

TABLE II  
Succinic dehydrogenase activity in various tissues in normal and orthene injected rats

Groups	No. of animals	Experimental period of weeks	$\mu\text{g}$ of dye reduced/mg of tissue/10 min.			
			Liver	Heart	Kidney	Brain
I	8	0	$1.58 \pm 0.002$	$0.76 \pm 0.001$	$1.75 \pm 0.003$	$1.02 \pm 0.002$
II	10	8	$0.99 \pm 0.001$	$0.50 \pm 0.001^*$	$1.01 \pm 0.002$	$0.72 \pm 0.004$
III	10	8	$1.59 \pm 0.010$	$0.79 \pm 0.002$	$1.78 \pm 0.101$	$1.08 \pm 0.050$

\* $P < 0.01$ .

toxicity influences the bodily requirements of the vitamin may be inferred from the protection offered by extra riboflavin administration against the poisonous effects of selenium<sup>15</sup> and lead<sup>16</sup>. In our present investigation the animals injected with orthene showed depletion of riboflavin and lower activity of SDH in different tissues. The animals receiving riboflavin injection along with orthene showed nearly normal level riboflavin and SDH activity in tissues indicating thereby that orthene increases the requirement of riboflavin of albino rats.

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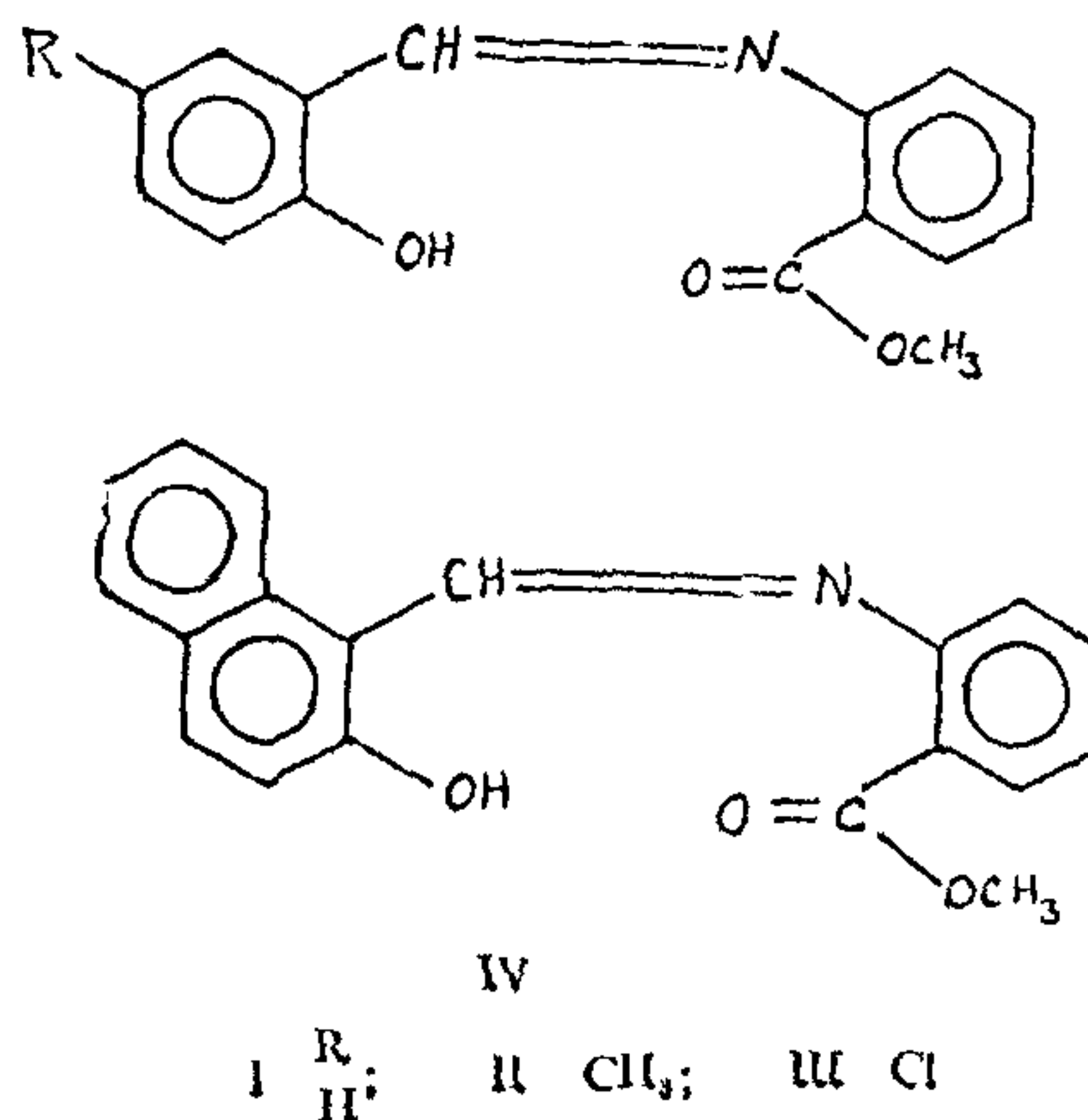
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### 5-COORDINATE OXOVANADIUM(IV) COMPLEXES WITH MONOFUNCTIONAL TRIDENTATE SCHIFF BASES CONTAINING -O, N, O- SEQUENCES

