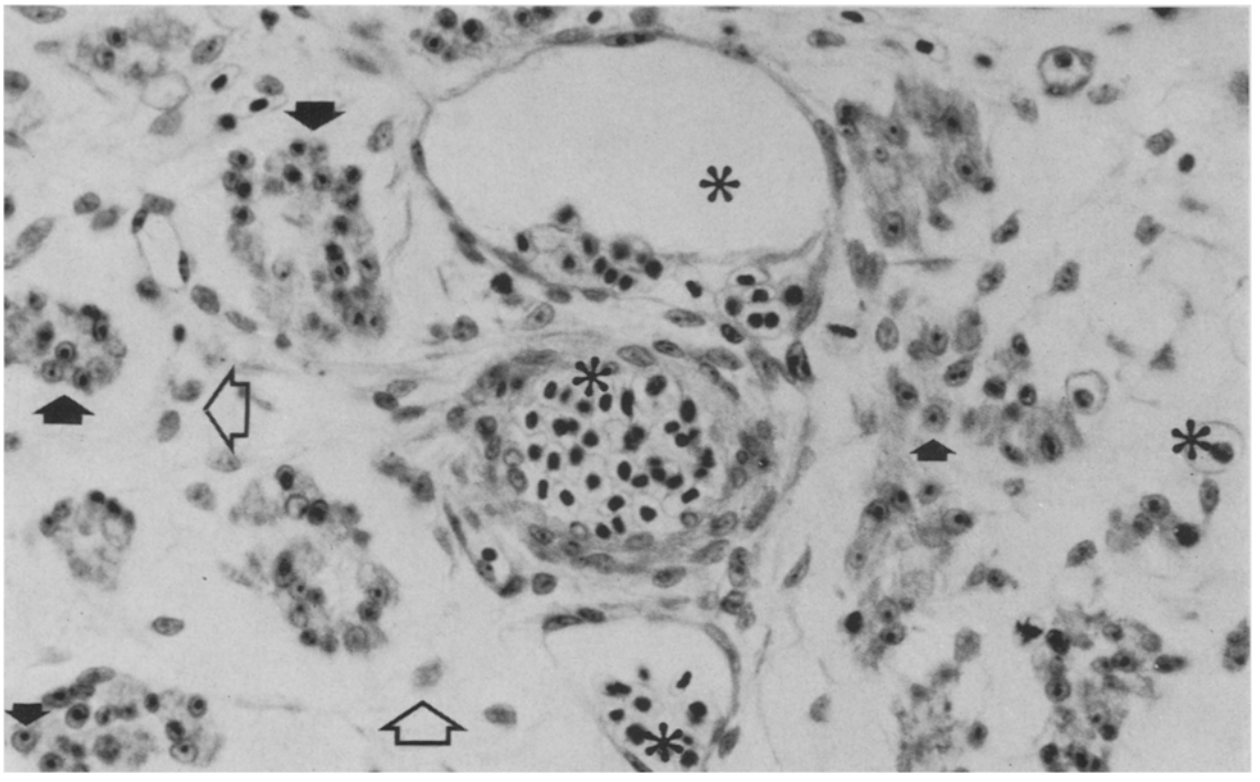

Fig. 4. Ausschnitt aus dem M. pectoralis major der operierten Körperseite eines 9 Tage alten Hühnerembryos. Schwarze Pfeile: Muskelzellen mit Kernen vom Wachteltyp. Schwarz gerandete Pfeile: Bindegewebszellen vom Hühnchen. Sternmarkierung: Gefässe mit Erythrocyten. Feulgenreaktion und Gegenfärbung mit Lichtgrün. Ca. 850:1.

Da bei unseren Operationen nur Somiten bzw. noch unsegmentiertes paraxiales Mesoderm der prospektiven Thoraxregion durch entsprechendes Mesoderm vom Wachtelembryo ersetzt worden war, kann aus den vorgelegten Ergebnissen geschlossen werden, dass sowohl die vertebralen als auch die sternalen Rippenanteile aus Somitenmesoderm entstehen. Damit werden die Untersuchungen von JACOB et al.[12] bestätigt, bei denen sich aus Somitentransplantaten in Extremitätenanlagen älterer Hühnerembryonen Rippen gebildet hatten, die auch sternale Anteile aufzuweisen schienen.

Weiterhin geht aus unseren Untersuchungen hervor, dass sich die gesamte Muskulatur der Brustwand einschliesslich der Mm. pectorales aus Somitenzellen differenziert. Dass SENO[4] bei seinen Markierungsversuchen an Hühnerembryonen der Stadien 16 und 17 (nach HAMBURGER und HAMILTON) später keine Kohlepartikel im M. pectoralis major beobachten konnte, könnte ein Hinweis darauf sein, dass diese muskelbildenden Somitenzellen schon füher in die Somatopleura einwandern, wie es nach den Untersuchungen von CHRIST et al.[13] für die Zellen angenommen werden muss, aus denen die Extremitätenmuskulatur entsteht.

Summary. The origin of the ribs and the thoracic muscles has been studied by using the quail-chick marker system. The results have shown that cells of somite origin give rise to both vertebral and sternal rib components. It was concluded that the muscles of the thorax, including the pectoral musculature, originate from the somites, whereas the lateral plate mesoderm is the source of the connective tissue.

