

THE MAGAZINE
OF
NATURAL HISTORY.

SEPTEMBER, 1837.

ART. I. *Observations on the opposable Power of the Thumb in certain Mammals, considered as a zoological Character; and on the natural Affinities which subsist between the Bimana, Quadrùmana, and Pedimana.* By W. OGILBY, Esq., M.A., F.L.S., F.G.S., F.Z.S., &c. &c.*

It was whilst employed in watching the habits of two fine specimens of *Mycètes seniculus* in the summer of 1829, that I had occasion, for the first time, to make an observation which greatly surprised me at the moment, and which I afterwards found to be of much greater importance than I had at first imagined. Upon presenting these *Mycètes* with a few nuts which I had taken for that purpose, I remarked with some surprise that they did not hold them between the finger and thumb, as I had seen other *Quadrùmana* do. This induced me to examine them more closely; and it was with increased surprise and astonishment that I perceived the cause of the phenomenon which had first attracted my attention: the thumb, in fact, though perfectly developed, and, comparatively speaking, much longer than in the ordinary *Simiæ*, was not opposable to the other fingers, but originated in the same line with them; was of the same long slender form, and acted in the same direction. At first, I was disposed to regard the specimens before me as the type of a new and undescribed genus; for at that time I had not the slightest suspicion of this character being common to the other *Mycètes*, much less to the whole of the American *Simiadae*; since, though I had formerly seen, and, as I fancied, examined, many of these animals, the observation had

* This memoir was read before the Zoological Society, March 8. 1836, and an abstract from it published in the *Proceedings* under that date. It is here given verbatim, as it was written, without any alteration or addition, except the foot notes.—*W. O.* August 10. 1837.

never occurred to me before; and I was aware, moreover, that no zoologist, with whose works I was acquainted, had recorded a similar fact. Baron Cuvier, indeed, had previously separated the *Ouistitis* (*Hápale*) from the other American *Simiadae*, partly on this account; but, in so doing, he had expressly recognised the rest of these mammals as true *Quadrumanæ*, in the strict and legitimate sense of the term, and actually included them in the same group with the common *Simiæ* of Asia and Africa, a group of which the zoological character depended entirely upon this circumstance of the thumb being opposable on the anterior as well as on the posterior extremities. In this respect Baron Cuvier was only following the example which had been set him by Ray and Linnæus; nor did contemporary zoologists dissent from his opinion upon this point.

I was, consequently, aware that the observation which I had made with regard to these two *Mycètes* had not been previously recorded by systematic writers; I therefore resolved to prosecute the enquiry, by extending my examination to other genera and species of American *Simiadae*: but such is our natural veneration for authority, that I confess it was not without very great caution and frequent misgivings, that I persevered in an enquiry where I found my own observations, at every step, directly opposed to the express declaration of the most illustrious masters of zoological science. It required a considerable time, indeed, to familiarise my mind with the new ideas and new views which these observations suggested; to persuade myself, in short, that the American *Simiadae* were not *Quadrumanæ*: in fact, so strongly was I impressed with the weight of authority, that it was actually some time before I could give its due weight to the evidence of my own senses. This state of mind, whilst it did not deter me from pursuing my observations, armed me with additional caution; and, though the authority of Nature soon asserted her preeminence over that of system, I guarded scrupulously against admitting, as conclusive evidence, such facts as rested only on the examination of preserved specimens, and resolved to wait patiently till I should have an opportunity of examining at least one species of each genus in the living state, where the observation of the organ in action, and in connexion with its proper function, would remove all possibility of deception.

During the last six years, I have been engaged in prosecuting this interesting enquiry, from time to time, whenever an occasion presented itself; and, as I have, during this period, enjoyed frequent opportunities of examining many different species of American *Simiadae*, including examples

of all the natural genera, I am now able to announce with confidence that the American *Simiadae* have not the thumb of the anterior extremities opposable to the other fingers; in short, that they are not *Quadrumanæ*, and, consequently, that any zoological system which includes them in the same group with the *Simiæ* of Asia and Africa is founded upon arbitrary principles, and opposed to the observed phenomena of their structure and economy.

