Observed Zeeman pattern affected by superposed line.
f Red member of observed Zeeman pattern double line.
g Observed Zeeman pattern affected by reversal.
h Observed Zeeman pattern unsymmetrical; doubtful.
i Observed Zeeman pattern blended.
j Intensities in observed Zeeman pattern unsymmetrical.
k Multiplet designation discordant with observed Zeeman pattern.
l Violet n-component of observed Zeeman pattern blended.
m Red n-component of observed Zeeman pattern weaker and blended.
n Red n-component of observed Zeeman pattern weaker.
o n-component of observed Zeeman pattern blended.
* Line probably a blend.

The total number of V II lines listed in table 1 is 1,700. Of these, 1,456, or 86 percent, have been classified as combinations of singlet, triplet, and quintet terms, as follows: 81 singlet, 780 triplet, 215 quintet, 210 singlet-triplet, 202 triplet-quintet, 8 singlet-quintet, and 18 miscellaneous levels, 53 doing double and 2 triple duty because of blends. In such a complex spectrum it is inevitable that some predictable lines are unobserved because of masking by coincident or adjacent lines of greater intensity. A list of 24 such lines is displayed in table 2, where successive columns show (1) the masking spectrum line, (2) its observed wavelength, (3) the difference in wavelength between observed masking and calculated masked line, (4) estimated intensities of observed lines and expected intensities of masked lines, (5) wave number of observed line, and (6) term combination of the masked line. Considering their closeness to strong lines, their relatively low intensity, and the general characteristics of spark lines at atmospheric pressure, the number of masked lines is not unduly large.

The average difference in wavelength between these masking and masked lines is 0.04 A, so that resolving power of the order of 100,000 would separate them if they were of equal intensity and reasonably sharp. But when the lines are somewhat diffuse and the intensity ratios average 10 or more, it appears to be impracticable to distinguish them if their separations are less than about 0.2 A.

TABLE 2.—*Masking and masked* V II *lines*

Spectrum	Observed λ	$\Delta\lambda$ o-c	Intensity		Observed wave number	Term combination
			Observed	Expected		
V I	4875.462	−0.03	40	5	20505.17	$c\,^3D_3-v\,^3D^{\circ}_3$
V I	4577.173	+.04	40	15	21841.44	$a\,^3D_3-z\,^3F^{\circ}_3$
V II	4205.080	+.03	250	15	23774.09	$a\,^5P_2-z\,^5D^{\circ}_2$
V I	3844.442	−.04	20	10	26004.23	$b\,^3F_4-z\,^3G^{\circ}_5$
V II	3337.845	+.08	200	20	29950.87	$b\,^3D_1-y\,^3D^{\circ}_1$
V II	3093.108	−.05	2500R	150	32320.59	$b\,^3G_5-y\,^3G^{\circ}_5$
V II	2982.75	+.05	40	3	33516.36	$d\,^3F_4-w\,^3G^{\circ}_4$
V II	2944.568	+.08	250	15	33950.94	$a\,^3D_2-x\,^3F^{\circ}_2$
V II	2941.372	+.15	200	20	33987.83	$d\,^3F_4-v\,^3D^{\circ}_3$
V II	2892.650	+.08	200r	8	34560.27	$c\,^3P_0-x\,^3P^{\circ}_1$
V II	2880.026	+.06	150	9	34711.75	$a\,^3G_4-y\,^3F^{\circ}_4$
V II	2810.272	+.03	100	20	35573.29	$c\,^3P_1-y\,^3S^{\circ}_1$
V II	2803.469	−.05	150	4	35659.61	$b\,^3F_3-y\,^3F^{\circ}_2$
V II	2798.755	+.02	80	4	35719.67	$b\,^3F_2-y\,^3F^{\circ}_3$
V II	2756.58	−.02	20Hl	3	36266.14	$a\,^5F_4-z\,^5G^{\circ}_5$
V II	2682.875	+.07	100	6	37262.39	$d\,^3F_3-y\,^3F^{\circ}_3$
V II	2657.295	+.04	10	3	37621.07	$a\,^5F_3-z\,^5F^{\circ}_4$
V II	2628.75	.00	30H	?	38029.56	$z\,^5G^{\circ}_5-e\,^5F_4$
V III	2593.052	.00	50He	2	38553.08	$z\,^5G^{\circ}_2-e\,^5G_3$
V II	2548.686	+.04	60	10	39224.14	$b\,^3F_3-x\,^3D^{\circ}_3$
V I	2420.115	+.05	100R	10	41307.79	$a\,^3P_0-x\,^3D^{\circ}_1$
V III	2382.468	−.01	80He	20	41960.47	$a\,^3P_2-w\,^3D^{\circ}_2$
V III	2216.033	−.02	100e	50	45111.59	$a\,^3F_2-w\,^3D^{\circ}_1$
V II	2134.12	{ −.04 / +.05 }	200	{ 100 / 50 }	46842.9	$a\,^5D_4-y\,^5D^{\circ}_3$ / $a\,^5D_1-z\,^5P^{\circ}_2$
V II	1797.64	−.04	15N	3	55628.5	$a\,^5D_1-y\,^3S^{\circ}_1$

2. TERMS OF THE V II SPECTRUM

The established terms of the V II spectrum are described in table 3, where singlet, triplet, and quintet terms are presented in groups. Successive columns show (1) the electron configuration responsible for the term, (2) term symbols, (3) level values, (4) level separations or intervals, (5) *g*-values derived from observed Zeeman effects, and

(6) observed combinations. All level values are relative to $(3d^4)$ $a\ ^5D_0 = 0.00$. The total number of levels is 223, including 89 terms which are divided among multiplicities as follows: 31 singlet, 41 triplet, 17 quintet terms, and 3 miscellaneous levels. A large majority of the terms are regular, only 10 being wholly or partially inverted, as shown by negative signs in column 4. Landé's interval rules are reasonably well obeyed, as is shown by some examples in table 4; but $b\ ^3P$, $c\ ^3P$, $b\ ^3D$, $c\ ^3F$, $d\ ^3F$, $z\ ^3P°$, $y\ ^3P°$, $x\ ^3P°$, $x\ ^3D°$, $w\ ^3D°$, and $y\ ^3F°$ are exceptions, many of which exhibit partial inversion. Of special interest is $z\ ^5D°$, whose first three intervals are law-abiding but the fourth is abnormally small, only $\frac{1}{20}$ of its expected value. These irregular intervals cannot be accounted for in any simple manner.

