Further work is in progress and a detailed paper will appear elsewhere.

L. SIBAIYA.
R. L. NARASIMHAIYA.
Department of Physics,
Central College,
Bangalore,
February 12, 1941.

[1] Mandell, *Proc. Roy. Soc*, 1927, **116**, 623.
[2] Sibaiya, *Proc. Ind. Acad. Sci.* (A), 1938, **8**, 393.
[3] Schaaffs, *Zeits. f Physik.*, 1937, **105**, 658.
[4] Sibaiya and Narasimhaiya, *Ind. Sci. Cong.*, 1941, and *Mys. Univ. Jour.* (under publication).
[5] Narasimhaiya and Doraiswami, *Ind. Jour. Phys.*, 1940, **14**, 187.

VISIBLE ABSORPTION BANDS OF MERCURIC CHLORIDE

WHILE investigating the absorption spectra of the halides of various elements, a characteristic band system has been observed in the visible region with mercuric chloride, which has not been previously recorded. The substance is heated in a steel tube, open at both ends, in a coke furnace to a temperature of about 1000° C. The bands extend approximately between λ 4900 to λ 4200 and consist of sequences of distinct doublet bands. Three of the sequences are well developed. They are ascribed to the diatomic molecule HgCl and are considered to form part of the class III system of bands which are reported to be poorly developed in emission by Wieland.[1] A full account of the results will be published shortly.

A. L. SUNDARA RAO.
Andhra University,
Waltair,
February 9, 1941.

[1] Wieland, *Helv. Phy. Acta.*, 1929, **2**, 46.

ULTRA-VIOLET EMISSION BANDS OF MERCURIC CHLORIDE

THE ultra-violet band spectrum of mercuric chloride as excited in a discharge tube has been photographed with a Hilger Quartz-Littrow spectrograph. The band system between λ 2900–λ 2700 reported first by Wieland[1] as due to the triatomic molecule $HgCl_2$ has been studied in detail. The assignment of this system by Cornell[2] to the diatomic molecule HgCl, and the vibrational analysis suggested by him have been confirmed. Additional groups of bands lying towards the short wavelength of each of the Q_1 sequences, have been newly classified as forming the Q_2 sequences of the same system giving an electronic doublet separation of about 90 cm.$^{-1}$ The entire system is ascribed to the transition $^2\Pi - {}^2\Sigma$. The lower state, $^2\Sigma$, is probably the same as the lower level of Wieland's class I system between λ 2650 – λ 2400. The vibrational constants, as derived from the Q_2 heads, are,

$$\omega_e' = 287{\cdot}8 \qquad x_e'\omega_e' = {\cdot}5$$
$$\omega_e'' = 281{\cdot}0 \qquad x_e''\omega_e'' = {\cdot}5$$
$$\nu_e = 36564{\cdot}2.$$

Details of the analysis will be published elsewhere.

M. G. SASTRY.
Andhra University,
Waltair,
February 9, 1941.

[1] Wieland, *Helv. Acta. Phys.*, 1929, **2**, 46, 77.
[2] Cornell, *Phy. Rev.*, 1938, **54**, 341.

INFANTILE MORTALITY AND BERIBERI

IN India beriberi as a serious public health problem is confined to the Northern Circars districts of the Madras Presidency. The disease is due to vitamin B_1 deficiency and is usually associated with the consumption of a diet consisting mainly of raw rice from which the outer layers, which contain most of the vitamin present in the grain, have been removed by machine-milling. About 70 per cent. of the rice-eating population of the Madras Presidency consumes machine-milled rice. The important difference between the dietary habits of the Northern Circars and those of the rest of the province is that in the former area raw rice is preferred to parboiled rice by the mass

of the population. Parboiled rice, in contradistinction to raw, remains rich in vitamin B_1 when highly milled, because the vitamin diffuses through the endosperm in the steaming process, and those who consume parboiled milled rice rarely suffer from beriberi. These questions are fully considered in "The Rice Problem in India"[1] in which the relation between the consumption of raw milled rice and beriberi in India was demonstrated.

