A Sphincter in the Umbilical Ring of the Rabbit

DURING the course of some experiments on fœtal rabbits, a very marked constriction was observed in the umbilical cord at the umbilical ring; the abrupt narrowing in this region accompanied the closure of the length of the umbilical vessels in response to traction or to cooling of the cord. A circular band of smooth muscle in the umbilical ring region has been described for the horse[1] but for no other animal, and Sir Joseph Barcroft suggested that the structure of the rabbit's umbilical cord should be studied in more detail.

Serial sections of the umbilical vessels, in the full-term fœtal rabbit, showed that there is a thin layer of unstriped muscle fibres surrounding their adventitia; this was recognizable around the branches of both the arteries and the vein a few millimetres from where they emerge from the placenta. When the three large umbilical vessels lie side by side in the umbilical cord proper, the outer portions of this muscle layer fuse and the muscle fibres can be seen circularly arranged under the amniotic sheath; the inner portions of the muscle layer between the three umbilical vessels gradually disappear. The circular fibres increase in number and the sphincter attains its maximal thickness 2–3 mm. in front of the abdominal wall; it continues thus for 2–3 mm. inside the abdomen, and gradually tapers to its connexion with the abdominal muscle. Ranson impregnation, together with control positive material, revealed no nervous supply to the sphincter. It was already present in the cord of 20-day rabbit fœtuses. No similar structure was found in the rat, in the human or in the guinea pig umbilical ring.

It is doubtful whether this sphincter has any physiological function *in utero*, since it is not innervated and responds most readily to local stimulation. At birth it is obviously an efficient mechanism for ensuring closure of the three umbilical vessels, for in the region of the sphincter there is more complete reduction in the size of the lumen of the three vessels than is found on either the fœtal or placental side of the umbilical ring. It is difficult to understand its special relationship to the mechanism of birth in the rabbit. However, effective closure of umbilical vessels may be a function of their length as well as the relative contractile properties of the vessel walls. The latter is impossible to assess from histological specimens; but it is noteworthy that the umbilical cord proper in the rabbit is comparatively short, and the sphincter may have been developed as an extra safeguard.

This work was begun in the Department of Physiology, Bedford College for Women, London. My thanks are due to Miss Beryl Shilton, who prepared many of the slides. Miss Helen Perry, of the Department of Zoology, Birkbeck College, London, is carrying out an exhaustive study of the umbilical rings in other animals.

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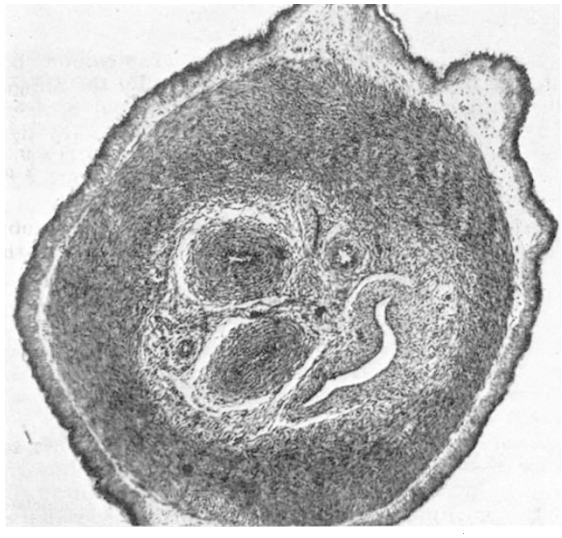
[1] Hauptmann, E., *Arch. Anat. Physiol. Lpz.*, Anat. Abt., 103 (1911).



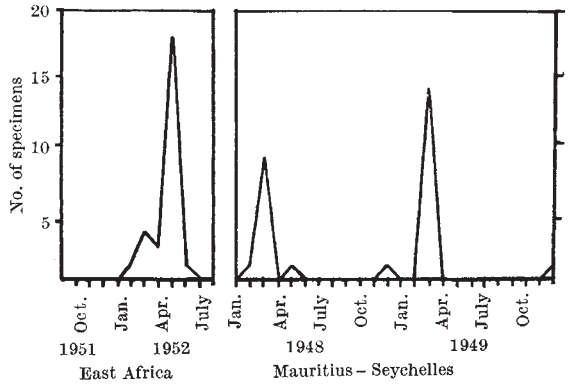
Transverse section of umbilical ring of the rabbit showing unstriped muscle sphincter surrounding umbilical vessels

Catches of *Coryphæna hippurus* (L.) in the Western Indian Ocean

WHILE carrying out a survey of the pelagic fishes of East African waters, twenty-seven specimens (twenty-four female, three male) of the dorade or dolphin fish were caught during multiple trolling operations during September 1951–August 1952. All the dorade were taken close inshore, and from the graph it can be seen that the catches were limited to the months February–June. Although the total catch is not large, it must be remembered that the dorade is of widespread distribution in tropical seas and is nowhere abundant. In all specimens the state of maturity of the gonads was determined.

Reference to unpublished data of the Mauritius–Seychelles Fisheries Survey, 1948–49 (Wheeler and Ommanney), provides evidence of the capture of twenty-seven dorades (seventeen female, ten male). With one exception, they were taken on or near the many shallow-water banks of this area. No ripe females were noted; but ripening females occurred in March in both years. In East African waters ripening females occurred from March to May, and ripe females in May.

These observations suggest that *Coryphæna* makes an inshore spawning migration between February and June in the western Indian Ocean. Confirmation



Catches of *Coryphæna hippurus* (L.)