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THE transition metal complexes with tridentate Schiff bases have been well investigated during the past two decades<sup>1-5</sup>. However, only recently the attention has been directed to the complexes of the transition metals with monofunctional tridentate Schiff bases containing -O,N,O- and -O,N,S- sequences<sup>6-8</sup>. In this communication, we describe the synthesis and spectral studies of oxovanadium(IV) complexes with the Schiff bases I-IV.



### Experimental

The ligands I-IV were prepared as reported earlier<sup>9</sup>. To a mixture of methylanthranilate (0.015 M) and aldehyde (0.015 M) in alcohol was added vanadyl sulphate (0.01 M) in alcohol and refluxed for an hour. Then about 2 g of sodium acetate were added and refluxed for a couple of hours. The reaction mixture was cooled and filtered. The pH of the filtrate was adjusted to about 8 with ammonia solution with vigorous stirring. The bluish green precipitate of the complex obtained was filtered, washed thoroughly with ethanol and dried in vacuum over fused calcium chloride. The metal and nitrogen contents in these complexes were analysed.

### RESULTS AND DISCUSSION

#### Nature and Stoichiometry

The elemental analyses indicate 1:1 stoichiometry for these oxovanadium(IV) complexes. The complexes are bluish green in colour and insoluble in common organic solvents. The complexes obtained from the Schiff bases I, II, III and IV are indicated as V, VI, VII and VIII.

#### Infrared Spectra

The infrared spectra of the ligands and the complex in Nujol mull were recorded on Perkin-Elmer 257 spectrometer. Some important bands are shown in Table I. These reveal that the ligands under consideration coordinate to the oxovanadium(IV) through all the coordinating sites and hence exhibit monofunctional tridentate behaviour.

#### Magnetic Moments

The magnetic susceptibility values obtained at room temperature on a Gouy balance are listed in Table I. Hg[Co(SCN)<sub>4</sub>] was used as a calibrant.

The magnetic moments of these complexes are very close to the spin only value of 1.73 B.M. expected for monomeric oxovanadium(IV) complexes. Such oxovanadium(IV) complexes acquire pyramidal structure.<sup>10,11</sup>

#### Electronic Spectra

The electronic spectra of the complexes in DMSO have been measured on an ELICO CL-24 spectrophotometer operating in the range of 340-900 nm. The observed  $\lambda_{max}$  values, the ligand field parameters and NSH parameters are listed in Table II.

The extent of distortion prevailing in the complexes has been calculated by applying NSH Hamiltonian theory of Lever and Coworkers<sup>12</sup>.

$$DT = \frac{7\sqrt{15}}{2} D_t DQ = (6\sqrt{21}) Dq - \frac{7\sqrt{21}}{2} D_t$$

and  $DT/DQ$ .

