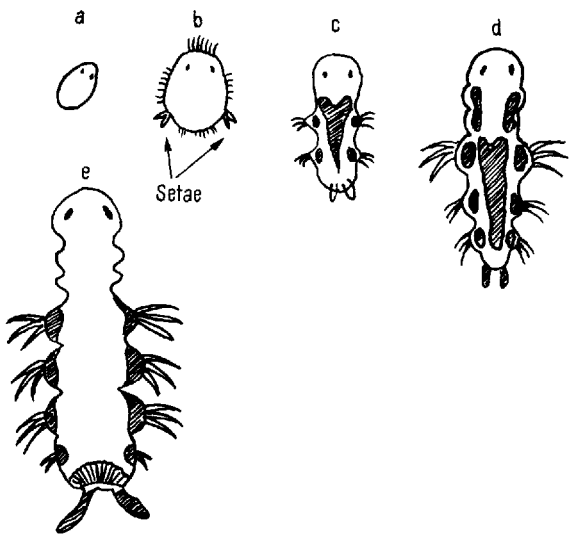
Polychaete egg masses anchored to the bottom of the soil were collected from the brackish water of Negombo lagoon, Negombo (Ceylon). PILLAI[6] had identified these polychaetes to be *Marphysa borradailei* (Negombo) and had carried out a detailed study of the sequential stages of their morphogenesis. The embryos, as recognized to be at the early metatrochophore stage by comparing with PILLAI's figures, have a brownish or yellowish colour. When viewed under the microscope in full light, they showed a deep yellow or green natural tint. In spite of this they could be stained very well with neutral red after keeping for some time in a solution of neutral red added to the petri dish with brackish water. The staining was practically uniform (see a) but a band of red granules was seen to stretch between the two eye spots, around the primitive mouth and at the posterior region. This staining pattern persisted up to the late metatrochophore stage (b) when a pair of lashing setae had appeared on both sides.

PILLAI[6] noted that the cilia are completely lost by the time the second parapodium has three jointed setae and that new parapodia are added successively between the last one formed and the anal segment. Some of these later stages were studied. As soon as the specimen had acquired a visible stain they were thrown back to brackish water and observed after 3–4 h. The Figures sum up the results. Two salient features are immediately noticeable. (1) The gut region is intensely stained up to the three parapodia stage (d) but at the four parapodial stage (e) (with the fifth emerging) the stain in the gut region has vanished. This is comparable with the progressive localization[5] of stain in the gut region of *Limnaea* embryos which was later verified and it was indubitably shown that at a later stage only the posterior part of the alimentary system retains the stain and the anterior part loses it[7]. (2) Secondly, there is intense localization of the stain at the bulges of the parapodia after they appear and just before they appear. The latter point is evident from (e) (fifth appearing).

The observations were carried out up to the eight parapodia stage and the above remarks were found to be valid till then[8].



Different stages of *Marphysa borradailei*. a, b: whole region is stained. c, d, e: the stained region is shown by shading.

Résumé. L'auteur a étudié une espèce de polychète de Ceylan par des colorations au rouge neutre. La couleur s'accumule uniformément dans l'embryon au stade métatrocophore. Après l'apparition des parapodes, le conduit alimentaire est fortement teinté, mais la couleur s'évanouit dès le stade des «quatre-parapodes». La couleur est toujours localisée dans les parapodes arronds, et se montre déjà à leur point de germination immédiatement avant qu'ils fassent saillie au dehors.

R. L. BRAHMACHARY

Research and Training School, Indian Statistical Institute, Calcutta (India), April 23, 1963.

[6] T. G. PILLAI, Ceylon J. Sci. *1*, 94 (1958).
[7] R. L. BRAHMACHARY, unpublished data.
[8] I am deeply indebted to Dr. A. C. J. WEERAKOON and Mr. G. PILLAI of the Colombo Fisheries Research Station for kindly providing me with the laboratory facilities and the material, and to Dr. N. DE SILVA who carried out the observations during my illness and thereby made this work possible.

