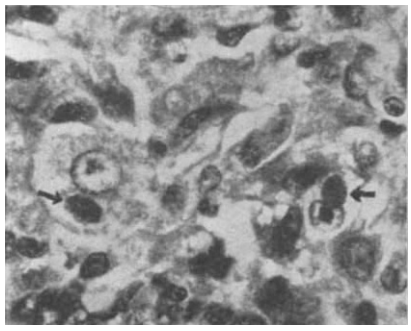

Fig. 2. Section of tumour showing cytoplasmic bodies (arrows)

were frequently enlarged but freely mobile. No metastases were found in any of the viscera in animals brought to autopsy.

Histological examinations showed that the bulk of the tumour was composed of pleomorphic cell types, the predominant cell (Fig. 2) being large with abundant cytoplasm. The cytoplasm of the majority of these cells contained one or more acidophilic, rounded or irregular bodies varying in size between 1 and 5μ and resembling virus-induced inclusions. In some cases there was a moderate degree of fibrous tissue reaction and an infiltration with inflammatory cells. No bacteria, fungi or protozoa were seen in tissue sections. In deeper layers of the growths tumour cells were frequently seen infiltrating between underlying muscle fibres. Enlarged regional lymph nodes were often seen to contain cells resembling those characteristic of the tumours.

The disease has been transmitted by subcutaneous inoculation of lightly centrifuged emulsions of tumour material to healthy rhesus monkeys and to two West African guenon monkeys (*Cercopithecus aethiops tantalus*). Attempts to transmit the condition to West African mangabeys (*Cercocebus torquatus torquatus*), to Patas monkeys (*Erythrocebus patas patas*) and to laboratory white mice have been unsuccessful.

Tumour material has been forwarded to Dr. C. H. Andrewes, National Institute for Medical Research, Mill Hill, London, for further investigation by his colleagues and himself; they have obtained evidence that the causative agent is a virus, as will be reported later.

Our thanks are due to Dr. F. N. Macnamara, director of the Virus Research Unit, for permission to publish this communication.

W. G. C. Bearcroft
Margaret F. Jamieson

Virus Research Unit,
West African Council for Medical Research,
Yaba, Lagos.
May 22.

Epidermal Structures in a Rhinoceros (*Ceratotherium simum*)

Most accounts of rhinoceros skin detail its more obvious characteristics, namely, its rough, wrinkled and mammillated exterior, its well-keratinized epidermis and its thick, weighty and inelastic dermis. Concerning the structure of such skin and the possible presence of epidermal derivatives (other than horns) information is curiously wanting in authoritative zoological treatises[1]. It is frequently stated that body hairs, save those constituting the ear- and tail-fringes, are lacking in the Rhinocerotidae, though Beddard[2] recognized an unobtrusive and rather sparse hairy covering as a general familial character.

Neuville[3] observed hairs around the base of the horn in the three Asiatic species (*Rhinoceros unicornis*, *R. sondaicus*, *R.* (*Didermocerus*) *sumatrensis*), and Lydekker[4] considered *Didermocerus* a form specially prone to hairiness, the so-called species '*Rhinoceros lasiotis*' being based on nothing more than a particularly hirsute specimen. Bigalke *et al.*[5] described, in an infant *Ceratotherium simum*, a very sparse hairy covering, becoming less obvious with advancing age, and we have noted a discrete hair tuft upon the nuchal eminence of an immature animal of this species. Reliable records as to the hairiness of young specimens of *Rhinoceros unicornis*, *R. sondaicus* and *Diceros bicornis* appear to be lacking.

It is probable that in some rhinoceros species at least, as in the elephant, the neonatus manifests an extremely sparse hairy coat which disappears gradually either as the result of friction or the accumulation of subcutaneous fat.

It is not surprising, therefore, that recent microscopical examination of the cervical and abdominal skin of an immature specimen of *Ceratotherium* should reveal the presence of hair follicles (provided with sebaceous glands) containing greater or lesser portions of well-formed hair shafts. Most unexpected, however, was the finding of large apocrine sweat glands, characterized by an abundance of relatively large, ectodermally developed myoepithelial cells, an anatomical arrangement clearly subserving the rapid and copious discharge of sweat.

