interference microscopes kindly lent by Messrs. Charles Baker and Mr. J. Dyson.

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Origin of the Pituitary Body of Chordates

My earlier investigations on the neural gland of tunicates may perhaps throw some light on the origin of the pituitary body in vertebrates. I have adduced evidence[1-4] that the neural gland (plus ciliated pit) of tunicates is the homologue of the vertebrate pituitary body. The mouth of the ciliated pit, then, is the homologue of the opening of Rathke's pouch, and as such does not enter into the structure of the pituitary proper. The stage in the development of the tetrapod pituitary at which Rathke's pouch is open is thus a 'recapitulation' of a phylogenetic step, still extant in ascidians.

Now what is known of the function of the pituitary in ascidians? I have shown that it is a chemoreceptor for detecting the presence of gametes of its own species in ingested water[3]; and it is probable that it may also act as a sense organ (in *Salpa* at least) for assaying the relative abundance of particles (food particles) in the ingested water[5]. Can it be that the pituitary is primitively a sense organ? This is the hypothesis which best fits the data. The only proved function of the pituitary in ascidians is that of chemoreception, and the ascidians are more primitive than any other chordate whose pituitary has been investigated; moreover, no other chemoreceptor is known in ascidians. The pituitary seems, in fact, to be the organ of olfaction in these forms. It has often been postulated that the pituitary shares with the nose proper an olfactory function in the cyclostomes; and Prof. R. Dohrn informs me that recently workers in his laboratory have shown this to be so in *Torpedo*. It has been replaced, however, by the 'nose' for this function in the higher chordates. Why has such a replacement taken place?

It seems most likely that the change from a benthic to a nektonic way of life has necessitated the development of a faster-acting olfactory organ than the pituitary body, in which the passage of information to the brain is chemical[3]. The new, fast-acting olfactory organ, of course, passes its information by nerves. It may be, indeed, that the new olfactory organ develops by innervation of part of the pituitary: the association of pituitary and nervous olfactory organ in the cyclostomes may perhaps suggest this. However this is, the pituitary proper, having lost its olfactory function, now presumably remains because its incretory products, once just of use for conveying information to the brain, have meanwhile become important for other purposes. For example, the gonadotropins of the pituitary, which in ascidians convey information of the presence of gametes to the brain, have in the vertebrates become essential to the gonads for their development: the site of action of the hormone has changed from the brain to the gonad. The reflex chain of the ascidians, deduced from the experiments described in an earlier paper[3], has been short-circuited to some extent, cutting out the neural arm of the reflex arc, so that both arms are now hormonal. The organ, the original function of which has become obsolete in higher chordates, remains because its incretory products have become essential to the body. This seems to be yet one more example of the rule that endocrine organs originally possessed some other function. Thus the thyroid is first a feeding organ, the endostyle, and when this method of feeding becomes obsolete in the evolutionary ascent the endostyle has to remain as a purely endocrine organ, since an incretory product has become essential to the body; the pineal is first an eye; the gonads are reproductive organs before they are endocrine glands; the first function of the pancreas seems to be to secrete digestive enzymes. In every one of these endocrine glands, including the pituitary body, the endocrine function seems to be secondary. The first function of the pituitary would appear to be one of chemoreception.

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Premature Oviposition in the Hen

It has been reported recently[1] that after various operations on the albumen-secreting region of the hen's oviduct, oviposition ceased almost entirely. This failure to lay was taken as evidence of a failure to ovulate and was attributed to inhibition at the pituitary gland by direct nervous stimulation from the oviduct.

During similar experiments, reported in this communication, it was noticed that if a loop of suture silk was placed in the shell gland in the manner described by Huston and Nalbandov[1], the production of normal hard-shelled eggs was replaced by the production of soft-shelled eggs in more than half the birds operated upon. In these birds ovulation continued at nearly the same rate as before the operation; but the yolk could not be retained in the oviduct long enough for egg formation to be completed. About half the resulting soft-shelled eggs had membranes and the rest were of yolk and albumen only.

Table 1 shows the number of normal and abnormal eggs produced by eight of the fourteen experimental birds for up to forty days after the operation; the remaining six birds and six controls continued laying normally at an average level of 70 per cent.

Table 1

Hen No.	Control period		Days after the operation							
	10 days		1–10		11–20		21–30		31–40	
	H	*S*	*H*	*S*	*H*	*S*	*H*	*S*	*H*	*S*
A	7	0	0	6	0	6	0	6	0	3
B	8	0	0	0	0	5	0	6	0	7
C	7	0	1	2	0	4	1	5	–	–
D	7	0	2	3	0	3	0	4	0	2
E	4	0	1	4	0	4	0	6	0	4
F	6	0	1	5	0	7	0	5	0	2
G	5	0	0	2	0	6	0	5	0	5
H	9	0	4	3	2	5	0	7	0	5

H = No. of hard-shelled eggs; *S* = No. of soft-shelled eggs.