TABLE 3.—*Terms of the* V II *spectrum* *

Electron configuration	Term symbol	Level	Difference	Observed g	Combinations
$3d^4$	$a\ ^1S_0$	19902.60			$z\ ^1P°$, $y\ ^1P°$, $z\ ^3P°$, $x\ ^3P°$, $z\ ^3D°$, $y\ ^3D°$, $x^3D°$, $w\ ^3D°$, $u\ ^3D°$, $y\ ^1D°$, $z\ ^5F°$.
$3d^3\ 4s$	$a\ ^1P_1$	22273.54		0.97	$z\ ^1S°$, $z\ ^1P°$, $y\ ^1P°$, $z\ ^1D°$, $y\ ^1D°$, $x\ ^1D°$, $y\ ^3S°$, $y^3P°$, $x\ ^3P°$, $y\ ^3D°$, $x\ ^3D°$, $y\ ^3\ F°$, $x\ ^3\ F°$, $y\ ^5D°$.
$3d^4$	$a\ ^1D_2$	20980.92		1.02	$z\ ^1P°$, $y\ ^1P°$, $z\ ^1D°$, $x\ ^1D°$, $w\ ^1D°$, $z\ ^1F°$, $y\ ^1F°$, $x\ ^1F°$, $w\ ^1F°$, $z\ ^3P°$, $y\ ^3P°$, $x\ ^3P°$, $y\ ^3D°$, $x\ ^3D°$, $w\ ^3D°$, $z\ ^3F°$, $y\ ^3F°$, $x\ ^3F°$, $v\ ^3F°$, $u\ ^3F°$, $y\ ^3G°$, $v\ ^3G°$.
$3d^3\ 4s$	$b\ ^1D_2$	25191.08		0.99	$z\ ^1P°$, $y\ ^1P°$, $z\ ^1D°$, $y\ ^1D°$, $x\ ^1D°$, $w\ ^1D°$, $z\ ^1F°$, $y\ ^1F°$, $x\ ^1F°$, $x\ ^3P°$, $y\ ^3D°$, $x\ ^3D°$, $w\ ^3D°$, $y\ ^3F°$, $x\ ^3F°$.
$3d^4$	$c\ ^1D_2$	44657.99			$x\ ^1D°$, $x\ ^1F°$.
$3d^4$	$a\ ^1F_3$	26839.82		.97	$y\ ^1D°$, $x\ ^1D°$, $w\ ^1D°$, $z\ ^1F°$, $y\ ^1F°$, $w\ ^1F°$, $y\ ^1G°$, $x\ ^1G°$, $w\ ^3D°$, $v\ ^3D°$, $u\ ^3D°$, $x\ ^3G°$, $w\ ^3G°$, $y\ ^3H°$, $1°$, $3°$.
$3d^3\ 4s$	$b\ ^1F_3$	34228.79		1.00	$z\ ^1D°$, $y\ ^1D°$, $x\ ^1D°$, $z\ ^1F°$, $x\ ^1F°$, $y\ ^1G°$, $x\ ^1G°$, $w\ ^1G°$, $y\ ^3F°$, $w\ ^3G°$.
$3d^4$	$a\ ^1G_4$	17910.98		0.95	$z\ ^1F°$, $y\ ^1F°$, $x\ ^1F°$, $z\ ^1G°$, $y\ ^1G°$, $x\ ^1G°$, $w\ ^1G°$, $z\ ^1H°$, $y\ ^1H°$, $x\ ^1H°$, $z\ ^3F°$, $y\ ^3F°$, $x\ ^3G°$, $x\ ^3G°$, $v\ ^3G°$, $z\ ^3H°$, $y\ ^3H°$, $y\ ^5F°$.
$3d^3\ 4s$	$b\ ^1G_4$	19112.93		.98	$z\ ^1F°$, $y\ ^1F°$, $x\ ^1F°$, $w\ ^1F°$, $z\ ^1G°$, $y\ ^1G°$, $x\ ^1G°$, $w\ ^1G°$, $z\ ^1H°$, $y\ ^1H°$, $x\ ^1H°$, $w\ ^3D°$, $u\ ^3D°$, $y\ ^3F°$, $z\ ^3G°$, $y\ ^3G°$, $x\ ^3G°$, $v\ ^3G°$, $z\ ^3H°$, $y\ ^3H°$, $z\ ^3I°$.
$3d^4$	$c\ ^1G_4$	36425.07		.96	$y\ ^1F°$, $x\ ^1F°$, $y\ ^1G°$, $x\ ^1G°$, $y\ ^1H°$, $x\ ^3G°$, $w\ ^3G°$.
$3d^3\ 4s$	$a\ ^1H_5$	23391.09		1.04	$z\ ^1G°$, $y\ ^1G°$, $x\ ^1G°$, $w\ ^1G°$, $z\ ^1H°$, $y\ ^1H°$, $z\ ^1I°$, $x\ ^3F°$, $w\ ^3F°$, $u\ ^3F°$, $y\ ^3G°$, $x\ ^3G°$, $w\ ^3G°$, $y\ ^3H°$, $z\ ^3I°$, $1°$.
$3d^4$	$a\ ^1I_6$	19191.50		0.96:	$z\ ^1H°$, $y\ ^1H°$, $x\ ^1H°$, $z\ ^1I°$, $y\ ^3G°$, $x\ ^3G°$.
$3d^4$	$a\ ^3P_2$ $a\ ^3P_1$ $a\ ^3P_0$	11908.27 11514.76 11295.51	393.51 219.25	1.49 1.48	$z\ ^3S°$, $y\ ^3S°$, $z\ ^3P°$, $y\ ^3P°$, $x\ ^3P°$, $z\ ^3D°$, $y\ ^3D°$, $x\ ^3D°$, $w\ ^3D°$, $v\ ^3D°$, $u\ ^3D°$, $z\ ^3F°$, $x\ ^3F°$, $z\ ^1S°$, $z\ ^1P°$, $z\ ^1D°$, $y\ ^1F°$, $z\ ^5S°$, $z\ ^5D°$, $y\ ^5D°$, $x\ ^5D°$, $z\ ^5F°$, $2°$.
$3d^3\ 4s$	$b\ ^3P_2$ $b\ ^3P_1$ $b\ ^3P_0$	19132.69 19166.19 19161.27	−33.50 4.92	1.38 1.40	$z\ ^3S°$, $z\ ^3P°$, $y\ ^3P°$, $x\ ^3P°$, $y\ ^3D°$, $x\ ^3D°$, $w\ ^3D°$, $v\ ^3D°$, $u\ ^3D°$, $t\ ^3D°$, $y\ ^3F°$, $x\ ^3F°$, $v\ ^3F°$, $y\ ^3G°$, $z\ ^1S°$, $z\ ^1P°$, $z\ ^1D°$, $y\ ^1D°$, $y\ ^1F°$, $z\ ^5P°$, $y\ ^5D°$.
$3d^3\ 4s$	$c\ ^3P_2$ $c\ ^3P_1$ $c\ ^3P_0$	20343.00 20089.56 20156.64	253.44 −67.08	1.36 1.35	$z\ ^3S°$, $y\ ^3S°$, $z\ ^3P°$, $y\ ^3P°$, $x\ ^3P°$, $z\ ^3D°$, $y\ ^3D°$, $x\ ^3D°$, $w\ ^3D°$, $v\ ^3D°$, $u\ ^3D°$, $t\ ^3D°$, $y\ ^3F°$, $x\ ^3F°$, $w\ ^3F°$, $v\ ^3F°$, $u\ ^3F°?$, $z\ ^1S°$, $z\ ^1P°$, $z\ ^1D°$, $x\ ^1D°$, $z\ ^1F°$, $y\ ^1F°$, $z\ ^5S°$, $z\ ^5P°$, $z\ ^5D°$, $y\ ^5D°$, $z\ ^5F°$.
$3d^4$	$d\ ^3P_2$ $d\ ^3P_1$ $d\ ^3P_0$	32040.76 32299.24 32420.04	−258.48 −120.80	1.38 1.48	$z\ ^3S°$, $y\ ^3S°$, $z\ ^3P°$, $x\ ^3P°$, $y\ ^3D°$, $x\ ^3D°$, $v\ ^3D°$, $u\ ^3D°$, $x\ ^3F°$, $y\ ^1P°$, $y\ ^1D°$.

* Colon denotes values are poorly determined.