In all Eastern countries apart from India in which beriberi is prevalent, the disease is known to be common among infants. It usually attacks breast-fed infants at about the third month of life, and is often fatal. Infantile beriberi has not, however, been reported in India. During visits to the Northern Circars we had the opportunity of observing clinically infantile cases which were unquestionably of this nature and this led us to suspect that infantile beriberi, though generally unrecognised, may be a serious problem in this area. Epidemiological investigations in hospitals and out-patient departments present considerable difficulties and we approached the problem by a study of the existing vital statistics relating to infantile mortality in a number of towns in the beriberi area and in other parts of the country.

The Annual Reports of the Director of Public Health, Madras, provide data about infantile mortality in municipalities in the Madras Presidency. Infantile deaths are grouped under the periods 0–1 month, 1–6 months, and 6 months to 1 year. A comparison was drawn between the proportionate mortality in these periods in 17 towns in the Northern Circars and 17 towns in the province south of Madras City in 1938, the total population concerned being approximately the same in each case. Only the records of municipalities employing health officers were investigated, because in such towns registration of births and deaths is likely to be fairly accurate. The results were as follows (Table I).

In the beriberi area infant mortality reaches its highest peak during the period 1–6 months. In the other towns and in British India generally,

TABLE I

Percentage of Total Infantile Mortality

Period	0–1 month	1–6 months	6–12 months
Towns in beriberi area (raw milled rice)	35·0	41·3	23·7
Towns outside beriberi area (parboiled milled rice)	53·0	26·6	20·4
British India (Report of the Public Health Commissioner with the Govt. of India, 1938)	46·8	30·6	22·6

the greatest proportionate mortality occurs during the first month. Further analysis showed that the reported infantile mortality in towns in the beriberi area is considerably higher than in towns outside the area, and that the excess mortality in the former is due to the larger number of deaths occurring in the group 1-6 months.

Municipal records were scrutinised to elicit the proportion of deaths at *each* month of infancy in three of the largest towns in each group, over a period of 10 years. In the towns in the beriberi area there was a striking peak in mortality at the third month, which was constantly present in all years and throughout the records of the 3 municipalities in question. It is highly probable that this peak, which was entirely absent in the records of the municipalities outside the beriberi area, is due to deaths from infantile beriberi.

The inaccuracy of vital statistics in India is well known. It may, however, be pointed out that registration of births and deaths in the Madras Presidency is more complete than anywhere else in India and that we were concerned with urban areas in which whole-time health officials were employed. Further, it is difficult to imagine how a sharp and constant peak in mortality at the age of 3 months, which revealed itself only on detailed study of the records, could be produced by errors and omissions in registration.

It is, in our opinion, very probable that a similar trend in infant mortality exists in all Eastern countries in which raw milled rice is the staple food—*i.e.*, that infantile beriberi has a specific effect on the proportionate mortality at different stages of infancy. Further investigations on this question, which is of great public health importance, are in progress.

W. R. AYKROYD.

B. G. KRISHNAN.

Nutrition Research Laboratories,
Indian Research Fund Association,
Coonoor,
March 5, 1941.