When I first made the observation which led to this important conclusion, I was anxious, as may be readily supposed, to examine strictly the works of the most original and trustworthy writers upon this subject, for the purpose of ascertaining whether the fact might not have been already recorded, though it had been overlooked by subsequent authors. A strict and attentive search, however, convinced me that the observation had not been made by Linnæus, Buffon, Pennant, Erxleben, Illiger, Géoffroy St. Hilaire, the Cuviers, Desmarest, Humboldt, nor even by the accurate and minute Daubenton. So close, indeed, is the approximation of the American to the Asiatic and African animals in general form and manners, that these illustrious naturalists seem never to have thought of comparing them in the more minute details of their conformation; nor, for that matter, should I have myself ever dreamed of the American *Simiadae* differing in this respect from the *Simiæ* of the Old World, had not chance thrown the observation in my way, in the manner already mentioned. At that time I did not possess Azara's admirable *Essais sur l'Histoire Naturelle des Quadrupèdes de la Province du Paraguay*; nor, for long after I procured it, did I think of consulting it upon this subject. When I did so at length (and it was only when about to prepare the present memoir), it was with the greatest pleasure I discovered that that acute and original observer had long since made the very same remarks which formerly struck me with so much surprise; and I hailed the circumstance as a complete confirmation of the correctness of my own observations. Since, then, the credit of having been the first to make this important observation is due to the Spanish naturalist alone, I shall transcribe the following short extracts from his work, in order at once to establish his claim to the original discovery, and to bring forward his authority in support of the observation itself.

Speaking of the caraya (*Mycètes niger*), Azara says: —“La main a cinq doigts, dans lesquels celui qui par sa position doit être le pouce ne semble pas tel, attendu qu'il nait sur la même ligne que les autres, qu'il a la même direction, et qu'il est le

plus foible. Les pieds ont les mêmes doigts, mais l'interne a la forme de pouce." * Again, in describing the cay (*Cebus capucinus*), he observes: — "Il y a cinq doigts à chaque pied, presque de la même forme que ceux de la main de l'homme, quoique le pouce de devant soit moins séparé que dans celui-ci, et qu'il ne soit pas plus gros que les autres doigts †:" and again, of the mariquoïna (*Pithecia Mariquoïna*): — "Dans la main il y a cinq doigts; l'extrême et l'interne naissent parallèlement entre eux, quoique celui-ci soit plus court: il n'a ni la séparation ni la forme d'un pouce, et il est le plus mince de tous. Les trois autres doigts sont plus longs que les deux précédens; ils naissent un peu plus en avant, et leur longueur suit l'ordre des doigts de la main de l'homme." ‡

These passages clearly establish Azara's title to be considered the original observer of this important fact; and it is not a little surprising that they should have remained so long buried in his admirable *Essais*, without having attracted that attention to which they are so justly entitled. Such, however, has hitherto been their fate: subsequent writers seem to have entirely overlooked them, or, if noticed at all, their real value was not appreciated; nor am I aware of the observation itself having been made by any other naturalist, with the exception of Mr. Martin, an able and zealous officer of the Zoological Society, to whose merit I am happy to have this opportunity of bearing witness. So far as I know, however, Mr. Martin has not followed up the ideas suggested by this observation, nor deduced from it the consequences to which it necessarily leads, and which it is the principal object of the present memoir to developé. §

I have thought it necessary to enter into this circumstantial history of the observation in question, in justice to all those whom I know to be connected with a discovery which I cannot avoid considering as one of the most important that has been made of late years in mammalogy, more especially in regard to its connexion with the principles of natural classification in this department of zoology. I shall only remark further, that the present memoir, though commenced last November ||, immediately after examining a specimen of

* Azara, *Quad. du Parag.*, ii. 213. † *Id.* ii. 233. ‡ *Id.*, ii. 244.

