than among younger ones except where underfeeding was commenced close to term. This suggestion supports the hypothesis which was advanced as early as 1891 by Spiegelberg[3] that insufficiency of fœtal nutrition is a factor concerned in the initiation of parturition. Certainly the fœtus or fœtal placenta must be concerned in this process, as a sire influence on length of gestation in sheep has been demonstrated by Terrill and Hazel[4]. This suggestion and Spiegelberg's hypothesis provide a basis for an obvious explanation of the findings, reviewed by these workers, that gestation in ewes bearing twins is usually shorter than in ewes bearing singles.

The present results add another item to the list of those which must be explained by any hypothesis about the factor or factors which actually precipitate parturition.

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[1] These series form part of a study of the influence of nutrition during pregnancy on the development of the lamb at birth. Details of this study are in preparation for publication.
[2] Thomson, A. M., and Thomson, W., *Brit. J. Nut.*, 2, 290 (1949).
[3] Spiegelberg, O., "Die Dauer der Geburt"; "Lehrbuch der geburtshilfe", 2 (1891); cited in Marshall's "Physiology of Reproduction", 2, 509, ed. Parkes (Longmans, 1952).
[4] Terrill, C. E., and Hazel, C. W., *Amer. J. Vet. Res.*, 8, 66 (1947).

Visual Pigments of Deep-Sea Fish

Experiments have been made on board R.V. *Sarsia* with the fresh retinæ of four species of deep-sea fish caught in the Bay of Biscay. These species, *Stomias boa* (Risso), *Flagellostomias* sp., *Argyropelecus olfersii* (Cuvier) and *Myctophum punctatum* Rafinesque, are often caught around 500 m.[1], a depth close to that at which the human eye ceases to see the light of day[2].

Simple visual inspection showed that the unbleached retinæ were golden coloured. Fig. 1 demonstrates that the changes in spectral absorption on bleaching such retinæ were those of retinal photosensitive pigments differing from visual purple in having their maxima displaced about 20 mμ toward the blue end of the spectrum. The retina of the conger eel has recently been shown to contain a pigment with an absorption curve very similar to those described here[3,4] (Fig. 1). The conger begins life in the deep ocean and returns there when mature.

The golden-coloured pigments which were found in high density in all these retinæ are admirably suited to make the best use of that fraction of daylight which penetrates deep into oceanic waters. These waters are most transparent to blue light around 475 mμ [5], and at depth this is effectively the only light.

Wald[6] has made the generalization that the retinæ of fresh-water fish contain purple pigments (porphyropsins) and those of coastal marine fish contain rose pigments (rhodopsins). We may now add another group, those of deep-sea fish the retinæ of which have principally golden-coloured pigments for which we suggest the name chrysopsins or visual golds.

We are grateful to Mr. N. B. Marshall of the British Museum (Natural History) for identifying the deep-sea fish and to Captain C. A. Hoodless and the crew of the Marine Biological Association's research vessel *Sarsia* for their enthusiastic co-operation.

The kindness of the Director of the National Institute of Oceanography has enabled the results described here to be confirmed and extended by experiments

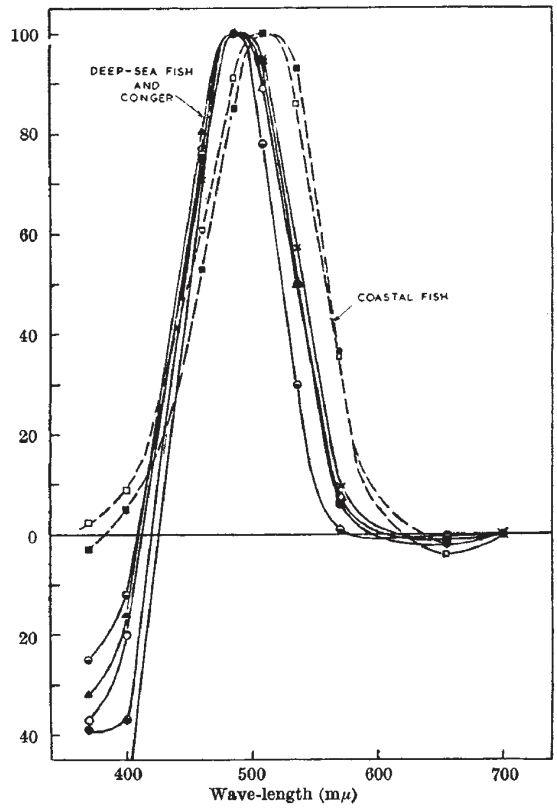

Fig. 1. The curves are of spectral density change of fresh retinæ when bleached with white light. Four deep-sea fish: ×, *Stomias boa* (Risso); ●, *Flagellostomias* sp.; ◒, *Argyropelecus olfersii* (Cuvier); ▲, *Myctophum punctatum* Rafinesque. A migrating fish: ○, *Conger vulgaris*. Two coastal fish: □, *Scophthalmus rhombus*; ■, *Cottus bubalis*. The ordinate is change in density (expressed as a percentage); the maximum density change is made equal to 100 per cent

made aboard R.R.S. *Discovery II*. Fifteen species of deep-sea fish were found to have golden-coloured retinal photosensitive pigments and only one oceanic fish, a surface form, *Saurus scombresox*, to have visual purple.

E. J. Denton
F. J. Warren

Marine Biological Laboratory,
Plymouth. July 25.

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[2] Beebe, W., "Half Mile Down" (John Lane, The Bodley Head, London, 1935).
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Sex Determination in Rats (*Rattus norvegicus* var. *albinus*) through the Ameloblasts of the Dental Germ

Since 1949, Barr *et al.* and others[1–3] have described the presence of 'sex chromatin' in various tissues of several animal species, arriving at the conclusion that in all of them behaviour of this 'sex chromatin' was practically identical. They excluded, however, certain rodents and lagomorphs, since it was impossible to determine their sex from nuclei of the tissues studied.

The importance of these studies became apparent when Barr[4] and Decourt *et al.*[5] applied these concepts to the determination of sex in human pathology.