Effects of Presso- and Chemoceptive Components of the Cat's Aortic Nerve on Sham Rage Behaviour[1]

It has recently been demonstrated that the sham rage behaviour of the acute thalamic cat is under the inhibitory control of the carotid sinus pressoceptors[2], while it is excited by chemoceptive afferents from the carotid bodies[3]. In order to study whether similar actions are also characteristic of the presso- and chemoceptive afferents coursing in the aortic nerves, we have resorted to electrical stimulation of these nerves. As demonstrated by DOUGLAS and SCHAUMANN[4], and later confirmed by us[5], stimulation of an aortic nerve with pulses of increasing amplitude or duration or frequency successively activates low threshold depressor fibres, intermediate threshold pressor fibres and high threshold depressor fibres. As the excitation of the intermediate component is also associated with the appearance of hyperpnoea, this group of fibres has been interpreted as composed of chemoceptive afferents, while the two depressor effects have been ascribed to pressosensitive fibres.

Methods. The experiments were carried out in 14 acute thalamic cats, whose brain was transected just in front of the anterior pole of the thalamus. The left aortic nerve

[1] This research has been sponsored jointly by the Aeronautical Systems Division, ASD and the Office of Aerospace Research, OAR, through its European Office, Office of Aerospace Research, United States Air Force, under Contract No. AF 61 (052)-253, and by Consiglio Nazionale delle Ricerche.
[2] C. BARTORELLI, E. BIZZI, A. LIBRETTI, and A. ZANCHETTI, Arch. ital. Biol. *98*, 308 (1960).
[3] E. BIZZI, A. LIBRETTI, A. MALLIANI, and A. ZANCHETTI, Amer. J. Physiol. *200*, 923 (1961).
[4] W. W. DOUGLAS and W. SCHAUMANN, J. Physiol. *132*, 173 (1956).
[5] G. BACCELLI, M. GUAZZI, A. LIBRETTI, and A. ZANCHETTI, Nature, in press.

was separated from the vagus trunk at the neck and stimulated with fine bipolar silver electrodes connected to a Tektronix series 160 unit. As soon as the effect of ether anaesthesia was dissipated, sham rage behaviour was observed, and some representative autonomic and somatic phenomena were recorded on a multichannel ink-writer (Battaglia-Rangoni M.10). Arterial pressure was measured from a cannulated femoral artery by means of a Sanborn differential transformer, and respiration was transduced by a crystal capsule connected to the side arm of the tracheal cannula. Graphic evidence of the somatic discharges paralleling autonomic activity in sham rage outbursts was obtained by leading the electrical activity of one or more muscles of the forelimbs adequately amplified.

Results. Stimulation of the left aortic nerve was performed during prolonged periods of quietness and during recurrent outbursts of rage of the thalamic preparation. Our observations are summarized in the Table. With a background of quiet behaviour, low voltage short pulse stimulation at 100 pulses per sec constantly induced a slight hypotension, frequently associated to a transient decrease of respiratory movements; no overt change in behaviour occurred. These were the threshold effects of aortic stimulation. Even a moderate increase in either the pulse amplitude or duration (e.g. from 1 to 2–3 V, or from 0.01 to 0.02–0.03 msec) brought forth a dramatic change in the reflex response: instead of hypotension and hypopnoea, the stimulus immediately elicited marked