§ When this passage was written, I had entirely forgotten that I had myself previously published the observation in question, in an article on the "Zoology of America," inserted in the *Penny Cyclopædia*, vol. i. p. 442. That article was published in 1833, and Mr. Martin's observations upon the subject did not appear till December, 1835. They may be found in the volume of the *Penny Magazine* for that year. — *W. O.*

|| 1835.

the doursucouli (*Aotus trivirgatus*), the only generic type which I had not previously seen alive, has been delayed from various causes; and that I was not aware that the primary observation which it records had been previously and originally made by Azara, till the moment of commencing it.

It will have been remarked, no doubt, in the second extract which I have given from the work of Azara, that this acute zoologist speaks in more qualified terms of the unopposable power of the anterior thumb in the cay, than in either of the other two species which he has described; and in this respect his observations are in perfect accordance with my own. Of the eight natural genera which include all the known Simiadae of the Western Hemisphere, and of which I have examined many living species, besides the skins of a much greater number, five have the anterior thumbs placed absolutely on the same line with the other fingers, of the same form, acting invariably in the same direction, and totally incapable of being opposed to them: these are, *Mycetes*, *Lagotherix*, *Aotus*, *Pithecia*, and *Hapale*. It is scarcely necessary to observe, that the thumb is entirely wanting in *Ateles*, or exists only in a rudimentary form beneath the skin; and there remain only the genera *Cebus* and *Callithrix*, in which I shall now proceed to explain the modifications of form and function presented by this organ.

In describing the *Cebus capucinus*, Azara observes: — “Il y a cinq doigts à chaque pied, presque de la même forme que ceux de la main de l'homme, quoique le pouce de devant soit moins séparé que dans celui-ci, et qu'il ne soit pas plus gros que les autres doigts.” This passage exactly describes the appearance of the organ in question, both in the genera *Cebus* and *Callithrix*. The thumb of these animals is, in fact, placed farther back than the general line of the other fingers, and, on that account, when superficially noticed, has the semblance of being opposed to them; but, as Azara very correctly observes, it is less separated than in man; and, I may add, than in the true *Simia*: it is, besides, of precisely the same long slender form, is weaker than the rest, absolutely without power of opposition, and habitually acts in the same direction. I have no doubt that it is the backward position of this organ in the *Cèbi*, and the deceptive appearance of opposition which this circumstance produces, that has hitherto prevented zoologists from observing the true characters and affinities of the American Simiadae; for, of all these mammals, the *Cèbi* are most commonly brought to Europe, and, unless examined with this express view, previously suggested by the observation of other genera, in which the character is less equivocally deve-

loped, would never have themselves given origin to the idea that they differed from the common *Símia* in the opposable power of the anterior thumbs. After having become once possessed of this fact, however, from my observations on the genera *Mycètes* and *Pithècia*, I paid very close attention to the actions of the various species of *Cèbi* which have been from time to time exhibited in the Zoological, and Surrey Zoological, Gardens, yet without having ever remarked them, even in a single instance, to oppose the thumbs to the other fingers in the act of prehension. It was very evident, indeed, notwithstanding the fallacious appearance occasioned by the backward position of the organ, that they had not the power of doing so: and, in fact, their principal power of prehension seems to be altogether independent of the thumb; for, generally speaking, it was not brought into action at all, at least not simultaneously with the other fingers, but hung loosely on one side, as I have seen it do, in like circumstances, in the opossums, phalangers, and other arboreal mammals. When actually brought into play, however, the thumb of the *Cèbi* invariably acts in the same direction as the other fingers; and, consequently, the exception which these animals might be supposed, on a casual examination, to offer to the general law of organisation presented by the other *Simiadæ* of the New World, is altogether illusory, and vanishes when put to the test of more accurate investigation.

