esculentus). The appearance of LNSC in the 5th nymphal instar, their peak activity in the freshly emerged adult female prior to mating and their complete inactivity after mating and oviposition is highly suggestive of the fact that the LNSC secretion induces the urge for mating (receptivity) in the female. Males are attracted towards the female when the latter exhibits her mating instinct. Therefore, the sex attractant, if any, is produced by the female and the effect of this attractant is to engage the male in copula for at least 96 h. There is sufficient evidence[1] to show that there is a definite relationship between mating and the activity of the corpora allata (CA).

Different views have been expressed regarding the control of mating in insects. ENGELMAN[2] and BARTH[3–5] have stated that mating is controlled by CA. ROTH[6] and ROTH and BARTH[7] showed that the female receptivity was not controlled by the CA or the ovaries and came to the conclusion that a receptivity centre of the brain NSC controlled the acceptance of male by a female and that the act of copulation rendered the receptivity centre inactive. It is, therefore, logical to regard the LNSC of protocerebrum of female *D. koenigii* as the receptivity centre, the endocrine secretion of which induces the onset of receptivity in the freshly emerged female.

Summary. Five pairs of median and 1 pair of lateral neurosecretory cell groups occur in the protocerebrum of *Dysdercus koenigii*, a hemipteran pest on the ladies finger plant (*Hibiscus esculentus*). The lateral neurosecretory cells (LNSC) become active prior to, and at the time of commencement of mating and release their secretion within 24 h of commencement. The female never mates again after laying eggs and the LNSC also never become active. It is believed that LNSC secretion induces the urge for mating in the freshly emerged female and the lateral groups of NSC form the receptivity centre in the brain.

USHA SHARMA, S. L. SAHNI and D. P. SINHA[8]

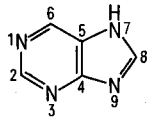
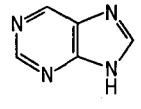
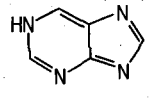
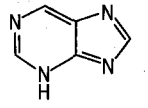
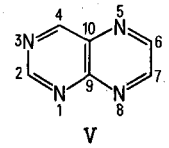
Science College, Department of Zoology, Patna-5 (India), and Magadh University, Department of Zoology, Gaya (India), 3 January 1975.

[1] USHA SHARMA, S. L. SAHNI and D. P. SINHA, Curr. Sci. *41*, 707 (1972).
[2] F. ENGELMAN, Experientia *16*, 69 (1960).
[3] R. H. BARTH, Science *1333*, 15 (1961).
[4] R. H. BARTH, Gen. comp. Endocr. *2*, 530 (1962).
[5] R. H. BARTH, Proc. 16th. Int. Congr. Zool. (1963), vol. 3, p. 3.
[6] L. M. ROTH, J. Insect Physiol. *10*, 915 (1964).
[7] L. M. ROTH and R. H. BARTH, J. Insect Physiol. *10*, 965 (1964).
[8] Magadh University, Department of Zoology, Gaya, India.

THEORIA

On the Use of π-Excessive and π-Deficient Terminology for Heterocyclic Bases

ALBERT[1] has proposed a useful classification of nitrogen heterocycles into π-excessive and π-deficient systems. Briefly, 5-membered rings bearing an –NH– group, e.g. pyrrole, pyrazole and imidazole, belong to the first type (π-excessive) while 6-membered rings such as pyridine, pyrimidine and pyrazine belong to the second type. However, from these definitions it is not at all clear how these monocycles should be classified when fused to form a new hetero system. For example, can the pyrimidine moiety of purine-NH-1 or NH-3 tautomeric form still be regarded as a π-deficient ring? Conversely, which of the 2 ring systems embodied in pteridine is 'more' π-deficient (pyrimidine or pyrazine)?