Pressor, respiratory and behavioural effects of left aortic stimulation

Cat no.	Stimulation parameters msec	V	BP	R	SR	Cat no.	Stimulation parameters msec	V	BP	R	SR
1	0.01	0.5	—	—	—	16	0.01	2.0	—	—	0
		1.0	↓	—	+		0.02		—	—	—
		1.5	+	+	+		0.03		—	—	—
	0.02	0.5	—	—	—		0.05		0	+	0
		1.0	+	+	+		0.1		+	↑	↑
	0.04	0.5	—	—	—		1.0		↑	↑	↑
		0.7	+	+	+						
		1.0	+	↑	+	17	0.01	0.5	—	—	—
								1.0	—	—	—
5	0.01	0.5	—	—	—			3.0	0	↑	0
		1.0	—	—	—			5.0	+	↑	↑
							0.02	1.0	—	—	—
10	0.01	0.5	—	—	—		0.05		—	—	0
		1.0	—	—	—		0.1		↑	↑	+
		2.0	—	—	—						
	0.05	2.0	+	+	+	18	0.01	1.0	0	0	0
								3.0	0	0	0
11	0.01	3.0	0	0	0			5.0	↑	↑	+
	0.03		0	0	0		0.03	3.0	↑	↑	↑
	0.05		0	0	0			5.0	↑	↑	↑
	0.1		—	0	0		0.1	1.0	↑	↑	↑
	1.0		—	—	0			3.0	↑	↑	↑
								5.0	↑	↑	↑
12	0.01	0.5	—	—	—						
		1.0	—	—	—	19	0.01	0.5	—	—	0
								2.0	—	0	0
13	0.1	0.5	0	0	0			3.0	—	↑	0
		1.0	—	0	0			5.0	+	+	↑
		2.0	+	+	+		0.05	0.5	—	—	0
								2.0	↑	↑	↑
14	0.01	0.5	—	—	—			5.0	↑	↑	+
		1.0	—	—	—		0.1	0.5	↑	↑	↑
		2.0	—	—	—			2.0	↑	↑	↑
	0.02	2.0	—	—	—			5.0	↑	↑	↑
	0.05		—	—	—						
	0.1		+	+	+	20	0.01	0.5	0	0	0
								1.0	—	—	0
15	0.01	0.5	—	—	0			2.0	—	—	0
		1.0	—	—	0			3.0	↑	↑	0
		2.0	0	+	0			5.0	↑	↑	↑
		3.0	+	+	+		0.5	0.5	↑	↑	↑
		5.0	+	+	↑			2.0	↑	↑	↑
	0.02	1.0	—	—	0	21	0.01	0.3	0	0	0
	0.03		0	+	0			0.5	—	—	—
	0.05		+	↑	+			1.0	0	↑	0
	0.1		+	+	↑			2.0	↑	+	↑
	0.5		+	↑	—		0.1	1.0	↑	↑	↑
	1.0		+	+	+			2.0	↑	↑	↑

Repetition rate of stimulating pulses was constantly 100/sec; duration and amplitude of each pulse is indicated in the Table. 0 indicates no effect; (—) decrease of blood pressure (BP) or respiration (R), or inhibition of sham rage (SR); (↑) increase of BP or R, or excitation of SR

hyperpnoea culminating in a patterned rage reaction with more hyperpnoea, blood pressure rise, mydriasis and struggling movements. Any further increase in the stimulus strength did not change the type of response, except for the fact that the rage outbursts could immediately follow the beginning of the stimulation and that the hypertensive fit was often preceded by an initial pressure fall (Figure B).

When performed during recurring outbursts of rage, threshold stimuli, besides the moderate decrease in blood pressure and respiration apparent during periods of quiet, could dramatically block all somatic and autonomic manifestations of the spontaneous rage fits (Figure A). This blockade could last for the whole period of stimulus application, angry behaviour being resumed at the end of stimulation. However, when either aortic stimulation was prolonged beyond 1 min, or the preparation was very active, rage outbursts could occasionally reappear before nerve excitation was stopped. Here again, slight increase in either amplitude or duration of the stimulating pulses changed the inhibitory into an excitatory effect, the recurring rage behaviour being markedly intensified both in frequency and strength. Further increase in the stimulating parameters could only exaggerate the excitatory response.