I have not enjoyed the same opportunities of extensive observation among the *Callítrices*: indeed, I have seen only two species of this genus alive; but their actions, as well as the form and position of their anterior thumbs, were in all respects similar to those of the *Cèbi*; nor have I any reason to believe that other American *Simiadæ* differ in this respect from those which I have seen, and of which I have here described the actions.

It has been already observed that the genera *Mycètes*, *Lagòthrix*, *Aòtus*, *Pithècia*, and *Hápale* have the anterior thumb placed absolutely upon the same line with the other fingers, and acting habitually in the same direction; and I have now shown that the backward position of this organ in the *Cèbi* and *Callítrices* is the only equivocal circumstance which appears to differentiate them from the other *Simiadæ*; but that, when observed more closely and in action, the deception vanishes, and its functions are found to differ in no respect from those of the allied genera. Here, then, we have obtained a new and far more important character, by which to distinguish the *Símia* of the Old and New Worlds, than those which have been hitherto so much insisted upon by zoologists, the

comparative thickness of the septum, and the absence of cheek pouches and callosities. The American animals, in fact, are not *Quadrùmana*; and, consequently, they can no longer be included in the same family with the *Símia* of Asia and Africa: they are, properly speaking, *Pedímana*; and it now remains for us to consider what are their true relations, and the position which they actually occupy in the scale of animal life.

In the first place, it follows, as a necessary consequence of the observations which I have here announced and detailed, that these animals can no longer be included in the same group with the *Quadrùmana*, properly so called, with the *Símia* and *Lemùridæ*, of which the essential and only universal zoological character consists in having the thumbs opposable to the other fingers on the anterior as well as on the posterior extremities. This character, of the highest influence as regards the habits and economy of the animals, and universally admitted to be the most important element in the principles which govern their natural arrangement, is wanting in the American animals; and, consequently, any system which includes them in a group founded entirely upon this peculiar modification of the organs of prehension must be purely arbitrary, and fail to express the actual relations which subsist between them and the true *Símia*. But, though the most important and influential, this is by no means the only distinction between these two groups of mammals; the absence of cheek pouches and callosities, the peculiar form of the septum naris, and the superior number of the molar teeth, in the American family, have long been recognised and admitted; and there are still other characters, less prominent, perhaps, but not less influential, by which they are equally distinguished, and which degrade them materially in the scale of animal life. Of these the fierce and intractable disposition of some, the decidedly carnivorous propensities of others, and the limited intelligence of the whole group, may be adduced, as manifestly approximating them to the *Carnívora*, and abstracting them altogether from the character and appetites of the *Quadrùmana*. Indeed, it is only in the *Cèbi* and *Callítrices* that we recognise anything like the liveliness, intelligence, and docility of true *Símia*. The *A'teles*, it is true, are quiet and inoffensive; but this arises from apathy or stupidity: all the others are morose, sullen, and apathetic, or exhibit a fierceness and intractability of temper entirely at variance with the character of frugivorous animals. Here, again, it will be observed, that this difference in the intellectual faculties and moral disposition, if I may be allowed the expression, of the American

Simiadae accords precisely with the difference of organic structure already pointed out in these animals; those which approach most nearly to the true *Quadrumanana* in the conformation of the organs of touch and prehension, exhibiting, at the same time, a degree of intelligence vastly superior to their conterminous genera. In short, here, as in all other cases, that admirable instrument, the hand, or even an approximation to its form, however imperfect it may be, entails upon its possessor a superior development both of mental and physical functions, and, exactly in proportion to its degree of perfection, and to its adaptation to the purposes of touch and prehension, exalts him in the scale of animal life.