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Mesothoracic Neurohaemal Organs in the Larva of *Philosamia ricini* Hutt. (Lepidoptera: Saturniidae)

Endocrine glands structurally similar to the corpora cardiaca, and functioning as neurohaemal organs for the neurosecretory cells of thoracic and abdominal ganglia, have recently been described in several insects[1-3]. The authors believe these organs and their nerves to be a part of the unpaired medial sympathetic nervous system, though HINKS[3] believes that this relationship was not readily evident in the vespids studied by him. RAABE[4] reported the presence of these organs in the thorax of cockroaches, whereas HINKS[3] found the organs in the thorax and abdomen of *Vespa* and *Vespula*. I attempted to trace these organs in the larva of a lepidopterous insect

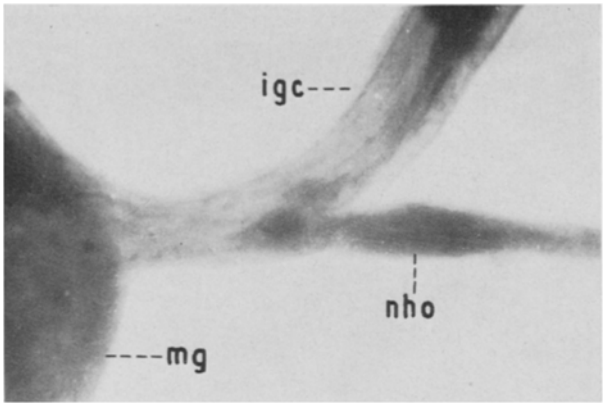

Fig. 1. Whole mount of mesothoracic neurohaemal organ (nho). mg, mesothoracic ganglion; igc interganglionic connective.

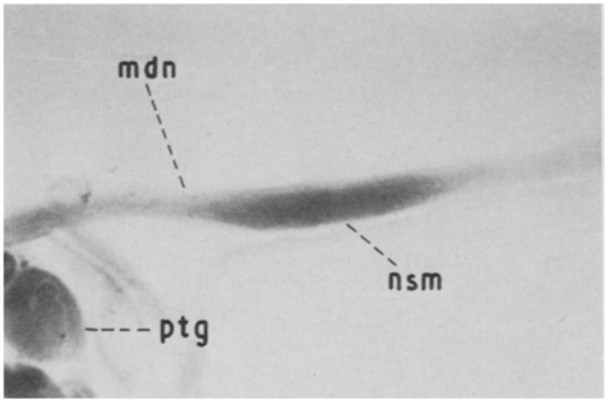

Fig. 2. A portion of mesothoracic dorsal nerve (mdn) to show the neurosecretory material (nsm). ptg, prothoracic gland.

by staining with reduced methylene blue solution in situ (0.5% ascorbic acid in 2% of aqueous methylene blue).

The base of the mesothoracic dorsal nerve of the larva of *Philosamia ricini*, which arises from the interganglionic connectives between the prothoracic and mesothoracic ganglia, bears a distinct dilation (Figure 1) representing the thoracic neurohaemal organ. Granules of neurosecretory material were found at 2 places in the mesothoracic dorsal nerve (Figures 1 and 2) which innervates the prothoracic gland.

HINKS[3] considered the presence of well-developed thoracic neurohaemal organs to be a primitive feature, probably because such organs are also reported in Blattaria[4]. He further reported that these organs might have been simply overlooked in other insects or been inconspicuous, but it was possible that some insects release thoracic neurosecretion from other end organs. DELPHIN[5] showed the neurosecretory transport along the ventral nerve cord, and BURGESS[6] found the presence of neurosecretion through the longitudinal axons of the ventral nerve cord of certain Diptera. CHALAYE[7] reported that one type of the neurosecretory product of the suboesophageal neurosecretory cells is transported to the corpora cardiaca or corpora allata and a second type, produced by other cells, passes back into the ventral nerve cord. HINKS[3] believes that thoracic and abdominal (lateral and medial) neurohaemal organs each stores and releases a single but different type of neorosecretion unlike the corpora cardiaca, which in all insects store and release several different secretions[8].

Résumé. Dans la larve de *Philosamia ricini*, le nerf dorsal mésothoracique possède à sa base un organe neurohémal contenant des éléments neurosécrétifs.

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[8] I wish to express my thanks to Prof. U. S. SRIVASTAVA for providing working facilities and valuable suggestions.

The Effect of Lymphostasis on the Isolated Working Rat Heart

The importance of the mechanically induced restriction of the lymphatic circulation in relation to the damage of the myocardium has often been emphasized in recent years by FÖLDI et al.[1-3]. Their findings suggest that impairment of the cardiac lymph flow after ligation of the lymph vessels is followed by severe changes in the myocardium which are caused by cardiac lymphedema and by narrowing of the coronary arteries as a result of plasma imbibition of the vascular wall[4].

In contrast to these findings, other investigators did not observe any myocardial changes after ligation of the lymphatics[5,6]. Therefore the importance of the lymphostatic myocardial damage was disputed and doubts arose whether an impaired lymph flow would actually result in cardiac failure[7]. In comparison with the coronary flow, there is a very low cardiac lymph flow of about 4.8 ml/g heart tissue/24 h at its maximum[8]. On the other hand, the velocity of the cardiac lymph flow as shown in the isolated heart by india ink injection is considerable, which suggests the presence and effectiveness of lymphovenous anastomoses[9]. In our studies, it was of special interest to establish whether a partial restriction of the lymph flow was a factor limiting the performance of the heart (as measured by the minute output of the aorta), and if so, after which period of time functional and morphological changes would occur.

Materials and methods. Hearts of male albino rats with an average weight of 230 g were prepared and perfused by a modified MORGAN technique[10]: perfusion at 37 °C, pH 7.4, arterial pO_2 646 mm Hg, venous pO_2 360 mm Hg (Langendorff) and 200 mm Hg (working heart). The isolated hearts were subjected to retrograde perfusion