The 10  $Dq$  values decrease from complexes V to VIII suggesting that there is increase in the steric hindrance due to the increasing size of the ligand. The ratio  $DT/DQ$  is a measure of tetragonal distortion. The values calculated for these complexes are in the range of 0.304-0.334. The value reported for a limiting case of tetragonally distorted molecule is 0.4226<sup>13</sup>. The ratio  $DT/DQ$  calculated for the oxovanadium(IV) complex having  $C_{4v}$  symmetry<sup>14</sup> is 0.377. The values

TABLE I

Important infrared frequencies in  $cm^{-1}$  and magnetic susceptibilities of the oxovanadium(IV) complexes with salicylidene methyl anthranilates

Sl. No.	Assignment	Complex V	Complex VI	Complex VII	Complex VIII
1.	H bonded OH stretch	..	..	..	..
2.	C=O stretch	1655 m	1655 m	1655 m	1625 m
3.	C=N stretch	1610 s	1620 s	1610 s	1600 s
4.	Aromatic C=C stretch	1535 s	1540 s	1525 s	1580 s
					1575 s
5.	Phenolic C-O stretch	1310 s	1305 s	1310 s	1320 m
6.	-O-C-O- stretch	1265 m	1270 m	1255 m	1245 m
7.	-O-C (methyl) stretch	1030 brm	1040 brm	1040 brm	1030 brm
8.	V=O stretch	980 s	980 s	980 s	970 s
9.	A band appearing at 3,300 is assigned to a new OH bound to vanadium through oxygen (reaction at pH 8) in all the complexes.				
10.	$\mu_{eff}$ (B.M.)	1.75	1.68	1.67	1.76

s = strong, m = medium, brm = broad medium.



TABLE II

Electronic spectral band maxima and ligand field parameters of oxovanadium(IV) complexes with salicylidene methyl anthranilates

Complex No.	$d_{xy} \rightarrow d_{yz}$ $\nu_1$	$d_{xy} \rightarrow d_{xz}$ $\nu_2$	$d_{xy} \rightarrow d_{x^2-y^2}$ $\nu_3$	$D$ cm <sup>-1</sup>	$D_5$ cm <sup>-1</sup>	$D_1$ cm <sup>-1</sup>	$D_Q$	$DT$	$DT/DQ$
V	12,821	18,519	25,641	1852	-2849	855	37,206	11,582	0.311
VI	13,000	18,250	25,500	1825	-2892	863	38,473	11,706	0.304
VII	13,333	18,180	25,641	1818	-2970	884	35,808	11,978	0.334
VIII	13,333	18,018	26,316	1802	-3092	818	36,426	11,083	0.304

obtained for our complexes are also in the vicinity of the above value.

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### MIXED LIGAND COMPLEXES INVOLVING DIETHYLENE TRIAMINE AND LEUCIN

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MIXED ligand complexes involving aminoacids and ammonia<sup>1</sup> or different polyamines<sup>2,3</sup> have been widely studied. The possibilities of the formation of different isomers of the mixed ligand complexes involving diethylenetriamine and aminoacids are noted by Legg and coworkers<sup>4</sup>. Some of the mixed ligand complexes of cobalt(III) involving diethylenetriamine and aminoacids like glycine, valine, 1-threonine, etc., were also reported<sup>5</sup>. We have also reported a number of mixed ligand complexes of Co(III) with diethylenetriamine and different aminoacids<sup>6</sup>. The present study is in continuation of this work.

#### Preparation of [Co(dien)(Leu)Cl]NO<sub>3</sub>

[Co(dien)Cl<sub>2</sub>] was prepared by a method similar to that of Crayton<sup>7</sup>. [Co(dien)Cl<sub>2</sub>] (~0.005 M) was added to 50 ml of water and to it 1.0 g of activated charcoal was added, the mixture was heated to about 60–70°C and stirred. Heating was continued for 15 minutes and then 2.4 g (~0.01 M) of silver salt of Leucin was added in small portions in an interval of 10 minutes. The mixture was stirred for 15 minutes and to it 1.7 g AgNO<sub>3</sub> in 10 ml of water was added dropwise for 5 minutes. The mixture was cooled, filtered and concentrated to about 20 ml. On cooling, dark brown crystals appeared. It was filtered, washed with 50% EtOH, acetone and dried (yield 0.3 g).

Found C 30.62, H 6.30, N 17.82, Co 14.89, Cl 9.01  
[Co(dien)(Leu)Cl]NO<sub>3</sub> requires C 30.78, H 6.41, N 17.96, Co 15.09, Cl 9.10%.

#### Preparation of [Ni(dien)(Leu)]NO<sub>3</sub>

[Ni(dien)Cl]Cl was prepared by the literature method<sup>8</sup>. The preparation of this complex was similar