TABLE 3.—*Terms of the V ii spectrum*—Continued

Electron configuration	Term symbol	Level	Difference	Observed g	Combinations
$3d^4$	$a\,^3D_3$	18353.89	60.02	1.30	$z\,^3P°,\ y\,^3P°,\ x\,^3P°,\ z\,^3D°,\ y\,^3D°,\ x\,^3D°,\ w\,^3D°,$
	$a\,^3D_2$	18293.87	24.38	1.13	$v\,^3D°,\ u\,^3D°,\ t\,^3D°?,\ z\,^3F°,\ y\,^3F°,\ x\,^3F°,\ w\,^3F°,$
	$a\,^3D_1$	18269.49		0.49	$v\,^3F°,\ u\,^3F°,\ y^3G°,\ z\,^1S°,\ z\,^1P°,\ y\,^1P°,\ z\,^1D°,$ $y\,^1D°,\ x\,^1D°,\ z\,^1F°,\ y\,^1F°,\ z\,^1G°,\ x\,^1G°,\ z\,^5S°,$ $z\,^5D°,\ y\,^5D°,\ x\,^5D°,\ z\,^5F°,\ 2°.$
$3d^3\,4s$	$b\,^3D_3$	20622.99	5.94	1.26	$y\,^5S°,\ z\,^3P°,\ y\,^3P°,\ x\,^3P°,\ z\,^3D°,\ y\,^3D°,\ x\,^3D°,$
	$b\,^3D_2$	20617.05	−5.09	1.25	$w\,^3D°,\ v\,^3D°,\ u\,^3D°,\ t\,^3D°,\ z\,^3F°,\ y\,^3F°,\ x\,^3F°,$
	$b\,^3D_1$	20522.14		0.58	$w\,^3F°,\ v\,^3F°,\ u\,^3F°,\ x\,^3G°,\ z\,^1S°,\ z\,^1P°,\ z\,^1D°,$ $y\,^1D°,\ x\,^1D°,\ z\,^1F°,\ y\,^1F°,\ z\,^1G°,\ z\,^5S°,\ z\,^5D°,$ $y\,^5D°,\ z\,^5F°,\ y\,^5G°?,\ 2°,\ 3°.$
$3d^3\,4s$	$c\,^3D_3$	44098.46	−60.97	(1.27:)	
	$c\,^3D_2$	44159.43	−41.54	(1.14:)	$v\,^3D°,\ t\,^3D°,\ w\,^3F°,\ u\,^3F°.$
	$c\,^3D_1$	44200.97:?		(0.50:)	
$3d^3\,4s$	$a\,^3F_4$	9097.81	255.84	1.22	$z\,^3P°,\ y\,^3P°,\ z\,^3D°,\ y\,^3D°,\ x\,^3D°,\ w\,^3D°,\ v\,^3D°,$
	$a\,^3F_3$	8841.97	201.76	1.04	$u\,^3D°,\ z\,^3F°,\ y\,^3F°,\ x\,F°,\ w\,^3F°,\ v\,^3F°,\ z\,^3G°,$
	$a\,^3F_2$	8640.21		0.65	$y\,^3G°,\ x\,^3G°,\ w\,^3G°,\ y\,^3H°,\ z\,^1F°,\ z\,^1F°,$ $y\,^1F°,\ z\,^1G°,\ z\,^2H°,\ y\,^1H°,\ z\,^5D°,\ y\,^5D°,\ x\,^5D°,$ $z\,^5F°,\ z\,^5G°,\ y\,^5G°?$
$3d^4$	$b\,^3F_4$	13609.00	66.32	1.19	$z\,^3D°,\ y\,^3D°,\ x\,^3D°,\ w\,^3D°,\ v\,^3D°,\ u\,^3D°,\ z\,^3F°,$
	$b\,^3F_3$	13542.68	51.84	1.06	$y\,^3F°,\ x\,^3F°,\ w\,^3F°,\ v\,^3F°,\ z\,^3G°,\ y\,^3G°,\ x\,^3G°,$
	$b\,^3F_2$	13490.84		0.59	$w\,^3G°,\ v\,^3G°,\ z\,^3H°,\ y\,^3H°,\ z\,^1P°,\ z\,^1D°,\ z\,^1F°,$ $y\,^1F°,\ x\,^1F°,\ z\,^1G°,\ z\,^1H°,\ y\,^1H°,\ z\,^5S°,\ z\,^5D°,$ $x\,^5D°,\ z\,^5F°,\ z\,^5G°.$
$3d^4$	$c\,^3F_4$	30318.63	12.23	1.25	$y\,^3D°,\ x\,^3D°,\ w\,^3D°,\ v\,^3D°,\ u\,^3D°,\ t\,^3D°,\ y\,^3F°,$
	$c\,^3F_3$	30306.40	38.94	1.06	$x\,^3F°,\ w\,^3F°,\ v\,^3F°,\ u\,^3F°,\ x\,^3G°,\ w\,^3G°,\ v\,^3G°,$
	$c\,^3F_2$	30267.46		0.67	$y\,^1D°,\ y\,^1F°,\ z\,^1G°,\ y\,^1H°,\ z\,^5D°,\ y\,^5D°,\ z\,^5F°,\ z\,^5G°?\ 2°,\ 3°.$
$3d^3\,4s$	$d\,^3F_4$	30613.97	−27.74	1.23	$y\,^3D°,\ x\,^3D°,\ w\,^3D°,\ v\,^3D°,\ u\,^3D°,\ t\,^3D°,\ x\,^3F°,\ w\,^3F°,$
	$d\,^3F_3$	30641.71	−31.43	1.05	$v\,^3F°,\ u\,^3F°,\ z\,^3G°,\ w\,^3G°,\ v\,^3G°,\ z\,^3H°,\ z\,^1P°,$
	$d\,^3F_2$	30673.14		0.67	$z\,^1D°,\ w\,^1D°,\ z\,^1F°,\ y\,^1F°,\ w\,^1F°,\ x\,^1G°,\ y\,^1H°,$ $y\,^5G°?\ 2°,\ 3°.$
$3d^4$	$a\,^3G_5$	14655.63	99.54	1.17	$y\,^3D°,\ x\,^3D°,\ w\,^3D°,\ v\,^3D°,\ z\,^3F°,\ y\,^3F°,\ x\,^3F°,\ w\,^3F°,$
	$a\,^3G_4$	14556.09	94.36	1.00	$v\,^3F°,\ u\,^3F°,\ z\,^3G°,\ y\,^3G°,\ x\,^3G°,\ w\,^3G°,\ v\,^3G°,$
	$a\,^3G_3$	14461.73		0.74	$z\,^3H°,\ y\,^3H°,\ z\,^1D°,\ x\,^1D°,\ z\,^1F°,\ y\,^1F°,\ z\,^1G°,$ $y\,^1G°,\ z\,^1H°,\ y\,^1H°,\ z\,^5D°,\ x\,^5D°,\ z\,^5F°,\ y\,^5F°.$
$3d^3\,4s$	$b\,^3G_5$	16533.00	111.49	1.16	$z\,^3D°,\ u\,^3D°?,\ z\,^3F°,\ y\,^3F°,\ w\,^3F°,\ v\,^3F°,\ u\,^3F°,$
	$b\,^3G_4$	16421.51	80.54	1.03	$z\,^3G°,\ y\,^3G°,\ x\,^3G°,\ w\,^3G°,\ v\,^3G°,\ z\,^3H°,\ y\,^3H°,$
	$b\,^3G_3$	16340.97		0.76	$z\,^1D°,\ z\,^1F°,\ y\,^1F°,\ x\,^1F°,\ z\,^1G°,\ y\,^1G°,\ z\,^1H°,$ $y\,^1H°,\ y\,^5G°?,\ 2°.$
$3d^4$	$a\,^3H_6$	12706.15	84.58	1.27:	$y\,^3F°,\ x\,^3F°,\ w\,^3F°,\ z\,^3G°,\ y\,^3G°,\ x\,^3G°,\ w\,^3G°,$
	$a\,^3H_5$	12621.57	76.42	1.02	$z\,^3H°,\ y\,^3H°,\ z\,^3I°,\ z\,^1F°,\ y\,^1F°,\ z\,^1G°,\ y\,^1G°,$
	$a\,^3H_4$	12545.15		0.83:	$z\,^1H°,\ y\,^1H°,\ z\,^1I°,\ z\,^5F°,\ y\,^5F°.$
$3d^3\,4s$	$b\,^3H_6$	20363.22	83.03	1.14	$y\,^3F°,\ u\,^3F°,\ z\,^3G°,\ y\,^3G°,\ x\,^3G°,\ w\,^3G°,\ v\,^3G°,$
	$b\,^3H_5$	20280.19	37.87	1.01	$z\,^3H°,\ y\,^3H°,\ z\,^3I°,\ z\,^1F°,\ y\,^1F°,\ z\,^1G°,\ y\,^1G°,$
	$b\,^3H_4$	20242.32		0.82	$w\,^1G°,\ z\,^1H°,\ y\,^1H°,\ x\,^1H°,\ z\,^1I°,\ 2°.$
$3d^3\,4s$	$a\,^5P_3$	13741.61	146.88	1.62	$z\,^5S°,\ z\,^5P°,\ z\,^5D°,\ y\,^5D°,\ x\,^5D°,\ z\,^5F°,\ z\,^1P°,$
	$a\,^5P_2$	13594.73	83.02	1.78	$y\,^3S°,\ z\,^3P°,\ y\,^3P°,\ z\,^3D°,\ y\,^3D°,\ x\,^3D°,\ u\,^3D°,$
	$a\,^5P_1$	13511.71		2.39	$1°.$
$3d^4$	$a\,^5D_4$	339.21	130.32		$z\,^5P°,\ z\,^5D°,\ y\,^5D°,\ z\,^5F°,\ z\,^3S°?,\ y\,^3S°,\ z\,^3P°,$
	$a\,^5D_3$	208.89	102.26		$z\,^3D°,\ v\,^3D°,\ z\,^3F°,\ u\,^3F°,\ z\,^3G°.$
	$a\,^5D_2$	106.63	70.58		
	$a\,^5D_1$	36.05	36.05		
	$a\,^5D_0$	0.00			
$3d^3\,4s$	$a\,^5F_5$	3162.80	194.58	1.28:	$z\,^5P°,\ z\,^5D°,\ y\,^5D°,\ x\,^5D°,\ z\,^5F°,\ y\,^5F°,\ z\,^5G°.$
	$a\,^5F_4$	2968.22	159.46	1.30:	$y\,^5G°?,\ x\,^1D°,\ z\,^1G°,\ z\,^1G°,\ z\,^1H°,\ z\,^3P°,\ z\,^3D°,\ z^3F°,$
	$a\,^5F_3$	2808.76	121.75	1.20	$y\,^3F°,\ w\,^3F°,\ u\,^3F°,\ z\,^3G°,\ w\,^3G°,\ z\,^2I°,\ 1°.$
	$a\,^5F_2$	2687.01	82.19	0.97	
	$a\,^5F_1$	2604.82			
$3d^3\,4d\ (^4F)$	$e\,^5P_3$	72908.17	233.89		
	$e\,^5P_2$	72674.28	156.44		$z\,^5D°,\ z\,^5G°,\ z\,^3D°,\ z\,^3F°.$
	$e\,^5P_1$	72517.84:			
$3d^3\,4d\ (^4F)$	$e\,^5D_4$	72951.00:	161.77		
	$e\,^5D_3$	72789.23:?	107.17		
	$e\,^5D_2$	72682.06:?			$z\,^5D°,\ z\,^5F°,\ z\,^5G°.$
	$e\,^5D_1$				
	$e\,^5D_0$				

