

think it a great Happiness, if this Relation may be of any Use or Satisfaction. I am,

S I R,

*Tours most obliged and  
most affectionate,*

B. Cooke.

- X. *An Account, by Mr. John Eames, F. R. S. of a Book intituled, Jacobi Theodori Klein Historiæ Piscium Naturalis promovendæ Missus primus Gedani, 1740. 4<sup>to</sup>. Or, The first Number of An Essay towards promoting the Natural History of Fishes, by Mr. Klein, Secretary of Dantzick, and F. R. S.*

*Read Feb. 4.  
1741-2.*

**A**lthough the Natural History of Animals has been vastly improved, since several of the worthy Members of the ROYAL SOCIETY, both at Home and Abroad, have taken it under their Consideration; yet there still remain some things to be known, in order to render it full and complete. As particularly, concerning the Hearing of Fishes, it is remarked, that in no Fishes beside the Cetaceous Kind, have hitherto been found any Auditory Passages, or Ear-holes; and whether all Fish hear or no, is a Question not yet fully determined, notwithstanding the Experiments alledged to prove the Affirmative.

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Tis with this View, and in order to set this Matter in a clearer Light, the ingenious Author has obliged the World with the Book before us.

It consists of a Dedication address'd to this Honourable SOCIETY, a Preface, an Essay, and a double Appendix.

The Preface begins with acquainting us, what he means by Fishes, and defines them so, as to exclude several Tribes, that have been commonly taken for such by the Antients. *Pisces dicimus Animalia* (says he) *apoda pinnis natantia*; and adds in his Annotation upon it, *Ab hac definitione seclusa sunt Serpentium Genus, pinnis carens, Cancri, Astaci, Testacea; Cochleæ, Conchæve; imo Amphibia, sive Bipeda, (ut Manati Clusii) sive Quadrupedia, ut Phocæ, &c.*

Mr. Klein then (waving the Consideration of the Cetaceous Kind, which are allow'd by most Authors to have both Auditory Passages, and the Sense of Hearing) proceeds to the main Question, *viz.* Whether the Cartilaginous and Spinose kinds of Fishes are endued with the Sense of Hearing; or have any Organs or Auditory Passages for that Purpose.

He gives us the Sentiments of the Antients and Moderns, by producing a Variety of Quotations, both *pro* and *con.* out of their Works; from whence (says he) it appears, that though some of them were dubious, yet many of them agree, that Fishes do hear; nevertheless, none of them were fully satisfied, by what Part, or Ways, they had this Sensation produced. And though *Julius Casserius Placentinus* found out some little Bones in the Head of the *Pike* or *Jack*, which he look'd upon to be the Organs of  
Hearing,

Hearing, yet he could not discover any manifest external Auditory Passages.

In fine, from a diligent Inquiry into, and Consideration of all, that hath been said from Reason and Experience on both sides the Question, our curious Author determines us in favour of the Affirmative; and says, That Fishes not only have Organs of Hearing, but also Passages, (though they are difficult in many Species of them to be demonstrated) by means of which a tremulous Motion is communicated to these Organs. Nor does he think the Water in which they live, any Impediment, but rather the Medium, (or, as he calls it, the *Intermedium*) by which Sound is communicated to them: As a Man shut up in one Room, will hear and understand what is said in another, notwithstanding the Interposition of a Party-wall.

Our ingenious Author then proceeds to his Essay, wherein he considers what Parts in the Head of Fish serve for the Organ of Hearing, and by what Passages a tremulous Motion producing this Sensation may arrive at them. This Part of his Treatise he styles, *De Lapillis, eorumque Numero in Craniis Piscium*. These little Bones, sometimes called *Ossicula*, or little Bones, Mr. *Klein* looks upon, and accordingly considers, as constituent or essential Parts in the Heads of Fish, and generated with the Brain itself. They differ (he says) in Magnitude, according to the different Size or Bulk of the Fish to which they respectively belong, and are easiest to be discover'd in Heads of the Spinose Kind.

There are in all kinds of Fish three Pair of them; the first are the two largest Bones, and are easily  
enough

enough found; but the greatest Difficulty lies in discovering the other two Pair, which are small, and lie envelop'd in distinct little Bags, or a fine sort of Membrane. These he takes to be the Auditory Organs, and answer to the *Incus*, *Malleus*, and *Stapes*, in other Animals: And he thinks by a diligent and careful Inspection, we might determine the Age of Fishes, by the Number and Thickness of the *Laminae* and *Fibres* of these Bones, as we can the Age or Growth of a Tree, by the Number of Circles in the woody Part of its Trunk.

The Passages by which a tremulous Motion producing the Sense of Hearing, may arrive at these Auditory Organs, are what our Author next inquires after; and he produces first a Specimen in the Spinose Kind, *viz.* in a *Jack* or *Pike*; and upon Inspection into the Head of this Fish, he observes several Holes, which, by means of Hogs Bristles, he finds lead directly to these Auditory Bones before describ'd.

