

$$\frac{\partial I}{\partial m} = \int_0^{\infty} \left\{ e^{-\frac{n}{2V}(kx+m)^2} - e^{-\frac{n}{2V}(kx-m)^2} \right\} f(x^2) dx$$

which is positive or negative according as  $m$  is negative or positive. Therefore

$$I(m) \leq I(0).$$

The completely unbiased character of the  $E^2$ -test (Tang, 1938), by stating the problem in its canonical form and following the above method of argument, can easily be shown to follow from the complete unbiasedness of the  $t$ -test just proved. This chain of reasoning can be followed up to show the completely unbiased character of the likelihood ratio test for the general regression problem and then further of the Wilk's criterion.

Detailed proofs will be published elsewhere.

Indian Council of Agric. Research,  
R. D. NARAIN.

New Delhi,  
December 28, 1948.

Daly, J. F., "On the unbiased character of likelihood ratio tests for independence in normal systems," *Ann. Math. Stats.*, 1940, **11**, 1. Tang, P. C., "The power function of analysis of variance tests with tables and illustrations of their use," 1938, **2**, 126.

### NEW BAND SYSTEMS OF THE $TlCl$ MOLECULE

EXCITING the vapour of thallium chloride in a high frequency discharge through a continuously evacuated pyrex tube, two new systems of bands, one between  $\lambda$  4300— $\lambda$  4150 and the other between  $\lambda$  4150— $\lambda$  3800 have been obtained in addition to the band system around  $\lambda$  3200 analysed by Howell and Coulson.\* The more refrangible system consists of about 75 bands in all which are degraded in either direction, while a few of them are headless and diffuse. The other system consists of about 18 bands which are mostly degraded towards the red, though a few of them are violet-degraded. The vibrational analyses of these two systems have shown that the lower state, which is found to be common to both of them, is the upper state of the ultraviolet system  $^31-^1\Sigma$ , established by Howell and Coulson. Predissociation similar to that found in the upper state of the ultraviolet system, is observed in the lower state of both the systems at  $v'' = 5$ . The following vibrational constants

have been determined for the more refrangible system.

$$\nu_0 = 24683.3 \quad \omega_e' = 101.3 \quad \omega_e'' = 206.5 \\ x_e' \omega_e' = 0.1 \quad x_e'' \omega_e'' = 6.5$$

The locus of intense bands in this system falls on a Condon parabola which is to be expected with such relative values of  $\omega$  as occur here. The following constants are suggested for the other system.

$$\nu_{0,0} \sim 24040 \quad \omega_e' \sim 100 \quad \omega_e'' \sim 205$$

The chlorine isotope effect observed in the system supports the vibrational analysis.

The close proximity of these two systems suggests that the upper levels may form an electronic doublet.

Details will be published elsewhere.  
Andhra University, P. TIRUVENGANNA RAO.  
Waltair,  
January 2, 1949.

\* Howell and Coulson, *Proc. Roy. Soc.*, 1938  
**166**, 238.

### THE EMISSION SPECTRUM OF BISMUTH IODIDE

A NEW BAND system between  $\lambda$  5900— $\lambda$  5650, attributed to the diatomic molecule, BiI, is recorded in emission in a high frequency discharge, in addition to the band system with origin at  $\nu = 23388.9$   $\text{cm}^{-1}$ , reported by Morgan.\* Vibrational analysis of this system has led to the determination of the following vibrational constants.

$$\nu_0 = 17216.0 \quad \omega_e' = 195.0 \quad \omega_e'' = 167.9 \\ x_e' \omega_e' = 1.0 \quad x_e'' \omega_e'' \sim 0.3$$

By analogy, this system may correspond to the low frequency system observed in the other bismuth halides.

Details will be published shortly.  
Andhra University, P. TIRUVENGANNA RAO.  
Waltair,  
January 19, 1949.

\* Morgan, *Phys. Rev.*, 1936, **49**, 47.

### PLEOCHROIC HALO FROM THE CHOTA NAGPUR GRANITE

WHILE consulting literature regarding the occurrences of pleochroic haloes in minerals, the description of a pleochroic halo mentioned by Dr. L. A. N. Iyer<sup>1</sup> in granite from Chota Nagpur was noticed. He records, "In one of the crystals of biotite in the granite from south of Jatiba, a good pleochroic halo is present with a dark red grain in the centre, which is presumably zircon. It shows an inner lighter