TABLE 3.—*Terms of the V* II *spectrum*—Continued

Electron configuration	Term symbol	Level	Difference	Observed g	Combinations
$3d^3\,4d(^4F)$	$e\ ^5F_5$ $e\ ^5F_4$ $e\ ^5F_3$ $e\ ^5F_2$ $e\ ^5F_1$	73293.82:? 73222.72:	71.10		$z\ ^5D°,\ z\ ^5F°,\ z\ ^5G°.$
$3d^3\,4d(^4F)$	$e\ ^5G_6$ $e\ ^5G_5$ $e\ ^5G_4$ $e\ ^5G_3$ $e\ ^5G_2$	73498.93: 73416.63 73278.92 73145.68 73026.76	82.30 137.71 133.24 118.92		$z^5 D°,\ z\ ^5F°,\ z\ ^5G°.$
$3d^3\,4d(^4F)$	$e\ ^5H_7$ $e\ ^5H_6$ $e\ ^5H_5$ $e\ ^5H_4$ $e\ ^5H_3$	73020.35: 72837.00: 72680.20: 72550.71 72447.96:	183.35 156.80 129.49 102.75		$z\ ^5G°,\ z\ ^3G°.$
$3d^3\,4p(^2P)$	$z\ ^1S_0°$	48258.28			$a\ ^1P,\ a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D.$
$3d^3\,4p(^2P)$	$z\ ^1P_1°$	52803.75		0.92	$a\ ^1S,\ a\ ^1P,\ a^1 D,\ b\ ^1D,\ a\ ^3 P,\ b\ ^3 P,\ c\ ^2P,\ a\ ^3D,\ b\ ^3D,$ $a\ ^3F,\ b\ ^3 F,\ d\ ^3F,\ a\ ^5P.$
$3d^3\,4p(^2D)$	$y\ ^1P_1°$	56171.49		1.05	$a\ ^1S,\ a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ d\ ^3P,\ a\ ^3D.$
$3d^3\,4p(^2P)$	$z\ ^1D_2°$	49898.22		0.93	$a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ b\ ^1F,\ a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b^3 D,$ $a\ ^3F,\ b\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G.$
$3d^3\,4p(^2D)$	$y\ ^1D_2°$	57342.59		.98	$a\ ^1P,\ b\ ^1D,\ a\ ^1F,\ b\ ^1F,\ b\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ c\ ^2F.$
$3d^3\,4p(^2F)$	$x\ ^1D_2°$	64586.23		1.03:	$a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ c\ ^1D,\ a\ ^1F,\ b\ ^1F,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,$ $a\ ^3G,\ a\ ^5F.$
?	$w\ ^1D_2°$	78791.3:			$a\ ^1D,\ b\ ^1D,\ a\ ^1F,\ d\ ^3F.$
$3d^3\,4p(^2G)$	$z\ ^1F_3°$	49568.45		0.97	$a\ ^1D,\ b\ ^1D,\ a\ ^1F,\ b\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,$ $a\ ^3F,\ b\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H.$
$3d^3\,4p(^2D)$	$y\ ^1F_3°$	55142.01		.94	$a\ ^1D,\ b\ ^1D,\ a\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ a\ ^3P,\ b\ ^3P,\ c\ ^3P,$ $a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^2F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,$ $b\ ^3H.$
$3d^3\,4p(^2F)$	$x\ ^1F_3°$	66303.88		.95	$a\ ^1D,\ b\ ^1D,\ c\ ^1D,\ b\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ b\ ^3F,\ b\ ^3G.$
$3d^2\,4s4p(^2G)$	$w\ ^1F_3°$	74664.5			$a\ ^1D,\ a\ ^1F,\ b\ ^1G,\ d\ ^3F.$
$3d^3\,4p(^2G)$	$z\ ^1G_4°$	49723.68		.96	$a\ ^1G,\ b\ ^1G,\ a\ ^1H,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ a\ ^3G,$ $b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ a\ ^5F.$
$3d^3\,4p(^2H)$	$y\ ^1G_4°$	54144.20		1.00	$a\ ^1F,\ b\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ a\ ^1H,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,$ $b\ ^3H.$
$3d^3\,4p(^2F)$	$x\ ^1G_4°$	65790.28		0.94	$a\ ^1F,\ b\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ a\ ^1H,\ a\ ^3D,\ d\ ^3F.$
$3d^2\,4s4p(^2G)$	$w\ ^1G_4°$	72292.2:			$b\ ^1F,\ a\ ^1G,\ b\ ^1G,\ a\ ^1H,\ b\ ^3H.$
$3d^3\,4p(^2G)$	$z\ ^1H_5°$	49593.41		.95	$a\ ^1G,\ b\ ^1G,\ a\ ^1H,\ a\ ^1I,\ a\ ^3F,\ b\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,$ $b\ ^3H,\ a\ ^5F.$
$3d^3\,4p(^2H)$	$y\ ^1H_5°$	55499.38		1.03:	$a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ a\ ^1H,\ a\ ^1I,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^3F,$ $a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H.$
$3d^2\,4s4p(^2G)$	$x\ ^1H_5°$	70936.4			$a\ ^1G,\ b\ ^1G,\ a\ ^1I,\ b\ ^3H.$
$3d^3\,4p(^2H)$	$z\ ^1I_6°$	55403.38		1.01:	$a\ ^1H,\ a\ ^1I,\ a\ ^3H,\ b\ ^3H.$
$3d^3\,4p(^2P)$	$z\ ^3S_1°$	52181.18		1.85	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^5D?$
$3d^3\,4p(^4P)$	$y\ ^3S_1°$	55663.27		1.92	$a\ ^2P,\ c\ ^3P,\ d\ ^3P,\ b\ ^3D,\ a\ ^1P,\ a\ ^5P,\ a\ ^5D.$
$3d^3\,4p(^4P)$	$z\ ^3P_2°$ $z\ ^3P_1°$ $z\ ^3P_0°$	46739.98 46690.43 46586.43	49.55 104.00	1.48 1.44	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ a\ ^1S,$ $a\ ^1D,\ a\ ^5P,\ a\ ^5D,\ a\ ^5F.$
$3d^3\,4p(^2P)$	$y\ ^3P_2°$ $y\ ^3P_1°$ $y\ ^3P_0°$	51123.31 50738.82 50662.36	384.49 76.46	1.51 1.39	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ a\ ^1P,\ a\ ^1D,$ $a\ ^5P.$
$3d^3\,4p(^2D)$	$x\ ^3P_2°$ $x\ ^3P_1°$ $x\ ^3P_0°$	54715.63 54717.85 54813.45	−2.22 −95.60		$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^1S,\ a\ ^1P.$ $a\ ^1D,\ b\ ^1D.$