In dissecting the Head of a *Sturgeon*, (as a Specimen of the Cartilaginous Kind) he traced the Auditory Duct as far as the Membranous Body in which the three Pair of little Bones are placed.

But as our curious Author has oblig'd us with an exact Delineation of these Auditory Ducts or Passages, as well as the Figures of a Variety of those *Lapilli* or *Ossicula*, from different sorts of Fish, on several Copper Plates, to these I must refer, for a more satisfactory Idea than can possibly be given in Words.

We therefore proceed to the first Appendix, which entertains us with the Anatomy of a *Porpefs*. This  
Fish

Fish our Author in the Title Page styles *Terpio*, the usual Name for it in *Pliny*; but he calls it *Phocæna* in the Appendix, the Name used for it by *Aristotle*.

'Tis ranked amongst the Cetaceous Kind, and is the smallest Fish in that Tribe, seldom exceeding five Feet in Length; in which it differs from *Dolphins*, (amongst which Species it has by some been improperly reckon'd) for they often exceed ten Feet in Length. The Snout also of the *Dolphin* is much larger than in the *Porpefs*, which is another thing sufficient to distinguish them. It would be needless here to give a Detail of the Anatomy of this Animal, which is so largely done by Dr. *Tyson* in his *Phocæna*. I shall therefore only take Notice of some Remarks made by our Author upon the Dissection of a *Porpefs*, by the accurate Hand of Dr. *De la Motte*, at Mr. *Klein's* Request.

In the first Place, the *Meatus Auditorius* was found by both to be two Inches distant from the exterior *Canthus* of the Eye, forming a very small Hole (lest the Water getting in might prove an Inconvenience to it). He then gives us an Account of the *Os Petrosum*, and other Auditory Organs, with curious Figures of them; in order to correct Mr. *Ray*, who in *Philosophical Transactions*, n. 76. p. 2278. says, *We observed not in this Fish any Ear-holes or Meatus Auditorii at all, wherein also Aristotle agreeth with us.*

A second Remark is, that though the *Porpefs* has no *Vesicula fellea* or Gall-bag, (and from thence most Authors have been induced to believe no Gall) yet Dr. *De la Motte*, upon a more exact Scrutiny, finds a Duct that arises with a great Number of Branches

in the Liver, and tending downwards, joins itself to the Pancreatic Duct; and these two, so united together, form a Canal or common Duct, about four or five Lines long, before they discharge their Contents into the *Duodenum*. From whence it appears, (says Dr. *De la Motte*) that the *Porpefs* has always a Discharge of Bile into the *Duodenum*, though 'tis but thin and diluted, and such as in other Animals is usually called Hepatic Bile.

In dissecting the *Os Petrosum*, several Worms were found: Some of these Mr. *Klein* has presented us with a Figure of, as also of the Parts of Generation proper to the Male *Porpefs*, and lastly the Thoracic Duct in its natural Dimensions.

Our ingenious Author concludes with some Observations made on the Heads of two *Raia* of an uncommon Species, and which he says are no-where described. He gives us the Figures of the Auditory Organs, with the Jaw of one of these Fish very accurately depicted in his vi<sup>th</sup> Table.

And having consider'd the Auditory Organs, with the Seat of them both, in the Cetaceous, Cartilaginous, and Spinose Kinds of Fishes, it appears, says our ingenious Author, that these *Lapilli* or *Ossicula* differ from one another both in Structure and Substance; for in Cetaceous Fishes, whose Skeletons are truly bony, and which, in certain respects, may be compared to truly Lignous Trees, both the *Os Petrosum*, and Auditory Organs, are in these, as in other Animals, perfectly *osseous* or bony: Whereas the Cartilaginous Fish, whose Skeletons are Elastic and Cartilaginous, they may be compared to the *Keratophyta* Species of Sea-Plants; and these Fish, instead

instead of an *Os Petrosum*, have something analogous, but cartilaginous; and the Auditory Bones are of a tartareous kind of friable and easily mactable Substance.

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XI. *A Journal of the Shocks of Earthquakes felt near Newbury in New-England, from the Year 1727. to the Year 1741. communicated in a Letter from the Rev<sup>d</sup> Mr. Matthias Plant to the Rev<sup>d</sup> Dr. Bearcroft.*

S I R,

Read Feb. 11.  
1741-2.

IT may be acceptable, if I give an Account of the Earthquake, as I took it down precisely at every time I heard it.

Oct. 29. 1727. being the Lord's-Day, about 40 Minutes past Ten the same Evening, there came a great rumbling Noise; but before the Noise was heard, or Shock perceived, our Bricks upon the Hearth rose up about three quarters of a Foot, and seem'd to fall down and loll the other way, which was in half a Minute attended with the Noise or Burst. The Tops of our Chimneys, Stone-fences, were thrown down; and in some Places (in the lower Grounds, about three Miles from my House, where I dwell) the Earth opened, and threw out some Hundred loads of Earth, of a different Colour from that near the Surface, something darker than your white Marl in *England*; and in many Places, opened dry Land into good Springs, which remain to this Day; and dried up Springs, which never came again.

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