

ON THE OCCURRENCE OF A 'PRINCIPAL ISLET' IN
THE PANCREAS OF TELEOSTEI. (Preliminary Note.)

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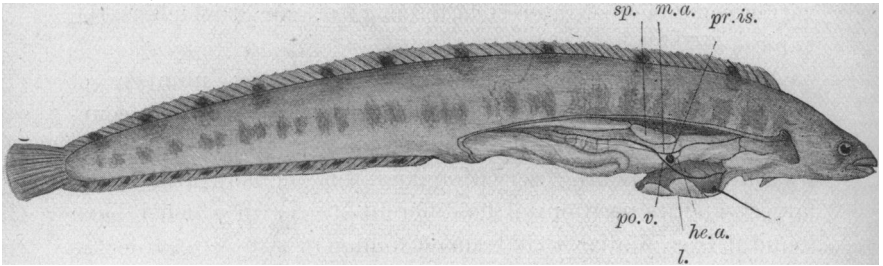
OUR knowledge of the existence of islets of epithelial cells in the pancreas of fishes is of comparatively recent date (Laguesse, '95; Massari and Diamare, '98), and has hitherto been limited to a relatively small number of species. In an account of work soon to be published I describe them in all the leading divisions of Teleostei, where they are shown to occur with such frequency that one may now conclude they constitute a common anatomical character of that group. In this investigation some facts of interest have emerged, one of which is the subject of the present note.

As the result of the examination of large numbers of specimens, I have noted in various species the constant occurrence in a definite position of a particular islet. Of the islets present, as far as my observation goes, this one is invariably the largest, and its position in the different species in which I have found it is so similar, that I am of opinion it is to be regarded as the same organ in all cases. Since I have not been able to discover (with one possible exception noted below) the same constancy in the case of the other islets, and since it is quite evidently the most important of these formations, I have termed it the 'principal islet.' Owing to the extremely diffuse condition of the pancreas in most Teleostei, these islets, possessing greater opacity, may usually be observed by the naked eye. They differ somewhat in form, but I have always found the principal one rounded or oval in section and enclosed within a more or less definite capsule. In *Pholis gunnellus*, the species of perhaps smallest adult size in which I have noted its existence, its longest diameter is about 1.5 mm.; while in large *Cyclopterus* or *Lophius* it may reach 14 mm. in length and 5 mm. in thickness.

The following is a list of the species in which I have observed it, viz.:—*Zeus faber*, *Lophius piscatorius*, *Cyclopterus lumpus*, *Pholis gunnellus*, *Zoarces viviparus*, *Anarrhichas lupus*, *Chiro-*

lophis galerita, *Hippoglossus vulgaris*, *Pleuronectes platessa*, *Syngnathus acus*, *Nerophis æquoreus*, *Syphonostoma typhle*. Besides these I have further noted in several *Gadidæ* and other *Pleuronectidæ* a structure similar in appearance, which is probably this islet, but I have not yet been able to verify its constancy nor to examine it histologically.

In *Zeus*, *Pleuronectes*, and *Hippoglossus* the principal islet is attached to the base or side of the gall-bladder. In the first two it is more or less completely enveloped by zymogenous tissue, in *Hippoglossus* the latter is almost absent. In this position Diamare has noted the occurrence of a large islet in *Orthogoriscus molæ* and in *Rhombus lævis*, but makes no observations on their constancy. In the other species which I have



Principal Islet in *Pholis gunnellus*. *l.*, liver; *sp.*, spleen; *m.a.*, mesenteric artery; *he.a.*, hepatic artery; *po.v.*, portal vein; *pr.is.*, principal islet.

named it may be stated generally that this islet is placed on the ventral side of the mesenteric artery and near to it, in the region of the abdominal cavity anterior to the spleen. In the forthcoming communication already referred to I shall indicate its exact position in each case; at present I shall limit myself to a statement of its relations in *Pholis gunnellus*. This species, though small, is one in which it may very readily be found. If the abdominal cavity be laid open by removing the right wall and the specimen pinned to a dissecting tray under water, the viscera may then be drawn towards the ventral side of the fish. If this be done, the leading blood-vessels, owing to their walls being pigmented, may easily be followed. A short distance in front of the spleen the mesenteric and hepatic arteries, together with the portal vein, enclose quite a small

triangular area, within which lies the islet in question. It is enclosed in a fairly tough capsule, which is frequently quite black owing to the deposition of pigment. (See figure.) Histologically it possesses the same structure as other islets in the same and other fishes, and no doubt can be entertained as to its homology. The authors cited have come to the same conclusion regarding similar formations seen by them. Before becoming acquainted with their work, I had satisfied myself as to this, their true nature; my evidence will appear in my next communication.

Regarding the question of function much has already been written on the subject, mainly with regard to the higher vertebrates. Latterly the consensus of opinion inclines to the view of an internal secretion, and with this view my observations are in complete accordance. The opinion of Laguesse, that they represent a stage to which the zymogenous elements may revert for a time, the tissue alternating throughout life between the epithelial and zymogenous conditions, does not agree with the facts in those fishes in which this particular islet—apart from others—is to be found at all times. It is a permanent organ, and I hope to show from experiments at present in progress, as well as from internal histological evidence, that it is functionally active.

I have further given some attention to the question of a possible similar constancy of occurrence in the case of the other islets. For this purpose I have examined several hundreds of *Lophius piscatorius* and a smaller number of *Hippoglossus vulgaris* (about fifty). In both of these I selected a small area of pancreas close to the pylorus. Within this area in *Lophius* there are situated several islets—a varying number, I am inclined to think. *With very great regularity* there occurs one which is markedly larger than the others. It is always next in size to the principal islet. I think it probable that more careful observation will show that it occurs with the same constancy as the principal. In *Hippoglossus* the area contained one large visible islet. It and the principal were the only two I could find by dissection in this species. In every case, save one or two, it was found. Whether the failure to find it in those few cases was due to want of skill on the part of the investigator

will be revealed by more extended enquiries. I incline to the view that it also is a structure constant in occurrence, with definite anatomical relations.

Further, I have found an islet, large enough to be seen by the unaided eye, within this area, in *Anarrhichas*, *Pholis*, and *Pleuronectes*; I have not yet had opportunities for observing whether it occurs regularly or not.

If constant and variable islets can be proved to exist, the relation between the two, I suggest, is probably similar to that between the thyroid and accessory thyroids, or spleen and accessory spleen. If this is so, since no constancy of the nature I describe has, so far as I know, been found amongst higher vertebrates, it may be that in the course of phylogeny the principal islets have disappeared, while the accessory have increased in number and importance.

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