

This article was downloaded by: [Virginia Tech Libraries]  
On: 13 March 2015, At: 07:10  
Publisher: Taylor & Francis  
Informa Ltd Registered in England and Wales Registered Number:  
1072954 Registered office: Mortimer House, 37-41 Mortimer  
Street, London W1T 3JH, UK



## Annals and Magazine of Natural History: Series 5

Publication details, including instructions  
for authors and subscription information:  
<http://www.tandfonline.com/loi/tnah11>

### XVII.—On Phœnicurus

M.H. de Lacaze-Duthiers

Published online: 09 Oct 2009.

To cite this article: M.H. de Lacaze-Duthiers (1885) XVII.—On Phœnicurus, *Annals and Magazine of Natural History: Series 5*, 16:93, 157-162, DOI: [10.1080/00222938509459865](https://doi.org/10.1080/00222938509459865)

To link to this article: <http://dx.doi.org/10.1080/00222938509459865>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever

caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

# THE ANNALS

AND

## MAGAZINE OF NATURAL HISTORY.

[FIFTH SERIES.]

No. 93. SEPTEMBER 1885.

XVII.—*On Phœnicurus.*

By M. H. DE LACAZE-DUTHIERS \*.

WHILE investigating *Tethys leporina* in the spring, at the Laboratoire Arago, I found in large quantities the curious parasite which that mollusk bears attached to its sides.

Upon *Phœnicurus*, which is the name of the parasite, we have only very imperfect information; but it was known to Rudolphi, Cuvier, and Delle Chiaje. This last naturalist, who at first thought he was the discoverer of it and called it *Planaria*, indicated how it is attached by its mouth to the mamillæ which are observed in the middle of the inter-branchial fossæ of the *Tethys*; he recognized in the interior of its body the numerous muscular bands which give it great contractility, as also the chief part of its digestive tube; but although he has given some good figures of the exterior of the animal his indications of its organization, when given, are very unsatisfactory.

A favourable opportunity having presented itself, the following are some of the facts which I have ascertained:—

The body of *Phœnicurus* has the form of a boy's kite; it

\* Translated from the 'Comptes Rendus de l'Académie des Sciences, July 6, 1885, tome ci. pp. 30-35.

is flat, rounded at one of its extremities, and drawn out into a point at the other; sometimes this extremity is simple, sometimes furcate, but whether single or double it is coloured red, which justifies the name of *Phœnicurus*.

The two surfaces are very different. One, the most extended, is marked with large black and whitish spots, washed over with a general slight reddish tinge, which is very variable in different individuals; it reminds one of the colouring of the back of certain toads. The other, which is white, is less extended, and margined by the former, which borders it and forms a sort of raised pad all round it.

The rounded extremity of the body bears an oval pit, pierced in the centre by an orifice. The skin of this pit is fine, smooth, white, and nearly transparent; it is bounded by a pad formed by the extremities of the two surfaces, which differ in colour.

This is all that we observe in the exterior of the animal.

When the *Phœnicurus* is in a very lively state it is seen to contract and change its form incessantly; it twists and inflates itself on the side of the marbled surface, especially towards the rounded extremity, which is then inclined towards the whitish surface, and the body becomes bent. Thus one is led to regard the surface covered with the pattern as the back of the animal, and the white surface as the anterior or abdominal part.

Led away by this impression I first of all sought the nervous system by opening the *Phœnicurus* on the coloured surface, but I found nothing, and it was only by resuming the dissection from the opposite surface that I obtained any results and displayed the centres of innervation.

The most normally constituted nervous system that I have met with presents, as a centre, two ganglia, one left, the other right, united by a long transverse commissure. From each of these ganglia issue two principal nerves, a superior one going to the neighbourhood of the mouth, an inferior one descending towards the tail. These centres are distant from one another and nearly lateral; they are situated at the junction of the anterior third of the body with the inferior two thirds, and thus the four superior and inferior nerves, with the ganglia and the transverse commissure, form an H, of which the branches are of unequal size. These ganglia are small relatively to the size of the animal; they contain large and not numerous nerve-cells with peculiar characters, which will be referred to hereafter in the histological examination.

