stead of 5 μc. If necessary 3 injections could be given at regular intervals instead of 2.

It is reasonable to infer that irradiation disturbs the physiological activity of the pituitary gland, and decrease in the secretion of FSH would result in the cessation of the growth and development of the oocytes. A similar view has also been expressed by EGAMI et al.[2] on the basis of their experiments on *Oryzias latipes*. VIVIEN[3-5] has been able to sterilize *Xiphophorus* and *Lebistes* by maintaining them in water containing P^{32}, and has concluded that radioactive phosphorus first acted on the hypothalamic nerve centres and thus inhibited the pituitary. Golgi bodies and mitochondria are believed to be responsible for the origin of the yolk vesicles and yolk globules[6]. It is probable that radiochemical changes in these organelles impair their activity, thereby inhibiting the development of the oocytes in the irradiated fish[7].

Zusammenfassung. Indischen Katzenwels-Weibchen (*Heteropneustes fossilis* Bloch) wurden im Februar und April 5 μc Co^{60} injiziert, was zur vollständigen Unfruchtbarkeit führte. Alle Fische erholten sich aber innerhalb von 14 Tagen auffallend gut von den Injektionsschäden.

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Relationship of Gasserian Cells to Extraocular Muscle Proprioception in Lambs

Afferent discharges in response to the stretch of the extraocular muscles were recorded from nervous fibres belonging to the third, fourth and sixth cranial nerves[1-4]. It was claimed that the cell bodies of such proprioceptive fibres were contained either in the mesencephalic nucleus of the trigeminus nerve[5-7] or in the small ganglia described on the trunk of the same oculomotor nerves[8-10]. However, arguments against both these views were presented. It was objected that such ganglia are not consistently present in the 3 oculomotor nerves and that the cells which they contain should be very few as compared with the number of the spindles found in the extraocular muscles. On the other hand, a clear-cut demonstration was given that the mesencephalic nuclei of the fifth cranial nerve are concerned with jaw muscle proprioception both in mammals and in birds[11-14]. However, another possibility could be taken into account. Ocular afferents were described in the trigeminal nerve by STIBBE[10] and connections between ocular muscle nerves and the trigeminus were observed in Ungulata[15]. The results of the present investigation provide evidence for the first time that cells contained in the semilunar ganglion of lambs are concerned with eye muscle proprioception.

21 lambs were employed in the present research. Under ether anaesthesia the left extrinsic eye muscles were isolated and the left eye ball was removed from the orbit. Then, under surgical anaesthesia, the left semilunar ganglion was gently exposed at the base of the skull after removal of the cerebral cortex and the operative wounds were infiltrated with procaine. The ether anesthesia was stopped, and the lambs were paralysed with Intocostrin T Squibb and maintained under artificial respiration. Tungsten microelectrodes were introduced into the semilunar ganglion by means of a microcontrol. The microelectrodes were connected through a Grass Hip 5A high-impedance probe with a Grass P5CR preamplifier. The upper beam of a Tektronix 502 A oscilloscope and a loud-speaker monitored the inputs. The lower beam recorded the stretching of the eye muscles by means of a Basile MDI 4 microdynamometer. Films were taken by means of a Cossor type 1431 kymograph camera. The exact position of the recording microelectrode tip was ascertained in all the experiments by histological control. The following criteria, proposed by DARIAN-SMITH, MUTTON and PROCTOR[16], were followed in order to ensure that the microelectrode tip was located in the region of the pericaria of the semilunar ganglion: (1) negative polarity of the units, (2) the unitary activity could be recorded while advancing the microelectrode tip up to 250 microns, (3) the histological control showing that the electrolysis of the recorded site was within a cellular pool.

A cellular pool was found in the medial-dorsolateral part of the semilunar ganglion of all 21 lambs at a depth of about 1–1.5 mm, which contained units responding to