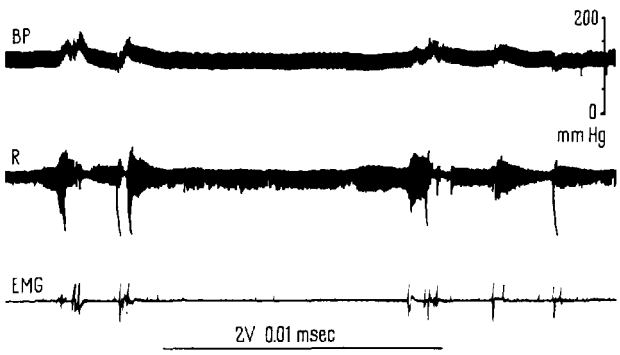


Figure A

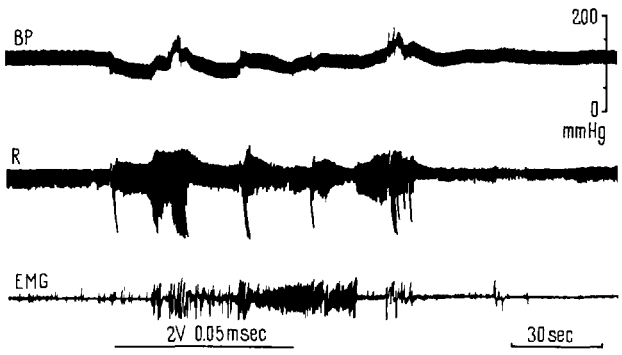


Figure B

Shift from inhibition (A) to excitation (B) of sham rage behaviour when pulse duration is lengthened from 0.01 to 0.05 msec. All other parameters of left aortic nerve stimulation (100/sec, 1 V) are the same. BP, arterial pressure; R, respiration; EMG, electromyogram of the left triceps brachii.

It is concluded that both the inhibition and the excitation of sham rage behaviour induced by natural stimulation of pressoceptors and, respectively, of chemoceptors in the carotid sinus region can be duplicated by electrical stimulation of two groups of low- and intermediate threshold fibres in the aortic nerve, presumably representing presso- and chemoceptive afferents from the aortic region. Bringing into action a third group of higher threshold fibres, supposedly pressoceptive in nature, is followed by an excitatory effect, which does not differ from that consequent upon stimulation of the intermediate threshold 'chemoceptive' fibres. However, it cannot be ruled out that this high threshold component is endowed with some inhibitory action upon the diencephalic mechanisms of rage, as is the case for the low threshold fibres, if it is assumed that this inhibitory action be completely overwhelmed by the excitatory effect of the simultaneously activated intermediate threshold fibres. This conclusion is supported by a similar concealing of the inhibitory action of low threshold afferents, as the intermediate threshold component is excited. The intensity of the respiratory and pressor reactions induced by the latter fibres in the thalamic animal also supports the opinion that the central excitatory state of the thalamic preparation favours any kind of excitatory afferent inflow.

Riassunto. La stimolazione elettrica delle fibre aortiche a più bassa soglia, presumibilmente d'origine pressocettiva, è capace d'inibire tutte le manifestazioni somatiche e viscerali dell'attività di rabbia del gatto talamico acuto. Uno stimolo maggiore, eccitando un altro gruppo di fibre, probabilmente di tipo chemocettivo, maschera questo effetto inibitorio, portando alla luce in sua vece una forte attivazione del comportamento di rabbia.

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Zuchtversuche mit geschlechtskonvertierten Krallenfröschen (*Xenopus laevis*)[1]

Während es schon längere Zeit bekannt war, dass genetisch männliche Larven des Krallenfrosches schon durch kleine Gaben von östrogenen Hormonen veranlasst werden sich weiblich zu differenzieren, war eine umgekehrte Konversion von weiblichen Larven nicht möglich. Allerdings erzeugt die prolongierte Behandlung mit androgenen Steroiden eine Entwicklung der männlichen Sekundärgeschlechtsmerkmale einschliesslich des Kopulationstriebes; jedoch die Keimdrüsen werden und bleiben stets Ovarien[2].

Nun ist es uns aber gelungen durch Einpflanzung von juvenilen Hoden zunächst die Keimdrüsenentwicklung der Larven entschieden zu hemmen. Wenn dann nach Entfernung des Implantats in etwa einjährigen Fröschchen die noch vorhandenen autochthonen Rudimente sich kompensatorisch vergrössern, kommt es vor, dass genetisch

[1] Arbeiten unterstützt durch Grant No. G-14057 der National Science Foundation und Grant No. C-3993 des National Institute of Health (USPHS).

[2] E. WITSCHI, Arch. Anat. micr. Morph. exp. *39*, 215 (1950).