The numerous, transverse secondary nerves issue both from the ganglia and from the large principal nerves to run into

all parts of the organism. They are in general very slender, very long, and most frequently much undulated, a condition which is in relation to the movements of extension and contraction of the body. They are divided into two very constant orders. Not far from the ganglia are given off some large trunks, some of which run into the common tissue situated within the muscular layers, which will be referred to further on; while the others, traversing these layers, are distributed to the subcutaneous tissue and probably arrive at the skin. This, however, is difficult to make out by dissections or sections, and the discovery of these terminations will be purely a matter of chance.

Studied in a great number of individuals the nervous system presents peculiarities which merit notice. The two superior nerves are stout and terminate suddenly close to the buccal orifice. I shall have to revert to this termination. In their course they give off pretty numerous delicate branches which run into the subcutaneous tissue of the buccal pit.

The nerves, as they depart from the centre, present from point to point ganglionic inflations of very variable bulk and composed of one, two, or three elongated cells, the larger axis of which is parallel to their direction.

Another very remarkable peculiarity is the following:—I think I have never met with two individuals presenting a complete identity in the composition of the nervous centres. The following are some of the arrangements observed:—Sometimes there was only one median ganglion, from which issued the two large buccal nerves and the two principal nerves of the caudal extremity; sometimes I have only met with a sort of chain of three or four elongated ganglia placed one after the other, a single nerve running towards the mouth and another towards the tail. Lastly, in one case, I found seven small ganglia arranged transversely and united not only by a transverse commissure, but also by filaments forming a network, a true plexus. In all cases, whatever may be the number of the ganglia, the situation of the nervous system as a whole, with regard to the digestive tube and the muscles, continues the same, and the filaments are distributed in part to the middle of the body and in part to the subcutaneous layers.

Finally, it is not uncommon to find only a single buccal nerve, and in this case the nerve is stouter; and I have seen the two buccal nerves issue from the same ganglion.

To sum up, the position of the nervous system is constant, but its forms vary infinitely.

I have still to note this fact—I found a transverse cord

issuing from the buccal nerves and uniting them, passing in front of the digestive tube. Was this an œsophageal collar or a simple anastomosis?

*Phœnicurus* presents a very interesting histological constitution, which will form the subject of a separate memoir. I shall say but little about it at present. Its body has no general cavity, it is therefore *acœlomatous*; but it is filled up with a cellular-fibrillar tissue showing nuclei, in the midst of which and soldered to it are various organs and large cells or vesicles which are often visible to the naked eye, and may acquire enormous dimensions.

Under the skin, after a layer of connective tissue, we find long muscular bands regularly spaced and forming two laminae, one dorsal, the other abdominal, passing to the buccal and caudal extremities. Between these two laminae is the central part. The body is in this way divided into three zones, two external to the muscular bands and one intermediate. Further other fibres, also muscular, but transverse and exterior to the former, to which they are attached, crossing them at right angles, form a true trellis, which is easily discovered; for it appears very evidently so soon as one opens the body of the animal and removes the integuments. At the sides, to the right and left, there are also bundles of muscular fibres passing perpendicularly from one surface to the other, which assist in limiting the central space.

It is in this median intermuscular space that we find the digestive tube, the central nervous system, and a special gland, the only organs that I have been able to observe.

The digestive tube commences at the central orifice of the pit noticed towards the rounded extremity, and descends to the tail. Sometimes, after leaving the mouth, it presents a dilatation followed by a constriction, indicated by Delle Chiaje; but great importance must not be attached to this arrangement, which varies with the state of the individuals.

The tube, which is sometimes even, sometimes irregular, narrowed, or dilated, descends narrowing to the neighbourhood of the tail, and throughout its length, as in all directions, in front, behind, and on the sides, gives origin to branches, which ramify infinitely, traversing the muscular interstices, and extending by their delicate branches into the vicinity of the integuments. From this point of view *Phœnicurus* is a very characteristic *Dendrocelan*.

The walls of the digestive tube, which are of extreme delicacy, easily escape observation if they are not filled with some coloured material or submitted to the action of some reagent which reveals their presence. I have not found any anus.