TABLE 3.—Terms of the V II spectrum—Continued

Electron configuration	Term symbol	Level	Difference	Observed g	Combinations
$3d^3\,4p(^4F)$	$z\ ^3D^\circ_3$	37205.01		1.32	
	$z\ ^3D^\circ_2$	37041.11	163.90	1.08	$a\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ b\ ^3G,\ a\ ^1S,$
	$z\ ^3D^\circ_1$	36954.58	86.53	0.24	$a\ ^5P,\ e\ ^5P,\ a\ ^5D,\ a\ ^5F.$
$3d^3\,4p(^4P)$	$y\ ^3D^\circ_3$	51085.77		1.27	
	$y\ ^3D^\circ_2$	50775.47	310.30	1.11	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,$
	$y\ ^3D^\circ_1$	50473.76	301.71	0.49	$c\ ^2F,\ d\ ^3F,\ a\ ^3G,\ a\ ^1S,\ a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ a\ ^5P.$
$3d^3\,4p(^2P)$	$x\ ^3D^\circ_3$	52767.36		1.26	
	$x\ ^3D^\circ_2$	52700.03	67.33	1.10	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,$
	$x\ ^3D^\circ_1$	52604.11	95.92	0.63	$c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ a\ ^1S,\ a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ a\ ^5P.$
$3d^3\,4p(^2D)$	$w\ ^3D^\circ_3$	53927.19		1.37	
	$w\ ^3D^\circ_2$	53868.63	58.56	1.10	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^2F,$
	$w\ ^3D^\circ_1$	53751.46	117.17	0.49:	$d\ ^3F,\ a\ ^3G,\ a\ ^1S,\ a\ ^1D,\ b\ ^1D,\ a\ ^1F,\ b\ ^1G.$
$3d^3\,4p(^2F)$	$v\ ^3D^\circ_3$	64603.53		1.22:	
	$v\ ^3D^\circ_2$	64804.13	−200.60	1.02:	$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ c\ ^3D,\ a\ ^3F,$
	$v\ ^3D^\circ_1$	64930.76	−126.63	0.46:	$b\ ^3F,\ c\ ^3F,\ d\ ^3F,\ a\ ^1F,\ a\ ^5D.$
$3d^24s4p(^4F)$	$u\ ^3D^\circ_3$	68945.0			
	$u\ ^3D^\circ_2$	68797.7	147.3		$a\ ^3P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,$
	$u\ ^3D^\circ_1$	68759.4	38.3		$c\ ^2F,\ b\ ^3G?,\ a\ ^1S,\ a\ ^1F,\ b\ ^1G,\ a\ ^5P.$
$3d^3\,4p(\text{high}^2\,D)?$	$t\ ^3D^\circ_3$	75848.13		(1.27:)	
	$t\ ^3D^\circ_2$	75758.29	89.84	(1.14:)	$b\ ^3P,\ c\ ^3P,\ a\ ^3D?,\ b\ ^3D,\ c\ ^3D,\ c\ ^3F,\ d\ ^3F.$
	$t\ ^3D^\circ_1$	75715.45:	42.84	(0.50:)	
$3d^3\,4p(^4F)$	$z\ ^3F^\circ_4$	40430.10		1.22	
	$z\ ^3F^\circ_3$	40195.52	234.58	1.02	$a\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^1D,$
	$z\ ^3F^\circ_2$	40001.66	193.86	0.65	$a\ ^1G,\ e\ ^5P,\ a\ ^5D,\ a\ ^5F.$
$3d^3\,4p(^2G)$	$y\ ^3F^\circ_4$	49268.61		1.18	$b\ ^3P,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ a\ ^3G,$
	$y\ ^3F^\circ_3$	49210.78	57.83	0.99	$b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ b\ ^1F,\ a\ ^1G,$
	$y\ ^3F^\circ_2$	49201.66	9.12	.63	$b\ ^1G,\ a\ ^5F.$
$3d^3\,4p(^2D)$	$x\ ^3F^\circ_4$	52657.51		1.18:	$a\ ^2P,\ b\ ^3P,\ c\ ^3P,\ d\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,$
	$x\ ^3F^\circ_3$	52391.94	265.57	1.07	$c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ a\ ^3H,\ a\ ^1P,\ a\ ^1D,\ b\ ^1D,\ a\ ^1H.$
	$x\ ^3F^\circ_2$	52245.68	146.26	0.68	
$3d^3\,4p(^2F)$	$w\ ^3F^\circ_4$	62176.24		1.36:	$c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ c\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^3F,$
	$w\ ^3F^\circ_3$	62133.39	42.85	1.00	$a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ a\ ^1H,\ a\ ^5F.$
	$w\ ^3F^\circ_2$	62085.02	48.37	0.58:	
$3d^24s4p(^4F)$	$v\ ^3F^\circ_4$	68147.2			$b\ ^3P?,\ c\ ^3P,\ a\ ^3D,\ b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^3F,$
	$v\ ^3F^\circ_3$	67905.1	242.1		$a\ ^3G,\ b\ ^3G,\ a\ ^1D.$
	$v\ ^3F^\circ_2$	67737.8	167.3		
	$u\ ^3F^\circ_4$	76643.5			$c\ ^3P?,\ a\ ^3D,\ b\ ^3D,\ c\ ^3D,\ c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,$
	$u\ ^3F^\circ_3$	76385.8	257.7		$b\ ^3H,\ a\ ^1D,\ a\ ^1H,\ a\ ^5D,\ a\ ^5F.$
	$u\ ^3F^\circ_2$	76220.4	165.4		
$3d^3\,4p(^4F)$	$z\ ^3G^\circ_5$	39612.97		1.19	
	$z\ ^3G^\circ_4$	39403.77	209.20	1.03	$a\ ^3F,\ b\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ b\ ^1G,\ a\ ^5D,\ a\ ^5F,$
	$z\ ^3G^\circ_3$	39234.05	169.72	0.84	$e\ ^5H.$
$3d^3\,4p(^2G)$	$y\ ^3G^\circ_5$	48853.04		1.22	
	$y\ ^3G^\circ_4$	48730.76	122.28	1.02	$b\ ^3P,\ a\ ^3D,\ a\ ^3F,\ b\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H,$
	$y\ ^3G^\circ_3$	48579.96	150.80	0.67	$a\ ^1D,\ a\ ^1G,\ b\ ^1G,\ a\ ^1H,\ a\ ^1I.$
$3d^34p(^2H)$	$x\ ^3G^\circ_5$	55206.87		1.15	
	$x\ ^3G^\circ_4$	55304.34	−97.47	1.02	$b\ ^3D,\ a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,$
	$x\ ^3G^\circ_3$	55349.63	−45.29	0.82	$b\ ^3H,\ a\ ^1F,\ a\ ^1G,\ b\ ^1G,\ c\ ^1G,\ a\ ^1H,\ a\ ^1I.$
$3d^34p(^2F)$	$w\ ^3G^\circ_5$	64229.10			$a\ ^3F,\ b\ ^3F,\ c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ a\ ^1F,$
	$w\ ^3G^\circ_4$	64130.84	98.26	1.02	$b^1F,\ c\ ^1G,\ a\ ^1H,\ a\ ^5F.$
	$w\ ^3G^\circ_3$	64057.39	73.45	0.72:	
$3d^24s4p(^4F)$	$v\ ^3G^\circ_5$	70227.8			
	$v\ ^3G^\circ_4$	69912.1	315.7		$b\ ^3F,\ c\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,\ b\ ^3H,\ a\ ^1D,\ a\ ^1G,\ b\ ^1G.$
	$v\ ^3G^\circ_3$	69644.2	267.9		
$3d^34p(^2G)$	$z\ ^3H^\circ_6$	47607.79		1.13	
	$z\ ^3H^\circ_5$	47297.08	310.71	1.01	$b\ ^3F,\ d\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ a\ ^1G,\ b\ ^1G.$
	$z\ ^3H^\circ_4$	47056.32	240.76	0.78	
$3d^34p(^2H)$	$y\ ^3H^\circ_6$	52252.70		1.04:	
	$y\ ^3H^\circ_5$	52153.55	99.15	0.98	$a\ ^3F,\ b\ ^3F,\ a\ ^3G,\ b\ ^3G,\ a\ ^3H,\ b\ ^3H,\ a\ ^1F,\ a\ ^1G,\ b\ ^1G,$
	$y\ ^3H^\circ_4$	52082.88	70.67	.70	$a\ ^1H.$