The skin examined was freshly procured and well fixed in the field; after paraffin blocking it was sectioned with difficulty, the best sections being 15μ–20μ in thickness. These stained well with hæmatoxylin and eosin, and with Mallory's triple stain.

Study of these skin sections reveals (*a*) a heavily keratinized and pigmented epidermis, 1 mm. thick, showing the customary component layers save for a stratum lucidum, (*b*) an exceedingly thick (18–20 mm.) and dense dermis, composed exclusively of pure collagen fibres disposed in every direction to the skin surface, and (*c*) hair follicles, hairs, sebaceous glands and apocrine sweat glands. The entire skin appears remarkably vascular. The ordinary small type of sweat gland is not observable.

The obtrusively large apocrine sweat glands are not particularly numerous, although estimation of their incidence is precluded by the thickness of the sections. Each gland surrounds, in open basket fashion, the base of a hair follicle and appears to be supplied by an independent arteriole: its spiral duct is fairly capacious in its intra-dermal course, but narrows perceptibly in its intra-epidermal course. A striking feature of the glands and ducts is the association therewith of large and numerous ectodermally developed myoepithelial cells: these lie between the secretory cells and the basement membrane of the glands and are disposed helicoidally around the ducts.

These distinctive apocrine sweat glands seem to have escaped previous notice in *Ceratotherium* and it is not known whether they occur in other rhinoceros species. Histologically the skin of *Ceratotherium* is demonstrated to be of typically mammalian constitution and to lack none of the customary epidermal derivatives. It is specialized in respect of the degree of keratinization of its epidermis, the thickness and

purely collagenous nature of its dermis and the size and structure of its peculiar sweat glands.

A detailed account of the skin histology will be published elsewhere.

We are deeply indebted to Dr. E. H. Williams, of Arua, for the collection and preservation, under difficulty, of the material studied.

A. J. E. CAVE

Department of Anatomy,
St. Bartholomew's Hospital Medical College,
London, E.C.1.

D. B. ALLBROOK

Department of Anatomy,
Makerere College,
Kampala.
May 28.

[1] Flower, W. H., and Lydekker, R., "Introduction to the Study of Mammals, Living and Extinct" (Black, London, 1891). Oppel, A., "Lehrbuch der vergl. mikroskop. Anat. der Wirbeltiere" (Fischer, Jena, 1896–1916). Weber, M., "Die Säugetiere" (Fischer, Jena, 1928). Grassé, P.-P., "Traité de Zoologie", **17** (1), 1109 (Masson, Paris, 1955).

[2] Beddard, F. E., "Cambridge Natural History", **10**, "Mammalia", 253 (Macmillan, London, 1902).

[3] Neuville, H., *Arch. Mus. Nat. Hist., Paris*, (6 Sér.), **2**, 179 (1927).

[4] Lydekker, R., "Horns and Hoofs" (Cox, London, 1893).

[5] Bigalke, R., *et al.*, *Proc. Zool. Soc.*, **120**, 519 (1950).

Lolium temulentum L., a Long-day Plant requiring only One Inductive Photocycle

COOPER[1] has recorded that *Lolium temulentum* is a long-day summer annual which shows no response to vernalization by low temperatures, and has no sharply defined critical photoperiod. My results, however, indicate that at least one strain of the species is a strict long-day plant, and that it can be induced to form normal inflorescences by exposure to only one long day.

The plants used were derived from the selfed progeny of a single Canadian plant, and were grown under controlled environmental conditions in the Earhart Laboratory, Pasadena. After seedling establishment in 8-hr. photoperiods, groups of plants were distributed to a series of photoperiod regimes at 17° C. under mixed incandescent and fluorescent illumination at an intensity of 1,200 ft.-candles throughout the photoperiod. The times of inflorescence initiation were determined by periodic dissection, and it may be seen from Table 1 that initiation was considerably delayed in photoperiods less than 12 hr. in length, and did not occur in 9-hr. photoperiods within 180 days. Initiation of inflorescences in this strain of *L. temulentum* thus appears to have an absolute requirement for long days.

