

POLLARD<sup>1</sup>, COLLINGE<sup>2</sup>, and others, working on Silurid fishes, state that the supra-orbital and infra-orbital canals join each other and then continue backwards as the main canal of the head. In a 30 mm long specimen of *Callichthys paleatus*, POLLARD<sup>1</sup> states that the infra-orbital canal runs almost in a continuous line with the supra-orbital, and even in a 25 mm long specimen of *Trichomycterus tenuis*, in which he regards the condition as larval, he found the two canals continuous. HERRICK<sup>3</sup>, quoted by LEKANDER<sup>4</sup>, also states that in a 25 mm long specimen of *Menidia*, the canals had assumed largely the same appearance as in the adult. But as is evident, such a condition has not been reached even upto the 28 mm stage of *Wallagonia attu*.

The preoperculo-mandibular canal in *Wallagonia attu* is also independent of the main canal at all the stages examined. Such a condition has also been figured in *Amiurus melas* by HERRICK<sup>5</sup>, in *Callichthys littoralis* by COLLINGE<sup>2</sup>, and in *Amiurus catus* by ALLIS<sup>6</sup> and WRIGHT<sup>7</sup>. Contradictory to the results of ALLIS<sup>6</sup> and WRIGHT<sup>7</sup>, COLLINGE<sup>2</sup> maintains that in *Amiurus catus*, the 'opercular canal' is continuous with the main canal.

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June 13, 1957.

#### Zusammenfassung

Das Studium der Sinneskanäle im Kopf des *Wallagonia attu* (Day) bis zu 28 mm Länge ergab, dass der präoperculäre Kanal sich nicht bis an den temporalen Hauptkanal erstreckt, dass der mandibuläre Kanal sich nicht mit dem präoperculären Kanal vereinigt und der infraorbitale Kanal nicht vollständig ausgebildet ist und sich nicht mit dem supraorbitalen vereinigt.

<sup>1</sup> H. B. POLLARD, Zool. Jb. 5, 525 (1892).

<sup>2</sup> W. E. COLLINGE, Proc. zool. Soc. London 1895, 274.

<sup>3</sup> C. J. HERRICK, J. comp. Neurol. 2, 3 (1899).

<sup>4</sup> B. LEKANDER, Acta zool. 30, 1 (1949).

<sup>5</sup> C. J. HERRICK, J. comp. Neurol. 11, 177 (1901).

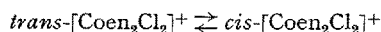
<sup>6</sup> E. P. ALLIS, J. Morph. 2, 463 (1889).

<sup>7</sup> R. R. WRIGHT, Proc. Canad. Inst. [n.s.] 2, 251 (1884).

#### DISPUTANDUM

### The Heat of the Reaction $trans \rightarrow cis$ $[Co(en)_2Cl_2]^+$ in Aqueous Solution

HAWORTH, NEUZIL, and KITSLEY<sup>1</sup> have recently investigated the equilibrium



in solution by a spectrophotometric method, and from the temperature dependence of the equilibrium constant they have found  $\Delta H$  over the temperature range 1–36° to be + 31.4 kcal. If this result were correct, it would be of the greatest interest, since it implies that bond strengths in the two isomers are widely different. Investigation of the infra-red spectra of *cis*- and *trans*-bischlorobisethylenediamine cobaltic chlorides from

450 to 3500  $cm^{-1}$  does not support this conclusion; corresponding bands differ nowhere by more than a few wavenumbers. In the 500  $cm^{-1}$  region, where Co–N vibration frequencies should be found<sup>2</sup>, the observed frequencies are: *cis*-compound, 575, 507, and 457  $cm^{-1}$ ; *trans*-compound, 585, 512, and 470  $cm^{-1}$ . These figures suggest very little difference in bond strengths. Furthermore, published data<sup>3</sup> for the heats of solution and of decomposition by aqueous sodium sulphide of both isomers lead to a value of + 1.8 kcal.

We are therefore driven to conclude that HAWORTH *et al.* have misinterpreted their spectral data, and that, as would be expected, the isomers differ in energy by only a very small amount.

A. G. SHARPE and D. B. WAKEFIELD

University Chemical Laboratory, Cambridge, January 30, 1957.

#### Zusammenfassung

Es wird gezeigt, dass der veröffentlichte Wert von  $\Delta H = + 31,4$  kcal für die Reaktion  $trans \rightarrow cis$ - $[Co(en)_2Cl_2]^+$  ion in wässriger Lösung zu hoch ist. Der richtige Wert ist + 1,8 kcal.

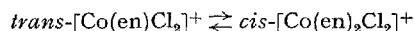
<sup>2</sup> D. B. POWELL and N. SHEPPARD, J. chem. Soc. 1956, 3108.

<sup>3</sup> T. C. J. OVENSTON and H. TERREY, J. chem. Soc. 1936, 1660.

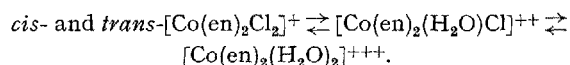
### The Heat of the Reaction $trans \rightarrow cis$ $[Co(en)_2Cl_2]^+$ in Aqueous Solution

#### A Reply

SHARPE and WAKEFIELD have criticized the value of 31.4 kcal<sup>1</sup> (obtained from the temperature dependence of the equilibrium constant) for the reaction



as being inconsistent with their interpretation of the infra-red spectra of these species. However, the following equilibria probably exist in aqueous solution<sup>2</sup>



Furthermore, there is evidence<sup>2</sup> that the interconversion actually occurs via the  $[Co(en)_2(H_2O)Cl]^{++}$  ions instead of the dichloro complexes. Thus, the observed temperature dependence of the equilibrium constant may be due to the aquation reaction rather than differences in bond strengths in the two isomers.

S. L. KITSLEY

Department of Chemistry, Marquette University, Milwaukee (Wisconsin), August 29, 1957.

<sup>1</sup> D. T. HAWORTH, E. F. NEUZIL, and S. L. KITSLEY, Exper. 12, 335 (1956).

<sup>2</sup> J. C. BAILAR, Chemistry of the Coordination Compounds (Reinhold Publishing Corporation, New York 1956), p. 301.

<sup>1</sup> D. T. HAWORTH, E. F. NEUZIL, and S. L. KITSLEY, Exper. 12, 335 (1956).