TABLE 3.—*Terms of the* V II *spectrum*—Continued

Electron configuration	Term symbol	Level	Difference	Observed g	Combinations
$3d^3\,4p(^2H)$	$z\,^3I^\circ_7$	53319.52		1.11:	
	$z\,^3I^\circ_6$	53076.82	242.70	0.98	$a^3H,\ b^3H,\ b^1G,\ a^1H,\ a^5F.$
	$z\,^3I^\circ_5$	52877.99	198.83	.84:	
$3d^3\,4p\ (^4P)$	$z\,^5S^\circ_2$	49731.32			$a^5P,\ a^3P,\ c^3P,\ a^3D,\ b^3D,\ b^3F.$
$3d^3\,4p\ (^4P)$	$z\,^5P^\circ_3$	47051.89		1.55	
	$z\,^5P^\circ_2$	46879.94	171.95	1.68	$a^5P,\ a^5D,\ a^5F,\ b^3P,\ c^3P.$
	$z\,^5P^\circ_1$	46754.59	125.35	2.28	
$3d^3\,4p\ (^4F)$	$z\,^5D^\circ_4$	37531.09		1.44	
	$z\,^5D^\circ_3$	37520.61	10.48	1.47	$a^5P,\ e^5P,\ a^5D,\ e^5D,\ a^5F,\ e^5F,\ e^5G,\ a^3P,\ c^3P,$
	$z\,^5D^\circ_2$	37369.01	151.60	1.39	$a^3D,\ b^3D,\ a^3F,\ b^3F,\ a^3G.$
	$z\,^5D^\circ_1$	37259.42	109.59	1.39	
	$z\,^5D^\circ_0$	37201.41	58.01		
$3d^3\,4p\ (^4P)$	$y\,^5D^\circ_4$	47420.10		2.28	
	$y\,^5D^\circ_3$	47181.17	238.93	1.48:	
	$y\,^5D^\circ_2$	47101.88	79.29	1.47	$a^5P,\ a^5D,\ a^5F,\ a^1S,\ a^1P,\ a^3P,\ b^3P,\ c^3P,\ a^3D,$
	$y\,^5D^\circ_1$	47107.98	-6.10	1.43	$b^3D,\ a^3F.$
	$y\,^5D^\circ_0$	47027.88	80.10		
$3d^2\,4s\,4p\ (^4F)$	$x\,^5D^\circ_4$	66158.6			
	$x\,^5D^\circ_3$	65996.7	161.9		
	$x\,^5D^\circ_2$	65885.3	111.4		$a^5P,\ a^5F,\ a^3P,\ a^3D,\ a^3F,\ b^3F,\ c^3F,\ a^3G.$
	$x\,^5D^\circ_1$	65816.2	69.1		
	$x\,^5D^\circ_0$	65783.4	32.8		
$3d^3\,4p\ (^4F)$	$z\,^5F^\circ_5$	37352.39		1.40:	
	$z\,^5F^\circ_4$	37150.57	201.82		$a^5P,\ a^5D,\ e^5D,\ a^5F,\ e^5F,\ e^5G,\ a^1S,\ a^1P,\ c^3P,$
	$z\,^5F^\circ_3$	36919.23	231.34	1.24	$a^3D,\ b^3D,\ a^3F,\ b^3F,\ a^2G,\ a^3H.$
	$z\,^5F^\circ_2$	36673.51	245.72	1.08	
	$z\,^5F^\circ_1$	36489.34	184.17	0.35	
$3d^2\,4s\,4p(^4F)$	$y\,^5F^\circ_5$	64287.1			
	$y\,^5F^\circ_4$	64026.6	260.5		
	$y\,^5F^\circ_3$	63816.9	209.7		$a^5F,\ a^1G,\ a^3G,\ a^3H.$
	$y\,^5F^\circ_2$	63657.2	159.7		
	$y\,^5F^\circ_1$	63548.5:	108.7		
$3d^3\,4p(^4F)$	$z\,^5G^\circ_6$	35483.39		1.16	
	$z\,^5G^\circ_5$	35193.13	290.26	1.14	$e^5P,\ e^5D,\ a^5F,\ e^5F,\ e^5G,\ e^5H,\ a^3F,\ b^3F.$
	$z\,^5G^\circ_4$	34946.55	246.58	0.93	
	$z\,^5G^\circ_3$	34745.72	200.83	0.31	
	$z\,^5G^\circ_2$	34592.72	153.00		
$3d^2\,4s\,4p(^4F)$	$y\,^5G^\circ_6$	67795.7:?			
	$y\,^5G^\circ_5$	67356.0:	439.7		
	$y\,^5G^\circ_4$	66962.7:	393.3		$a^5F?,\ b^3D?,\ a^3F?,\ c^3F?,\ d^3F?,\ b^3G?.$
	$y\,^5G^\circ_3$	66667.3:	295.4		
	$y\,^5G^\circ_2$	66228.4:	438.9		
	1°_4	62761.9			$a^1F,\ a^1H,\ a^5P,\ a^5F.$
	2°_3	76405.4			$a^3P,\ a^3D,\ b^3D,\ c^3F,\ d^3F,\ b^3G,\ b^3H.$
	3°_3	79040.4			$a^1F,\ b^3D,\ c^3F,\ d^3F.$

TABLE 4.—*Intervals of some* V II *terms*

Term	Level intervals	Interval ratios Observed	Interval ratios Theoretical
$a\,^3P$	393.51	2.00	2
	219.25	1.11	1
$d\,^3P$	−258.48	2.00	2
	−120.80	0.94	1
$c\,^3D$	−60.97	3.00	3
	−41.54	2.06	2
$a\,^3F$	255.84	4.00	4
	201.76	3.15	3
$b\,^3F$	66.32	4.00	4
	51.84	3.12	3
$b\,^3G$	111.49	5.00	5
	80.54	3.61	4
$a\,^3H$	84.58	6.00	6
	76.42	5.42	5
$a\,^5P$	146.88	3.00	3
	83.02	1.70	2
$a\,^5D$	130.32	4.00	4
	120.26	3.14	3
	70.58	2.16	2
	36.05	1.10	1
$a\,^5F$	194.58	5.00	5
	159.46	4.10	4
	121.75	3.12	3

Term	Level intervals	Interval ratios Observed	Interval ratios Theoretical
	82.19	2.11	2
$z\,^3F°$	234.58	4.00	4
	193.86	3.30	3
$z\,^3G°$	209.20	5.00	5
	169.72	4.05	4
$z\,^3H°$	310.71	6.00	6
	240.76	4.66	5
$z\,^3I°$	242.70	7.00	7
	198.83	5.72	6
$z\,^5P°$	171.95	3.00	3
	125.35	2.09	2
$z\,^5D°$	10.48	0.20	4
	151.60	3.00	3
	109.59	2.08	2
	58.01	1.15	1
$y\,^5F°$	260.5	5.00	5
	209.7	4.04	4
	159.7	3.07	3
	108.7	2.09	2
$z\,^5G°$	290.26	6.00	6
	246.58	5.11	5
	200.83	4.15	4
	153.00	3.16	3

Observed magnetic splitting factors (g–values) for 146 levels entered in column 5 of table 3 may be compared with Landé values by referring to the tables already mentioned [21]. In calculating g–values from Babcock's observations of Zeeman patterns, the actual formulas used were those given by Russell [14], and double weight was assigned to results from resolved patterns, or from combinations with one $j=0$. Single or/and uncertain determinations are followed by colons.