Table 1. NUMBER OF DAYS REQUIRED FOR THE INITIATION OF INFLORESCENCES IN PLANTS OF *L. temulentum* GROWN AT 17° C. UNDER INCANDESCENT AND FLUORESCENT ILLUMINATION AT AN INTENSITY OF 1,200 FT.-CANDLES

Photoperiod length (hr.)	8	9	11	12	13	15	24
Days to double ridge appearance	—	>180	95	28	18	14	8

Groups of plants, which had been grown for five weeks in 8-hr. photoperiods, were exposed to a varying number of long days at 23–17° C. before being returned to short-day conditions. The rates of development of their inflorescences in short days at 23–17° C. subsequent to induction were determined by the dissection of five plants in each treatment group each week. All plants received 8 hr. of natural illumination daily, and during treatment were given photoperiod extensions at intensities of 12, 40 or 400 ft.-candles at plant height. Both continuous light and 16-hr. photoperiods were used for induction. Of the plants not exposed to long days, none showed any sign of inflorescence initiation within 140 days. Their apices did, however, increase in length throughout the period of the experiment, due to the accumulation of unexpanded leaf primordia. On the other hand, all the plants exposed to long-day conditions in all series, even those exposed to only one 16-hr. photoperiod of low intensity, either eared or displayed unambiguous inflorescence initiation on dissection. This strain of *L. temulentum* thus has a sensitivity to photoperiodic induction comparable to that of *Xanthium pensylvanicum* among short-day plants. It should be noted, however, that maximum photoperiodic sensitivity is not attained until the plants have been grown for about five weeks in short-day conditions at 23°–17° C. After only 14 days in that regime the plants need four days of continuous light for induction, while seedlings 21 and 26 days old require, respectively, three and two days of continuous light.

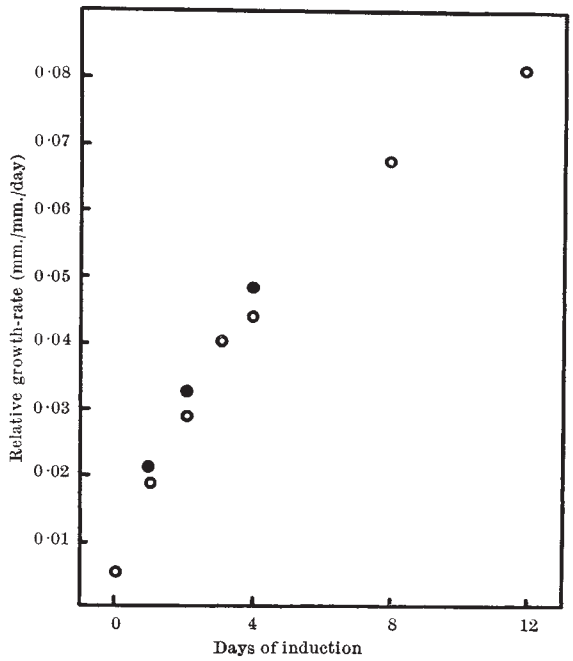

Fig. 1. The effect of the number of days of continuous light induction on the relative growth-rate of inflorescences of *L. temulentum* in 8-hr. photoperiods at 23–17° C.: with day-length extensions of 400 ft.-candles intensity, ○; with day-length extensions of 40 ft.-candles intensity, ●

In the controlled environmental conditions available for these experiments, the increase in apex length among induced plants was exponential with time, and it may be seen from Fig. 1 that the relative growth-rate of *L. temulentum* inflorescences, in 8-hr. photoperiods at 23–17° C. after initiation, was greatly affected by the number of long days to which the plants had been exposed. The rates were, in fact, approximately proportional to the logarithm of the number of inductive photocycles given. They were, moreover, highly reproducible, and provide a sensitive index for kinetic analyses of the inductive process.

Variation in the number of long days to which the plants were exposed had no effect on the number of spikelets formed in each inflorescence, nor were