

unusual intensity distribution. For the molecule RbH an approximate calculation of the relative intensities of the bands of the system in emission has been made by Gaydon and Pearse<sup>3</sup>. The results may be applied to absorption by molecules in the lowest state by assuming an initial distribution of all the molecules in the level of the lower electronic state for which  $v'' = 0$ , instead of a Maxwell distribution among the vibrational levels of the upper electronic state. The factor  $v^4$  is also changed to  $v$  for absorption, but this is relatively unimportant in its effect on the results. This has been done in the course of an investigation of the spectrum of the NaH molecule by R. C. Pankhurst with the results shown in the accompanying table.

$v', v''$	$\lambda$	$I_0$	$I_c$
0,0	—	—	0
1,0	—	—	0
2,0	—	—	0
3,0	—	—	1
4,0	4230.6	0	3
5,0	4169.0	2	7
6,0	4108.4	5	16
7,0	4049.0	7	27
8,0	3990.9	9	42
9,0	3934.3	10	50
10,0	3879.4	10	50
11,0	3826.0	9	—
12,0	3774.3	9	—
13,0	3724.5	9	—

Here  $v', v''$  are the vibrational quantum numbers of the upper and lower levels,  $\lambda$  is the wave-length given by Hori<sup>4</sup> for the  $R(0)$  line of the band as observed in absorption,  $I_0$  is his corresponding band intensity, while  $I_c$  is the value of the intensity obtained by calculation. It will be noticed that the experimental and calculated values agree on the general course of the intensity from vanishingly small values near the origin of the system rising steadily to a flat maximum in the  $(v', 0)$  progression. Without laying too much stress on the actual numerical values, which are based on an arbitrary scale of 50 for the maximum in the calculated relative intensities,  $I_c$ , and are eye-estimates on a scale of 10 for the maximum in  $I_0$ , it may be noted in favour of the assignment that the transition observed, namely (9,0), is in the region of the maximum, but since in this region the intensities of neighbouring bands are so nearly the same, it would seem that they also should be obtained. If this could be done the probability of the identification being correct would be greatly strengthened.

R. C. PANKHURST.  
R. W. B. PEARSE.

Astrophysics Dept.,  
Imperial College of Science and Technology,  
London, S.W.7.  
May 6.

<sup>1</sup> Adams, W. S., *Astrophys. J.*, **93**, 11 (1941).

<sup>2</sup> McKellar, A., *Pub. Ast. Soc. Pac.*, **52**, 187 (1940).

<sup>3</sup> Gaydon, A. G., and Pearse, R. W. B., *Proc. Roy. Soc., A*, **173**, 37 (1939).

<sup>4</sup> Hori, T., *Z. Phys.*, **62**, 352 (1930).

## Reflexion from Paper

I HAVE observed a curious optical effect which I have not seen described anywhere. If an open book is illuminated fairly strongly from one side, for example, from over one shoulder, the general colour of

the white paper is different for the two eyes when one or the other is closed. The effect has been tried with several subjects with the same result. When the light comes over the left shoulder and the left eye is open the pages have a bluish tinge; when the right eye is open and the left closed the tinge is reddish. If the light comes over the right shoulder the above effects are reversed. If the light is centrally placed above and behind the head there is no difference.

E. BURKE.

5 Watts Avenue,  
Rochester,  
Kent.

I THINK the effect Mr. Burke describes is due to selective specular reflexion from the paper. Many near-white papers are slightly more glossy in red light than they are in blue; that is, the specularly reflected light contains relatively more red and less blue than does the incident light. If the incident light comes over the left shoulder, the right eye will be rather nearer the angle of specular reflexion than the left, consequently the light reaching the right eye will be a little richer in red.

The effect can be observed in more pronounced form with many glossy coated ('art') papers, if they are illuminated and viewed at an angle of about 70° to the normal: the diffuse image of the light source appears distinctly orange or reddish compared with the source itself.

V. G. W. HARRISON.

Printing and Allied Trades Research  
Association,  
101 Princes Gardens, Acton, W.3.

## History of the British Thermal Unit

THE date of the phrase "British thermal unit" can be pushed back by fifteen years; it occurs in W. J. M. Rankine, "Manual of the Steam Engine" (1859), p. 300; but here, as in the 1875 quotation given by Dr. Powell<sup>1</sup>, it is a descriptive phrase and not a technical term; Rankine is in fact contrasting the British thermal unit and the French thermal unit.

It occurs, however, as a technical term in 1889 in De V. Wood, "Thermodynamics", 3rd ed. (New York), p. 3 ("The British Thermal Unit (B.T.U.)"). (I have not been able to consult earlier editions of this book.) H. Evers, "Steam" (1889), p. 4, speaks simply of "A Unit of Heat"; M. H. Wright, "Heat" (1893), p. 79, says: "In England the unit of heat or thermal unit is . . ."; W. S. Hutton, "Steam-boiler Construction" (1891), p. 4, speaks of "The British thermal unit".

It would seem likely that it was in the United States that it was first found necessary to incorporate the word British in the name of the unit, and that the phrase then recrossed the Atlantic as a technical term, and reached British physicists by way of British engineers.

G. WOLEDGE.

The Library,  
Queen's University,  
Belfast.  
May 13.

<sup>1</sup> NATURE, May 9, p. 525.