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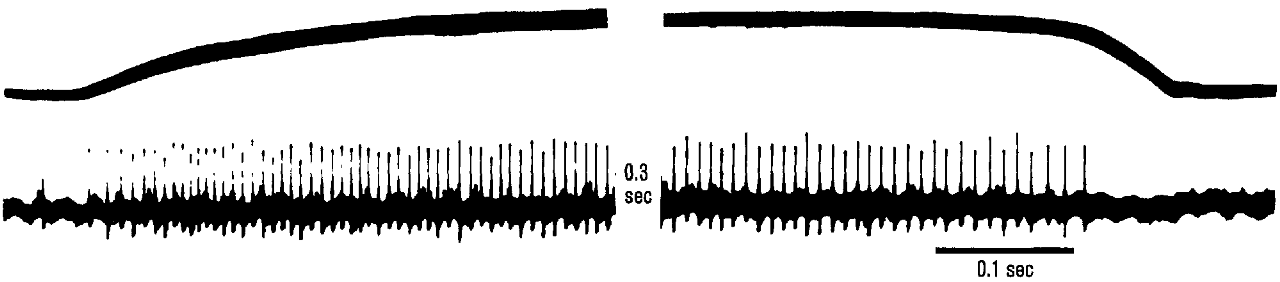

Upper beam: mechanogram of the stretch of the left inferior oblique muscle. Lower beam: unitary discharge recorded from a cell in the medial-dorsolateral part of the left semilunar ganglion of a lamb. The unit responded only to the stretching of the left inferior oblique muscle.

the stretch of the extraocular muscles. The units studied were spontaneously active in many cases and exhibited a discharge rate of 10–20/sec. The units showed a negative polarity with an amplitude of 100–200 μV. A given unit was exclusively and consistently modified by stretching of a determined extraocular muscle; only when the record was a multifibre one, was the unitary discharge affected by stretching 2 or more extrinsic ocular muscles.

The response of such gasserian cells to the stretch of the extraocular muscles was characterized by a sudden increase in the discharge rate (up to 300/sec). The discharge of the units then settled down at a lower frequency (150–90/sec). The firing of the units decreased immediately or stopped for a few msec when the stretch was released and subsequently recommenced at the original resting rate (Figure). It is to be noted that such responses exhibited a very brief latency: 1–3 msec. All the units studied showed a slight adaptation.

The firing of the units during a stretch of a given extraocular muscle was inhibited by the electrically induced contraction of that muscle; thus the units could be identified as muscle spindle afferents[17].

The gasserian units responsive to the stretch of the extraocular muscles were unaffected by movements of jaw or by stimulation of other ipsilateral trigeminal receptors. The responses were not abolished by Nembutal anaesthesia, whilst they disappeared totally after cutting the ipsilateral ophthalmic branch of the fifth nerve.

Summing up, stretching of the extraocular muscles provoked short latency-sustained responses of a limited group of cells contained in the semilunar ganglion of lambs. Such responses were of the type induced by muscle spindles. The conclusion was reached that proprioceptive fibres from extraocular muscles have their cell bodies in the semilunar ganglion.

Riassunto. È stato isolato nel ganglio semilunare dell'agnello un limitato gruppo di cellule la cui scarica unitaria è tipicamente ed esclusivamente modificata dallo stiramento di singoli muscoli oculari. Tali risposte sono del tipo di quelle indotte dai fusi neuromuscolari. Si trae la conclusione che nel ganglio di Gasser dell'agnello si trovano i pirenofori di fibre che provvedono alla sensibilità propriocettiva dei muscoli estrinseci dell'occhio.

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Responses of Crustacean Larval Chromatophores to Light and Endocrines

Evidence for the presence of functional amounts of chromatophorotropins from very early stages of development of crustaceans has been reported[1,2]. However, the times at which the chromatophoral systems in developing crustaceans first take on functional activity have been determined in few forms[3–7]. Zoeae of *Hippolyte* and *Palaemon*[3], *Nephrops*[4], *Crangon*[5] and *Carcinus*[6] failed to exhibit chromatic adaptation. By contrast, zoeae of *Palaemonetes* exhibited background responses[7]. Pautsch[5,6] reported that the chromatophores of zoeae of *Crangon* and *Carcinus* were unaffected by chromatophorotropins, while Broch[7] reported that chromatophores of *Palaemonetes* zoea responded to adult chromatophorotropins. To determine the effect of chromatophorotropins on zoeae, Pautsch[5,6] has plunged the zoeae into an aqueous suspension of the nervous tissue extracts, while Broch[7] has tested the efficacy of chromactive extracts on isolated pieces of carapace of zoea. Since such a fundamental difference exists between their techniques, it was felt worthwhile to repeat them, using another test species to facilitate proper interpretation of the available data.

During the present study, berried female *Ocypode macrocera* collected from the Visakhapatnam beach were

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