Compound	Fragment	Total π charge (CNDO/2)
 I	C_6-N_1-C_2-N_3	−0.139
	N_7-C_8-N_9	+0.181
	C_4-C_5	−0.042
 II	C_6-N_1-C_2-N_3	−0.137
	N_7-C_8-N_9	+0.177
	C_4-C_5	−0.040
 III	C_6-N_1-C_2-N_3	+0.289
	N_7-C_8-N_9	−0.368
	C_4-C_5	+0.079
 IV	C_6-N_1-C_2-N_3	+0.346
	N_7-C_8-N_9	−0.420
	C_4-C_5	+0.074
 V	N_1-C_2-N_3-C_4	−0.018
	N_5-C_6-C_7-N_8	+0.001
	C_9-C_{10}	+0.017

The CNDO/2 method, known to give reliable charge distributions[2,3], provided the following data (Table):

a) Purine tautomers I, II, bearing an imidazole ring in its π-excessive state according to ALBERT's proposal, possess a *positive* π charge on the fragment N_7-C_8N_9 and a *negative* π charge on the pyrimidine counterpart C_6-N_1-C_2-N_3. The bridged carbon atoms C_4-C_5, common to both rings, serve as a negatively-charged sentinel.

b) The reverse is observed for purine tautomers III, IV in which the imidazole is in a quinoid-like structure. Here the N_7-C_8-N_9 fragment is *π-negative*, while the pyrimidine analogue C_6-N_1-C_2-N_3 is *π-positive*. However, C_4-C_5 accomodates a positive character.

c) In pteridine (V), the pyrimidine framework N_1-C_2-N_3-C_4 is π *negatively* charged, while the pyrazine counterpart N_5-C_6-C_7-N_8 is slightly positive. The negative π charge on the pyrimidine fragment is derived mainly from the bridged C_9-C_{10} atoms.

From these and related CNDO/2 calculations[4], the following conclusions may be deduced: 1. Where no

[1] A. ALBERT, *Heterocyclic Chemistry* (Athlone Press, London 1968).
[2] B. PULLMAN, H. BERTHOD, F. BERGMANN, Z. NEIMAN, H. WEILER-FEILCHENFELD and E. D. BERGMANN, Tetrahedron *26*, 1483 (1970).
[3] Z. NEIMAN, J. heterocyclic Chem. *11*, 7 (1974).
[4] In preparation.

tautomerization has occured, a π-excessive ring (ALBERT's nomenclature) tends to *donate* a π charge when fused to a π-deficient ring to form a new heterocyclic skeleton. The reverse is true if prototropy has taken place.

2. No simple prediction can be made regarding the charge distribution of two π-deficient or two π-excessive rings fused together without referring to detailed MO calculations.

Summary. Detailed MO computations reveal that the title definitions do not always represent the actual π-electronic charge distribution: tautomers of purine and pteridine are discussed as an example.

Résumé. Les calcules avec la méthode OM montrent que la terminologie π-exessive ou π-deficient ne représente toujours pas la situation réelle; la purine et la ptéridine sont prises comme exemples.

Z. NEIMAN

Pharmacology Department, Hadassah Medical School, P.O. Box 1172, 91-000 Jerusalem (Israel), 14 February 1975.

PRO EXPERIMENTIS

A Device for Intracerebroventricular Injections in the Conscious Rabbit

Injection of drugs into the lateral cerebral ventricle of conscious animals is a technique used widely in the investigation of the central actions of drugs. Methods for the implantation of chronic cannulae in the cerebral ventricles have been described for the cat[1] and the rat[2]. In the rabbit such injections are usually made with the device described by COOPER, CRANSTON and HONOUR[3], itself a modification of that of MONNIER and GANGLOFF[4]. This apparatus consists of a steel head plate which is permanently fixed to the skull and a second cannula guide plate which is fitted to the head plate when required. However, this method cannot be used in conscious animals unless they are confined in headstocks since the cannula projects from the device and is readily broken off if the animal is allowed freedom of movement.