In table 3 the g–values of $c\,^3D$ and $t\,^3D°$ are enclosed in parentheses. This combination was identified by the g–values, and therefore the entered g's are not rigorously "observed" g's. There are no other observations to check these three g–values.

Since both the term analysis and the Zeeman-effect data are most nearly complete for the $3d^3\,4s$ configuration, we have chosen these levels to illustrate the agreement of observed and theoretical g–values in table 5. Comparison of the observed and theoretical sums shows that the former are about 2 percent too small. The same difference was noted by Russell and Babcock [22] in their analysis of the Zeeman effect for V I lines, and was explained as a probable error in determining the magnetic field strength at the time the observations were made nearly 20 years ago. If the observed g–values for V I and V II levels are increased by 2 to 3 percent, the general agreement between observed and theoretical splitting factors becomes quite satisfactory.

TABLE 5.—*Observed and theoretical g-values for $3d^3 4s$ levels*

Term	$J=6$	5	4	3	2	1	0	Sum
$a\ ^5F$		1.28	1.30:	1.20	0.98	--------		4.76
Landé		1.40	1.35	1.25	1.00	0.00		5.00
$a\ ^5P$				1.63	1.75	2.38		5.76
Landé				1.67	1.83	2.50		6.00
$b\ ^3P$					1.38	1.41	--------	2.79
$c\ ^3P$					1.38	1.38	--------	2.76
Landé					1.50	1.50	0.00	3.00
$b\ ^3D$				1.31	1.23	0.58		3.12
$c\ ^3D$				1.27:	1.14:	.50:		2.91:
Landé				1.33	1.17	.50		3.00
$a\ ^3F$			1.21	1.09	0.65			2.95
$d\ ^3F$			1.23	1.06	.68			2.97
Landé			1.25	1.08	.67			3.00
$b\ ^3G$		1.16	1.03	0.73				2.92
Landé		1.20	1.05	.75				3.00
$b\ ^3H$	1.14	1.01	0.81					2.96
Landé	1.17	1.03	.80					3.00
$a\ ^1P$						0.98		
$b\ ^1D$					1.01			
$b\ ^1F$				0.99				
$b\ ^1G$			0.96					
$a\ ^1H$		1.09						5.03
Landé		1.00	1.00	1.00	1.00	1.00		5.00
Sum observed	1.14	4.54	6.54:	9.28:	10.20:	7.23:	--------	38.93:
Sum Landé	1.17	4.63	6.65	9.49	10.51	7.50	0.00	40.00

The observed combinations of each term are indicated in the last column of table 3; they may serve to exhibit the combining properties of the terms in lieu of a diagram of transitions. All combinations obey the simple selection rules $\Delta L=0$, ± 1, ± 2, and $\Delta J=0$ (except 0 to 0), ± 1, but, as usual, not all permitted combinations have been observed. Failure to find a predicted line is occasionally explained by masking (table 2), but more generally be extremely low intensity. Relative intensities appear to be law-abiding for the most part, but in triplet-system multiples the satellite lines appear to be abnormally weak when the L-values are large.

The total number of observed multiplets is 572, of which 81 are singlet-singlet, 205 triplet-triplet, 29 quintet-quintet, 164 singlet-triplet, 70 triplet-quintet, 8 singlet-quintet, and 15 combinations with 3 miscellaneous odd levels.

3. ELECTRON CONFIGURATIONS AND SPECTRAL TERMS

Vanadium has atomic number 23, and the extra-nuclear structure of normal vanadium atoms is represented by $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^3\ 4s^2$ electrons. The last five electrons account for the V I spectrum [7]; and when one is removed by ionization, the remaining four will account

for the V II spectrum. It was first believed that $(3d^3\ 4s)$ ^{5}F represented the normal (unexcited) state of V$^+$ ions, but further analysis proved that $(3d^4)$ ^{5}D had this distinction [3]. Both configurations yield quintet, triplet, and singlet terms, the former 16 terms with 38 levels, and the latter 16 terms with 34 levels. These even terms combine with a multitude of odd terms resulting from configurations that include a p-electron, $3d^3\ 4p$, $3d^2\ 4s\ 4p$, thus accounting for a majority of the observed V II lines.

The low (even) terms theoretically associated with the abovementioned configurations [6] are as follows:

$3d^3\ 4s$: ^{5}(PF), ^{3}(PF), ^{3}(PDFGH), ^{1}(PDFGH), ^{3}D, ^{1}D.
$3d^4$: ^{5}D, ^{3}(PDFGH), ^{1}(SDFGI), ^{3}(PF), ^{1}(SDG).

Terms resulting from this analysis of the V II spectrum have been paired off with each and every one of these theoretical terms, except two, the highest ^{1}D of the first configuration and the highest ^{1}S of the second. In no other spectrum are expected terms of these two configurations so completely established. Theoretical values of the two missing levels have been calculated by Ufford [23], as follows: $(3d^3\ 4s)$ ^{1}D$=50274$ and $(3d^4)$ ^{1}S$=61919$ cm^{-1}. Owing to the great elevation of these metastable levels, their strongest expected combinations would be in the infrared region where no V II lines have been found.

Another configuration of electrons that might be expected to yield metastable terms in the V II spectrum is

$3d^2\ 4s^2$: ^{3}(PF), ^{1}(SDG),

but no evidence for this has been found among our data. In this respect the V II spectrum differs most strikingly from the Ti I spectrum, which it should resemble according to the displacement law. In fact, the relative importance of the three configurations (or even terms) above-mentioned is completely reversed in the two spectra; $3d^2\ 4s^2$ includes the ground state of Ti I but is not detected in V II, whereas $3d^4$ yields the ground state of V II but produces only very high and relatively inconspicuous terms in Ti I. However, in both spectra the strongest lines involve $3d^3\ 4s$, as might be expected.

All this is in accord with the general properties of spectra of elements of the first long period. The low even configurations in the first spectra are $d^{n-2}\ s^2$ and $d^{n-1}\ s$, and those in second spectra are $d^{n-1}\ s$ and d^n. As the d shell nears completion or half completion, the levels of d^n drop below those of $d^{n-1}\ s$, while the available data indicate a corresponding rise of $d^{n-2}\ s^2$ relative to $d^{n-1}\ s$. In V II $(3d^2\ 4s^2)$ ^{3}F might be expected at about 34000 cm^{-1} above $(3d^4)$ ^{5}D, but almost all of the observed lines in the spectral region where its combinations should lie have been otherwise classified.

From the configurations $3d^3\ 4p$ and $3d^2\ 4s4p$, the following (odd) middle terms are expected to arise:

$3d^3\ 4p$: ^{5}(SPD), ^{5}(DFG), ^{3}(SPD), ^{3}(DFG), ^{3}(SPD), ^{3}(PDF), ^{3}(DFG), ^{3}(FGH), ^{3}(GHI), ^{1}(SPD), ^{1}(PDF), ^{1}(DFG), ^{1}(FGH), ^{1}(GHI), ^{3}(PDF), ^{1}(PDF).
$3d^2\ 4s4p$: ^{5}(SPD), ^{5}(DFG), ^{3}(SPD), ^{3}(DFG), ^{3}P, ^{1}P, ^{3}(SPD), ^{1}(SPD), ^{3}(PDF), ^{1}(PDF), ^{3}(DFG), ^{1}(DFG), ^{3}(FGH), ^{1}(FGH).

