that part of the potassium set free during this hæmolysis is accumulated by the tissue cells. Unfortunately we are at present unable to present enough data on the level of potassium in plasma. Only small changes in this level are necessary, however, to induce an increase in cellular potassium, due to the effect of the Gibbs–Donnan equilibrium. This explanation seems the more reasonable as we found the time of the year to be the important factor: no differences in muscle potassium were observed between samples from animals with normal or hypothermic body temperature.

The effect of hæmolysis in October–November seems to last until December. This lag might be explained on the assumption that the extrusion of salts through the kidney is extremely slow in animals in deep hibernation. With the progress of time (December–March) this slow process, however, leads to a reduction of cellular (and plasma) potassium.

Regarding our results for bats, these are in accordance with such considerations.

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Diuresis due to Stress in Cattle

In the course of investigation of some aspects of renal function in adult dairy cattle, it was noted that there was a marked diuretic response to a painful stimulus. The animals used were non-lactating, non-pregnant Ayrshire dairy cows accustomed to experimental procedures, and the stimulus was puncture of the brachial artery by the technique described by Fisher[1], which, despite the use of local anæsthetic, always caused some discomfort. Arterial puncture was carried out during continuous urine collection by an indwelling urethral catheter for renal clearance measurements. In association with the increased rate of flow after arterial puncture, urine became noticeably paler in colour, and there was a marked fall in urinary bicarbonate concentration. Cystometric measurement of bladder pressure showed that there was no variation in intracystic pressure at the onset of diuresis, and, on the basis of these observations, it was assumed that the increase in the rate of urine collection was a true reflexion of increased rate of formation, rather than the expulsion of uncollected urine from the bladder.

The discomfort of arterial puncture, in some animals, caused an immediate diuresis of 200–300 per cent of the previous mean rate of urine flow. The onset and regression of this response were usually rapid. One cow, with a mean rate of urine flow of 9·6 ml./min., showed a diuresis of 28·5 ml./min. in the 5 min. following arterial puncture, the rate returning to 8·5 ml./min. in the next 5 min. period. After repeated experiments on the same animals, this type of response was preceded by a diuresis associated with the preliminary procedure of clipping, swabbing, and anæsthetizing the site for puncture. Fig. 1 illustrates the diuresis which occurs on carrying out

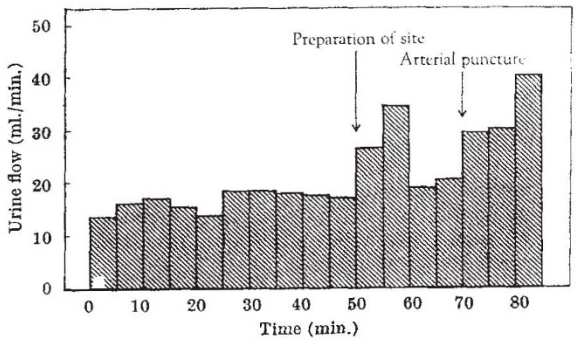

Fig. 1. The effect of arterial puncture, and of clipping, swabbing, and anæsthetizing the site on the urine flow of a normal cow

arterial puncture, preceded by the response to preparation of the site.

Rydin and Verney[2] demonstrated a marked inhibition of urine flow of hydrated dogs following emotional stress, with good evidence that this response was due to the release of antidiuretic hormone. Andersson and Persson[3], however, reported that, in hydrated goats, painful or emotional stimuli did not result in any alteration in the rate of urine formation. In man, Miles and De Wardener[4] described an emotional diuresis which occurred on bladder catheterization, or resulted from apprehension of a surgical procedure. They attributed the rise in salt excretion which accompanied this diuresis to three possible causes: (1) a rise in glomerular filtration-rate; (2) the inhibition of a salt-retaining hormone; (3) a nervous inhibition of tubular function. There are, therefore, marked species differences in renal responses to painful or emotional stimuli.

The mean blood pressure of cows may rise markedly on experimental interference[5], but whether the observations reported here are the result of alterations in renal hæmodynamics or of inhibition of the antidiuretic hormone is not known. It is, however, clear that experiments on cattle which depend on measurement of the rate of urine flow must be carried out with the minimum amount of stress to the subject.

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Effects of Thymectomy on the Resistance of Rats to Drowning and Histamine Stress

The thymus has been proposed as a site of hormone production[1]. Bomskov *et al.*[2] have reported that treatment of normal rats and guinea pigs with calf thymus extract distinctly diminished survival-time of animals exposed to chloroform–air mixtures.

The aim of the present work was to determine the degree of resistance conferred by thymectomy on albino male Wistar rats. Two procedures were used, one involving resistance to drowning stress and the second resistance to histamine stress.

Two hundred and forty male rats averaging 50 gm. were matched by weight and divided into three