A similar pattern of varietal resistance was recorded in 1965 and 1966 in a second trial sown in an adjacent field in 1964 and it is clear that the relative performance of varieties at Cambridge is being greatly affected by the differential reaction of the varieties to clover rot.

The distribution of clover rot in white clover crops throughout the United Kingdom has not been studied, but the disease has been identified in trial plots at the Grassland Research Institute, Hurley, Berkshire; at Harper Adams Agricultural College, Newport, Shropshire; and at Hill Farm, Lolworth, near Cambridge. Clover rot does not appear to be present in variety trials grown at Trawscoed, near Aberystwyth, or at Headley Hall, near Leeds.

These trials provide the first evidence in the United Kingdom of differences in resistance to clover rot of white clover varieties. Dillon Western, Loveless and Taylor[4] commented on the reputed immunity of wild white clover to clover rot and stated that other varieties of white clover were not affected severely. Our own findings do not support these statements.

These results suggest that clover rot can cause loss of vigour and plant mortality in white clover under practical farm conditions. The distribution and economic importance of this disease are not known, however, and require further investigation.

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Received October 14, 1966.

[1] Lester, E., and Large, E. C., *Plant Pathol.*, **7**, 115 (1958).
[2] Moore, W. C., *British Parasitic Fungi*, 347 (Cambridge Univ. Press, 1959).
[3] Sampson, K., and Western, J. H., *Diseases of British Grasses and Herbage Legumes*, 58 (Cambridge Univ. Press, 1954).
[4] Dillon Weston, W. A. R., Loveless, A. R., and Taylor, R. E., *J. Agric. Sci.*, **36**, 18 (1946).

PSYCHOLOGY

Fall in Critical Flicker Frequency associated with Adaptation to Intermittent Light

In a series of experiments in which the effects of centrally acting drugs on the adaptation of the critical flicker frequency (CFF) to intermittent light of varying frequency was investigated, a consistent placebo effect was noted, namely a fall in mean CFF[1–3]. This had not been described by other workers investigating the effects of drugs and placebo on mean CFF alone, and it was therefore possibly due to the method used. The method used involved exposing subjects for periods of 1 min to an intermittent light of 25 or 50 c/s, before measuring ascending and descending thresholds of CFF[3]. To investigate this further, the CFF was measured in six subjects at 0, 1·5 and 3 h on 3 consecutive days, beginning at 9 a.m., about 1·5 h after a light breakfast. The subjects abstained from tea, coffee and smoking during the experimental period. On one day, ascending and descending thresholds were measured without previous adaptation, while on the others, subjects were exposed for 1 min to intermittent light at 25 or 50 c/s before the thresholds were measured. The method of measurement was the same as that previously described[3] except that the light source was viewed through an artificial pupil 2 mm in diameter and was placed at the focal point of a lens which delivered parallel light to the eye. This procedure eliminated any effect of changes in pupil size of the subject. An interval of 1 min elapsed between each determination.

The results were submitted to analysis of variance and the table of means is given in Table 1.

As has previously been shown[4,5], there was a significant difference between the mean ascending and descending thresholds, and between mean thresholds after exposure to 25 and 50 c/s. There was no significant change in ascending or descending or mean thresholds without adaptation at 1·5 and 3 h, but exposure to the adapting frequencies produced a consistent fall at 1·5 h with a further but less marked fall at 3 h.

Table 1. MEAN ASCENDING (*A*) AND DESCENDING (*D*) THRESHOLDS OF CFF (C/S), BOTH WITHOUT EXPOSURE AND AFTER EXPOSURE FOR 1 MIN TO INTERMITTENT LIGHT OF 25 AND 50 C/S, IN SIX SUBJECTS, AT 0, 1·5 AND 3 H

	A	*D*	25*A*	25*D*	50*A*	50*D*
0	50·33	47·42	47·42	45·42	50·83	48·58
1·5	50·42	47·92	46·00	44·00	49·25	47·00
3	49·50	47·75	45·42	43·50	49·17	46·75

Standard error of any mean = 0·40.
5 per cent critical difference (2-tail) = 1·14.
5 per cent critical difference (1-tail) = 0·95.
1 per cent critical difference (2-tail) = 1·52.
1 per cent critical difference (1-tail) = 1·36.

It appears, therefore, that the fall in CFF which follows the administration of a placebo is due to the adaptation procedure used. The nature of this effect is uncertain, but may be related to fatigue somewhere in the visual pathway. This is supported by the observations[1,3] that central stimulants such as amphetamine and phenmetrazine may abolish this fall without necessarily producing an increase in CFF compared with resting levels. On the other hand, central depressant agents such as barbiturate and phenothiazine drugs produce an even greater fall in CFF.

While a placebo control is always desirable in such investigations, it is essential when investigating the effects of a drug on the adaptation phenomenon, because of the physiological change which occurs in CFF after repeated adaptation.

One of us (P. T.) holds a Wellcome senior research fellowship in clinical science.

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[1] Turner, P., thesis, Univ. London (1965).
[2] Turner, P., *J. Pharm. Pharmacol.*, **17**, 388 (1965).
[3] Smart, J. V., and Turner, P., *Brit. J. Pharmacol.*, **26**, 468 (1966).
[4] Turner, P., *J. Physiol.*, **171**, 6P (1964).
[5] Turner, P., Patterson, D. S., and Smart, J. V., *Nature*, **209**, 813 (1966).

APPLIED SCIENCE

Lubricant Entrapment between Approaching Elastic Solids

The theoretical and experimental work carried out in recent years on elastohydrodynamic lubrication has been almost exclusively concerned with steady state conditions. In many elastohydrodynamic situations encountered in machinery, however, the film thickness changes with time, and it is important that the effects of "normal" motion of the opposing solids should be examined.

Christensen[1] examined theoretically the problem of an elastohydrodynamic film between approaching cylinders in some earlier work in this department. He predicted that the fluid film pressures could reach very high values, often in excess of the Hertzian maximum pressure of dry contact, and that these pressures could readily produce elastic and possibly permanent indentations in the solids. Experimental evidence was provided of the formation of permanent indentations when a steel ball was loaded against a plane solid in the presence of a lubricant, but no experimental observations of the development of the elastic indentation have been recorded. In this note, we describe how interferometry can be used to detect the