The device here described is a modification of this system which is suitable for use in the unrestrained rabbit. It can therefore be used for cardiovascular work where the stress of confinement in headstocks can considerably distort responses to drugs. Firstly the cannula itself has been shortened and protected by stout flanges on the cannula holder; secondly the head plate has been simplified to be used exclusively for ventricular injection and thirdly the plates are made not of steel but of transparent plastic. This not only lightens the device but has the important advantage that the suture landmarks on the animal's skull can be seen through the head plate as it is fixed in position.

Materials and methods. Figure 1 shows a scale drawing of the device. It has 3 components, a head plate which is affixed to the skull (Figure 1a + b), a top plate which carries the cannula guide tube (Figure 1d + e) and the cannula itself (1f). Both plates are machined out of perspex. The bottom plate has holes at each corner through which short stainless steel self tapping crews (10 BA 7 mm)

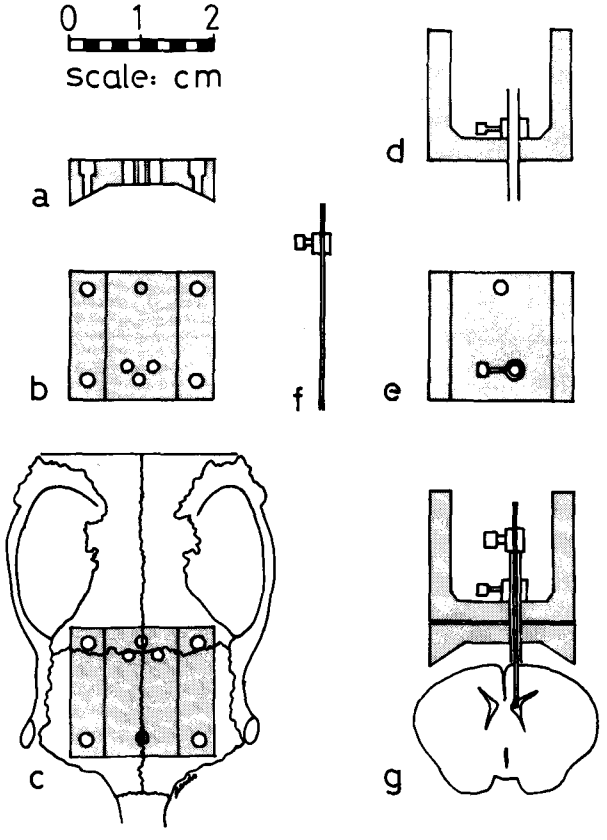


Fig. 1. a + b head plate; c, fixation of the head plate; d + e, top plate; f, cannula and g, whole assembly.

[1] W. FELDBERG and S. L. SHERWOOD, J. Physiol., Lond. *120*, 3 P (1953).
[2] J. F. HAYDEN, L. R. JOHNSON and R. P. MAICKLE, Life Sci. *5*, 1509 (1966).
[3] K. E. COOPER, W. I. CRANSTON and A. J. HONOUR, J. Physiol., Lond. *181*, 852 (1965).
[4] M. MONNIER and H. GANGLOFF, *Atlas for Stereotoxic Brain Research on the conscious rabbit* (Elsevier, Amsterdam 1961).

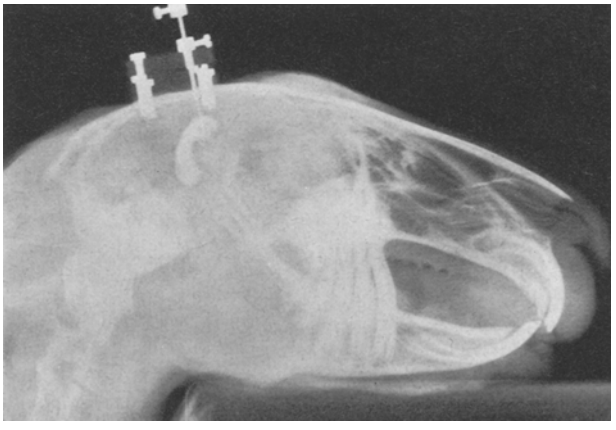


Fig. 2. Myodil ventriculogram with cannula in situ.