pyrogen, a substance likely to be the cause of a variety of experimental and pathologic fevers, when injected directly into sensitive areas of the hypothalamus still causes fevers with longer latencies and durations[5,7].

The present study doesn't specifically bear on the question of whether fluctuations of sodium-calcium ion balance within the CNS play a physiologic role in thermoregulation. It does suggest that the changes in calcium ion concentration caused by Na_2EDTA act downstream from the site at which pyrogens act since acetaminophen and sodium salicylate in doses which effectively antagonize the pyrogenic actions of endotoxin[8] and leukocytic pyrogen in cats after either i.v. or intraventricular administration[9,10], were ineffective in antagonizing the action of Na_2EDTA. An action downstream from the thermostat is also indicated by the findings[3] that only perfusions of the posterior hypothalamus with varied salt concentrations consistently altered temperature. Perfusion of the anterior hypothalamus, a region which is clearly involved in normal thermoregulation and which is assumed to be the site of the major central control mechanisms in models of temperature regulation[11], produced inconsistent responses. In favor of an action on the thermostat, however, is the observation that the responses to Na_2EDTA appeared to result from coordinated effector activity similar to that seen after pyrogens[12]. Thus, shivering was present during the development of the hyperthermia without significant antagonism by heat loss mechanisms. As the peak was reached, shivering was replaced by tachypnea and panting.

Although not studied extensively, Na_2EDTA seemed to differ from pyrogens which act directly or indirectly on the central nervous system in that no apparent ceiling to its effect was reached when repeated injections or infusions were made. After a maximally pyrogenic dose of bacterial endotoxin or staphylococcal enterotoxin is determined, increasing the dose 50–100 times does not increase the height of the fever[10].

The behavioral effects seen after Na_2EDTA were considerably different from those reported after perfusion of the ventricular system of cats with NaCl solutions for 30 min[1]. The obvious distress, sympathetic activity and excitability produced by Na_2EDTA were not reported to occur with the perfusions, even with comparable increases in temperature. However, longer perfusions in the rabbit[2] did cause restlessness, struggling and even convulsions. Perhaps longer perfusions in the cat would have produced behavior more like that seen after Na_2EDTA[13].

Conclusions. Chelation of calcium ions by Na_2EDTA injected intraventricularly in unanesthetized cats caused a hyperthermic response characterized by a very rapid onset and brief duration. The response could be blocked by pentobarbital anesthesia but not by the antipyretics, acetaminophen and sodium salicylate. The results favor an action downstream from the site at which pyrogens act.

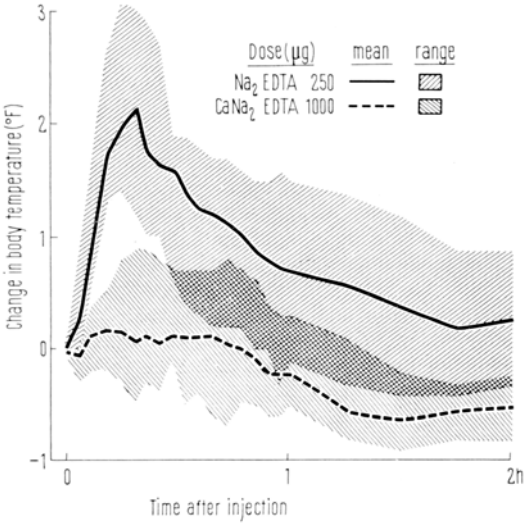

Fig. 3. Responses of 6 cats to intraventricular injections of Na_2EDTA and $CaNa_2EDTA$.

Résumé. La chélation des ions de calcium par l'EDTA Na_2 injecté dans le ventricule cérébral des chats non anesthésiés a produit une réaction hyperthermique caractérisée par une installation rapide et une durée brève. Cette réaction peut être bloquée par l'anesthésie au pentobarbital, mais non pas par les antipyrétiques, le N-acétyl-paraaminophénol ou le salicylate de sodium. Les résultats indiquent une action plus tardive dans la chaîne des événements que celle des pyrogènes.

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Electronmicroscope Studies of Crayfish Setae (*Austropotamobius pallipes*)

Although the setae of decapods are conspicuous, and occur in great profusion, little is known of their anatomy. A study of the setae present on the crayfish *Austropotamobius pallipes* at the optical level, failed to resolve some aspects of their anatomy[1], particularly the nature of the setal tips and outgrowths of the setal wall.

The presence of an apical pore on certain decapod setae has been suggested by some authors[2], but never figured. Stereoscan electronmicroscope studies on the setae of *A. pallipes* show conclusively that an apical pore is present (Figures 1a, b and c). The exact position of the pore differs from one seta to another but has a constant position for a given setal variety. A great variety of apices occurred amongst the different setae (Figures 1a–d), the pore rarely being terminal in position but often set someway behind the tip (Figures 1a + c). None of the many and varied outgrowths from the setal wall appeared to bear pores, and no pores were detected over the shaft surface.