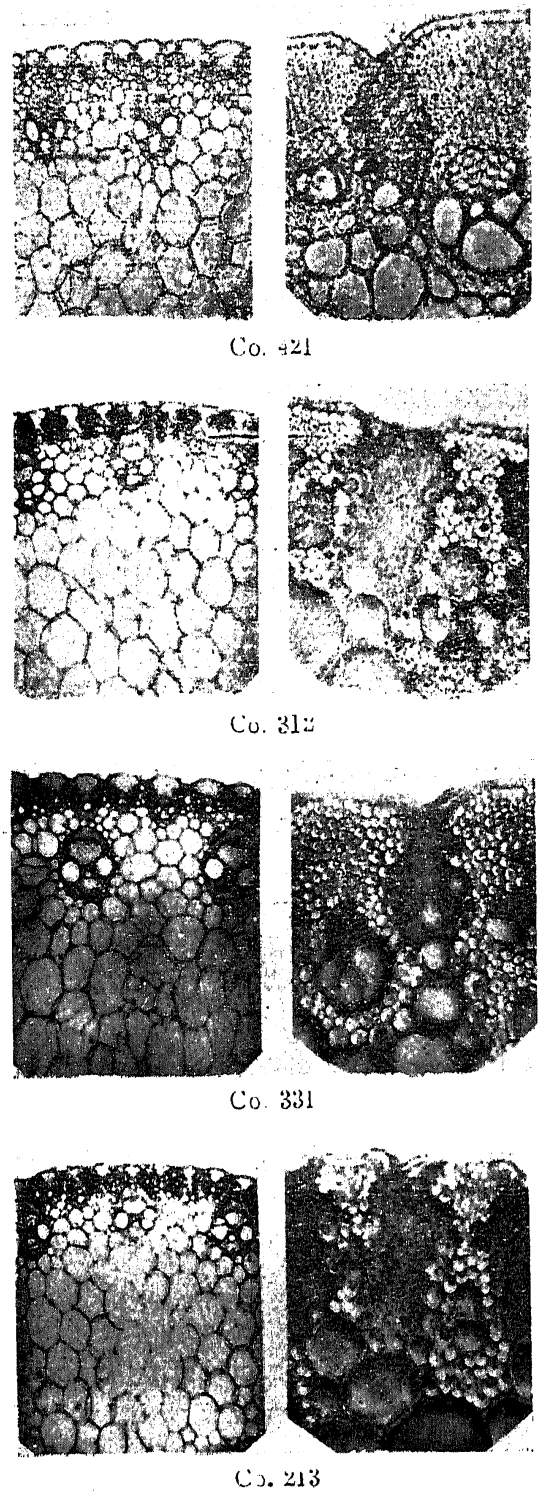
[1] Aykroyd, Krishnan, Passmore and Sundararajan, (1940), *Indian Medical Research Memoir*, No. 32.

HARD LEAF MID-RIB IN SUGARCANES AND RESISTANCE TO TOP-BORER (*SCIRPOPHAGA NIVELLA* F.)

MR. P. V. ISAAC, Sugarcane Entomologist (Dipterist) at the Imperial Agricultural Research Institute, New Delhi, suggested in *Current Science* (May 1939, p. 211) hardness of leaf mid-rib in sugarcane varieties as a possible factor conducive to resistance to sugarcane top-borer (*Scirpophaga nivella* F.). This suggestion was made after an extensive examination of a number of cane varieties and seedlings in the field coupled with a study of the habits of the pest including the manner in which the larvæ enter the shoot.

Anatomical studies of various parts of the sugarcane plant—including those of various species of *Saccharum* (both wild and cultivated) and interspecific and intergeneric hybrids with *Saccharum*—have been in progress at Coimbatore, with the object of working out the inheritance of anatomical characters. The above suggestion of Mr. P. V. Isaac naturally attracted attention and structure of the leaf mid-rib was included in the studies.

Leaf mid-rib specimens of resistant and susceptible varieties were obtained both from Coimbatore and from its substation at Karnal and sections taken at or near the hole made by the larvæ of the top-borer. The collection of the mid-rib specimens did not present any



Co. 421 Co. 312 Co. 331 Co. 213

Cross-sections of leaf midrib
low power × 200 and high power × 500

difficulties. The studies have shown fair correlation between the thickening of the various mid-rib tissues and resistance of the variety to top-borer attack. The photo plate (Fig. 1) gives the mid-rib cross-sections of four canes, two of which, *viz.*, Co.'s 421 and 331 have