V II levels have been assigned to all the terms of $3d^3 4p$, except the last five, which are theoretically very high, but only a few could be ascribed to $3d^2 4s4p$.

All V II terms that, with increasing total quantum numbers, form spectral series approach as limits the normal or metastable state of V^{++} ions, described as follows:

$3d^3$: ^{4}(PF), ^{2}(PDFGH), ^{2}D

A partial analysis of the V III spectrum has been published by White [24], who gave values to all these terms except ^{2}F and the second (high) ^{2}D. The normal state of V^{++} ions is represented by $(3d^3)$ ^{4}F, and its absolute value is estimated to be 214 000 cm^{-1}.

The first high (even) terms to be expected in series with the low (even) terms of V II are as follows:

$3d^3 5s$: ^{5}(PF), ^{3}(PF), ^{3}(PDFGH), ^{1}(PDFGH), ^{3}D, ^{1}D.
$3d^3 4d$: ^{5}(PDFGH), etc.

The latter have been recognized in whole or in part, but no trace of the former could be established. This is very surprising, since the $4p$–$5s$ transitions should be prominent because $4s$–$4p$ produces the strongest lines in the V II spectrum. However, after repeated failure to find any $3d^3 5s$ levels, it became apparent that the unclassified lines in table 1 are neither grouped nor located properly to disclose such levels. An explanation is not obvious, but the fact is regretted because it foils any attempt to derive a trustworthy spectoscopic ionization potential from our data. Investigation with some other type of source, like the Paschen hollow cathode, which favors spectral series, appears to be necessary in this case.

At the present time the only available information on the absolute value of V II terms is that given by Russell [25]. From comparisons of analogous spectra, he adopted 114 600 cm^{-1} as the probable distance between the ground states of V II and V III. This corresponds to an ionization potential of 14.1 volts for the V^+ ion.

Our assignment of observed V II terms to electron configurations and convergence limits is summarized in table 6. These assignments are based on considerations of combining properties, relative positions of terms, level separations, and in many cases on theoretical calculations made by Ufford. Unfortunately these guiding criteria are not always quantitative or decisive, and then there is a temptation to become more or less arbitrary about the interpretation.

Indeed, the mutual perturbations of neighboring terms may result in a partial "sharing of identity." The configuration which is mainly responsible for the term may, however, often be assigned with considerable probability.

To each low even term of the configuration, $(3d)^3 4s$ corresponds a proper triad of terms of $(3d)^3 4p$, which has the same limit term in V III. The terms of this triad are usually roughly at the same level, and their combinations with the related low terms are stronger than with other low terms (except when badly perturbed). The intensities have been given the most weight in the assignments; then the levels.

FIGURE 1.—*Diagram of V II terms, showing relative magnitudes and assignments to configurations and limits.*

— =singlet term, △=triplet term, ○=quintet term.

TABLE 6.—V II predicted and observed terms

Electron configuration	Limit V III	Predicted	Observed
$(3d)^4$		^5D; $^3(PF)$	$a\ ^5D$; $d\ ^3P\ c\ ^3F$
		$^3(PDFGH)$	$a\ ^3P\ a^3D\ b^3F\ a^2G\ a^3H$
		$^1(SDG)$	$---\ c^1D\ c^1G$
		$^1(SDFGI)$	$a\ ^1S\ a^1D\ a^1F\ a^1G\ a^1I$
$(3d)^3 4s$	^4F	^5F; ^3F	$a\ ^5F$; $a\ ^3F$
	^4P	^5P; ^3P	$a\ ^5P$; $c\ ^3P$
	^2P	^3P; ^1P	$b\ ^3P$; $a\ ^1P$
	^2D	^3D; ^1D	$b\ ^3D$; $b\ ^1D$
	^2F	^3F; ^1F	$d\ ^3F$; $b\ ^1F$
	^2G	^3G; ^1G	$b\ ^3G$; $b\ ^1G$
	^2H	^3H; ^1H	$b\ ^3H$; $a\ ^1H$
	(^2D)	^3D; ^1D	$c\ ^3D$; ----
$(3d)^3 4p$	^4F	$^5(DFG)$; $^3(DFG)$	$z\ ^5D°\ z\ ^5F°\ z\ ^5G°$; $z\ ^3D°\ z^3F°\ z\ ^3G°$
	^4P	$^5(SPD)$; $^3(SPD)$	$z\ ^5S°\ z\ ^5P°\ y\ ^5D°$; $y\ ^3S°\ z\ ^3P°\ y\ ^3D°$
	^2P	$^3(SPD)$; $^1(SPD)$	$z\ ^3S°\ y\ ^3P°\ x\ ^3D°$; $z\ ^1S°\ z\ ^1P°\ z\ ^1D°$
	^2D	$^3(PDF)$; $^1(PDF)$	$x\ ^3P°\ w\ ^3D°\ x\ ^3F°$; $y\ ^1P°\ y\ ^1D°\ y\ ^1F°$
	^2F	$^3(DFG)$; $^1(DFG)$	$v\ ^3D°\ w\ ^3F°\ w\ ^3G°$; $x\ ^1D°\ x\ ^1F°\ x\ ^1G°$
	^2G	$^3(FGH)$; $^1(FGH)$	$y\ ^3F°\ y\ ^3G°\ z\ ^3H°$; $z\ ^1F°\ z\ ^1G°\ z\ ^1H°$
	^2H	$^3(GHI)$; $^1(GHI)$	$x\ ^3G°\ y\ ^3H°\ z\ ^3I°$; $y\ ^1G°\ y\ ^1H°\ z\ ^1I°$
	(^2D)	$^3(PDF)$; $^1(PDF)$	----- $t\ ^3D°?$ ----; ----- ----- -----
$(3d)^2 4s4p$	^4F	$^5(DFG)$; $^3(DFG)$	$x\ ^5D°\ y\ ^5F°\ y\ ^5G°$; $u\ ^3D°\ v\ ^3F°\ v\ ^3G°$
	^4P	$^5(SPD)$; $^3(SPD)$	----- ----- -----; ------ ----- -----
	^2S	^3P ; ^1P	----- ; ------
	^2P	$^3(SPD)$; $^1(SPD)$	----- ; ------ ----- -----
	^2D	$^3(PDF)$; $^1(PDF)$	----- ----- -----; ------ ----- -----
	^2F	$^3(DFG)$; $^1(DFG)$	----- ----- -----; ------ ----- -----
	^2G	$^3(FGH)$; $^1(FGH)$	----- ----- -----; $w\ ^1F°\ w\ ^1G°\ x\ ^1H°$
$(3d)^3 4d$	^4F	$^5(PDFGH)$	$e\ ^5P\ e\ ^5D\ e\ ^5F\ e\ ^5G\ e\ ^5H$
$(3d)^3 5s$	^4F	^5F; ^3F	--; --
	^4P	^5P; ^3P	--; --
	^2P	^3P; ^1P	--; --
	^2D	^3D; ^1D	--; --
	^2F	^3F; ^1F	--; --
	^2G	^3G; ^1G	--; --
	^2H	^3H; ^1H	--; --

The terms $d\ ^3P$ and $c\ ^3F$ have been assigned to $(3d)^4$ rather than to $(3d)^2\ (4s)^2$ because of their narrow or inverted intervals. Terms from $(3d)^2\ (4s)^5$ would have wide intervals, in normal order.

The term $x^1H°$ can come only from $(3d)^2 4s\ (^2G)4p$; and $w^1G°$ and $w\ ^1F°$, being nearly at the same level, have been tentatively assigned to the same configuration.

Two very high terms ($w\ ^1D=78{,}791$, $u\ ^3F=76{,}643$) have not been definitely assigned to electron configurations; they probably belong to $3d^2\ 4s\ 4p$.

The relative positions of identified V II terms, and correlations with configurations are shown in figure 1.

There can be no doubt about the identifications and correlations of the low terms, but in the present state of our knowledge the assignment of highly excited states to definite configurations and limits cannot be guaranteed to be correct in all cases. Our greatest disappointment is our failure to establish spectral series involving transitions of a single s-type electron and thus obtain absolute values for the V II terms.

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