Figure 1a shows the apical region of a serrate seta taken from the dactylopodite of the third maxilliped, note the apical pore just behind the smoothly pointed tip. The

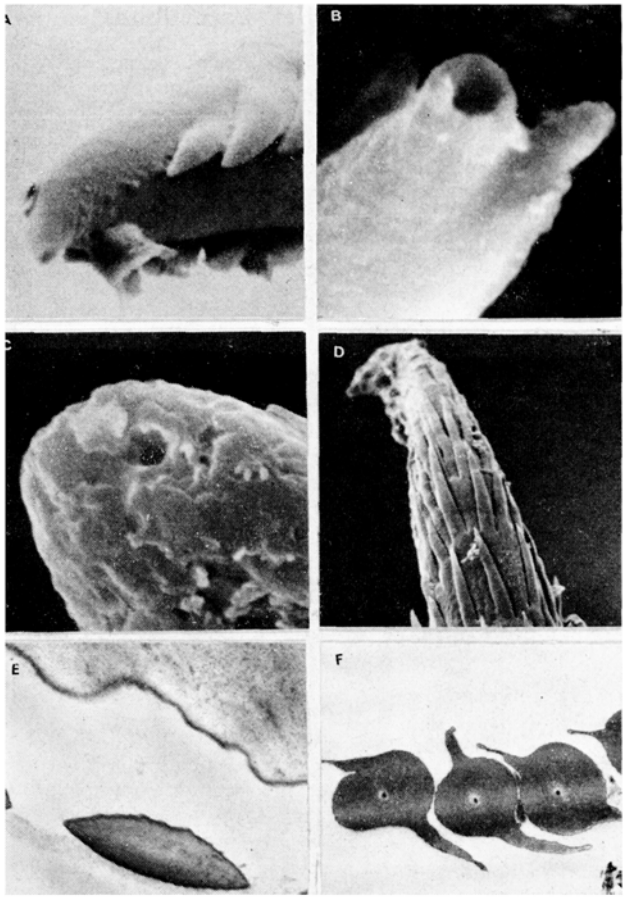

Fig. 1. The apices of some of the setae present on *A. pallipes*. a) ×1,300; b) ×8,000; c) ×6,800; d) The apex of an acuminate seta, showing outgrouwths of the setal wall; ×2,400. e) Transverse section through a setobranch wall and its outgrowth; ×20,000. f) Transverse section through the setules of a plumose seta; ×12,400.

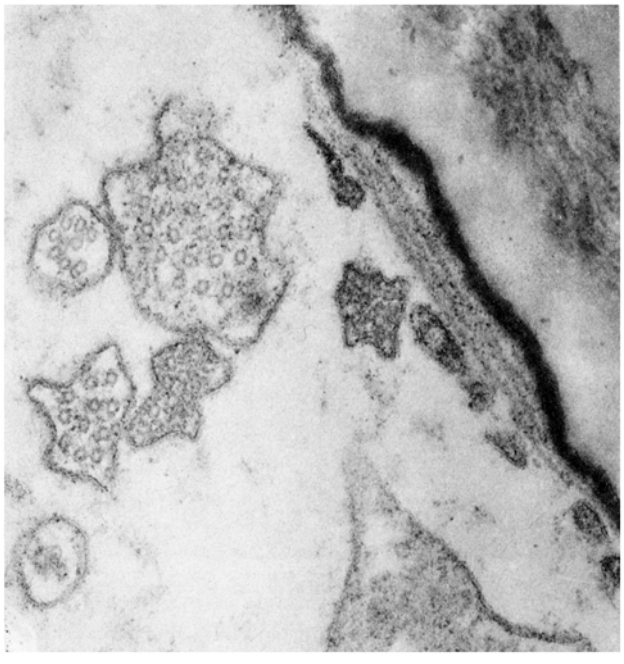

Fig. 2. Transverse section through the lumen and its lining of an acuminate seta showing the microtubules present; ×61,000.

position of the pore is the same in other serrate setae taken from other parts of the crayfish. In contrast the apical pores of the papillate setae[1] are terminal in position, relatively large, and accompanied by characteristic blind ending papillae (Figure 1b). These setae form dense fringes on the distal margins of the coxopodite and basipodite of the maxillae. A conspicuous pore is also present on the small heavily cuticularized conate setae found in large numbers on the proximal parts of the maxillules, maxillae, and walking legs. Even the very heavily cuticularized cuspidate setae of the dactylopodite of the second maxilliped bears an apical pore (Fig. 1c).

All the long rod-like setae of the dactylopodite and propodite of the walking legs have a cleft apex with a pore present on the shorter branch. Two setal types possessing terminally placed pores are the acuminate setae found over the general body surface and the multidenticulate types[1] found on the maxillules and maxillae.

The various setae present on *A. pallipes* can be classified on the basis of the outgrowth that occur on the setal wall[1]. It is not known whether these serrations, denticles or setules contain a diverticulum of the lumen. It has been suggested[3] that the individual branches of setae carry branches of the dendrites which innervate the setae. Stereoscan electronmicroscope studies have shown clearly the external characteristics of these outgrowths (Figure 1d), but initial attempts at sectioning the setae have proved difficult owing to their extreme hardness. However it is clear that in some of the setae the outgrowths are not hollow (Figure 1e) whereas in others such as the plumose types (Figure 1f) the setules in section do appear to have a suggestion of a diverticulum. Even the highest magnifications however failed to resolve the real nature of the interior.

In transverse section all the crayfish setae seem to be built on the plan of an outer thin layer, enclosing a much wider 'cortical' region. This cortical area is itself differentiated into an inner relatively narrow laminated area which abuts on a thick triple layered lumen lining.

Although dendrites are known to pass into the lumen of some decapod setae[3] it is not known how far they penetrate or how their endings are related to the presence of the apical pore. So far no organized structures have been seen in the distal third of the lumen of any seta. Some electronmicroscope sections of crayfish setae taken near the apex suggest that in fact organized structures do occur high up in the lumen of some types of crayfish setae. Figure 2 shows clusters of microtubules occurring in the lumen of an acuminate seta taken from the telson fringe of *A. pallipes*.

Zusammenfassung. Elektronen- bzw. rastermikroskopisch wurden die Borsten eines dekapoden Krebses, *Austropotamobius pallipes*, untersucht und festgestellt, daß alle terminal oder subterminal eine Öffnung (Pore) aufwiesen.

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