The last organ of which I was able to ascertain the existence is a very simple gland formed by a tube terminating in one or two cæca, and bearing some rare lateral cæca. One of them, directed towards the white surface of the body, but not extending to the integuments, is constant and larger. This gland is situated towards the marbled surface, and opens into the buccal orifice itself. What are its functions? It is difficult to say, although it seems natural to regard it as a salivary gland.

I have proved that what Delle Chiaje regarded in *Tethys* as an aquiferous apparatus was nothing but the venous apparatus of the mollusk, opening externally at the apex of the papilla situated in the centre of the interbranchial fossæ. The *Phœnicurus*, grasping this papilla with its mouth, can therefore at any moment suck in the sanguine fluid of the *Tethys*, of which it is the parasite in the most exact acceptation of the word.

From what has been stated it is now easy to place and orientate the animal. Placing the nervous system posteriorly, the white surface evidently represents the back, and the marbled surface is anterior; the mouth being placed above, all the positions are easy to characterize and indicate. Hence to find the nervous system we must open the *Phœnicurus* at the back, and remove the subcutaneous tissues, and it is in front of the muscular bands that we discover the ganglia; then it will be seen that in passing from back to front we find the nervous system, the digestive tube, and the salivary gland.

*Phœnicurus* appears to me to be very distinctly characterized as a *Dendrocolan* by the absence of the abdominal ganglionic chain and by the arrangement of its arborescent intestine.

To fix more completely its zoological relations it would be of service to have traced its evolution. Now, in the month of May, I was unable to discover the organs of reproduction; only once I found an individual in which the large cells above mentioned had acquired enormous proportions. The skin of the animal being torn, they projected outwards like bunches of grapes. I will not assert that they represented ova, for all questions relating to reproduction remain to be cleared up. It is important that I should repeat that my observations were made in the month of May, and that, in the animals preserved, I have not met with reproductive organs, which are so easily recognized in the Turbellaria or the Trematoda.

Does *Phœnicurus* represent only a period or a stage of its whole existence? Is it a creature deformed or degraded by parasitism? Is its evolution accomplished under varied forms

in different stations? These questions are equally curious and interesting to solve.

I have had the *Phænicurus* in abundance at the Laboratoire Arago. My boat, every time it went out to seek specimens of *Tethys* for me, brought me a great number of all sizes, free or fixed. I hope, therefore, shortly to elucidate this still obscure history.

XVIII.—*On the Relationship of Ulodendron, Lindley and Hutton, to Lepidodendron, Sternberg; Bothrodendron, Lindley and Hutton; Sigillaria, Brongniart; and Rhytidodendron, Boulay.* By ROBERT KIDSTON, F.G.S.

[Plates III.-VII.];

[Continued from page 139.]

## II. DESCRIPTIONS OF SPECIMENS.

### *Lepidodendron Veltheimianum*, Sternberg.

*Specimen No. 1.* From Burghlee Pit, Loanhead, Midlothian (Carboniferous Limestone Series). Pl. III. fig. 1 (nat. size).—This fossil, which is represented by an *impression* of the plant in a fine-grained micaceous sandstone, is 15 inches long and at its broadest part about  $4\frac{1}{2}$  inches wide. Towards its upper part it shows one of the characteristic Ulodendroid scars, which is  $4\frac{1}{2}$  inches high and  $2\frac{1}{2}$  inches wide. The central umbilicus is situated about 2 inches above the lower margin of the scar. On the lower surface of the Ulodendroid scar, and extending slightly above and around its umbilicus, are rows of little "dots" arranged in spirals, converging towards the umbilicus. The little "dots" indicate the position of the vascular bundles of the aborted leaves, and become closer to each other as they approach the umbilicus. On the upper part of the scar is a number of straight lines which radiate from the umbilicus; these are the impressions of the basal leaves or bracts of the appendicular organ. The umbilicus is slightly raised. On other parts of the specimen are seen the impressions of the leaf-scars, which are, in form and arrangement, similar to those of *Lepidodendron Veltheimianum*. To the left of the fossil the leaf-scars are obliterated by a longitudinal splitting of the bark.

As the specimen is only an impression it must be remembered that the elevations on the fossil were depressions in the plant.