But, though the *Sapajous* and *Sagoin*s of America differ thus essentially from the true quadrumanous types of the Old World, they exhibit, nevertheless, numerous important relations in other respects, more especially with the family of *Simiæ*, which cannot be overlooked, and which, indeed, have hitherto been solely relied upon for determining their position in the scale of nature. Among the *Pedimana*, in fact, they form a parallel group to the true *Simiæ* among the *Quadrumanana*; and it is for the purpose of expressing at once the difference which exists between these two groups, and the relations which they exhibit to one another, that I propose to appropriate the term *Simiadae* to the American animals, reserving the name of *Simiæ* exclusively for those of the Old World, to which alone it originally and legitimately belongs. I am ready to acknowledge the impropriety, under ordinary circumstances, of substituting new names in the place of those which have been already received into the science; the terms *Catharhinnus* and *Platyrhinnus*, however, which M. Geoffroy St. Hilaire has already applied to the same groups, besides not being generally adopted by other zoologists, express such trivial and unimportant relations, compared with the ideas attached to those which I propose to substitute for them, that the change is in this instance a decided advantage; nor does it deduct from the merit of the learned professor, since whatever novelty or discovery the case presents is contained in the observations here recorded; and the loss of a mere name is not a circumstance that can affect the solid and well-earned reputation of the illustrious French zoologist. The proposed change has, besides, the farther advantage of reintroducing into the science the old classical name of a group which has for some time past fallen into neglect, but which is much more appropriate and expressive than any of those by which it has been replaced.

In the second place, the *Sagoin*s and *Sapajous*, or, as I

shall hereafter call them, the Simiadae, are not the only mammals which exhibit the peculiar conformation of the organs of locomotion and prehension here described. There is a small family of marsupials which possess the same character of having opposable thumbs on the posterior extremities only, and which, in spite of considerable variety in the dentition of the different genera, form a very natural group, which I characterised, some years ago, in a paper read before the Linnæan Society, and of which I shall now recapitulate the most important affinities. The group comprehends the genera Didélphys, Cheironéctes, Balántia, Phalangista, Petaurus, and Phascoláretos, together with a new genus, Pseudocheirus*, which I have found it necessary to separate from Phalangista as at present constituted. All these genera, besides the characters proper to them as marsupial and pedimanous animals, agree in their nocturnal habits, omnivorous appetites, and arboreal lives. It has been usual hitherto to separate the Phalangiers and Petaurists from the Opossums, and even from the Koalas, on the supposition that the modifications observable in the dental system of these genera betokened a difference of regimen. Thus, we have had the various families † of Entomóphaga ‡, Caróphaga §, Phyllóphaga ||, Frugívora †, &c. all claiming the rank of natural groups, though founded solely upon this presumption. Such *à priori* reasoning, however, should be very sparingly used in a science which depends entirely upon observation; and, in the present instance, the experience which I have had in studying the habits and appetites of the numerous species of all those genera which have been from time to time exhibited in the Zoological Society's gardens convinces me that there is little or no difference, in this respect, between the Opossums and Phalangiers, but that

* It is only necessary to observe, that this genus is distinguished by a peculiar formation of the anterior extremities, the fingers being divided into two groups, as in Phascoláretos; not, indeed, opposable to one another, but sufficiently separated to facilitate the act of prehension in moving among the branches of trees. It is separated from Phalangista, and includes P. Coókii and P. glirifórmis. Before noticing the important character upon which I have founded this new genus, I could never understand why Mr. Bell, in his excellent paper on the latter species in the *Linnæan Transactions*, spoke of it as having opposable thumbs on the fore feet as well as on the hind. The fact is, however, that it has two thumbs, if I may be allowed a slight latitude of expression, on the anterior extremities; which, though not exactly opposable to the other fingers, are still sufficiently separated from them to have the general appearance of being so.

† Cuv. Règ. Anim., i. 175.

§ Latr. Fam. Nat., 53.

‡ F. Cuv. Dents des Mam., 125.

‡ Desm. Mam., 262—275.

|| Less. Man. des Mam., 217.

all are equally omnivorous. The Phalangers and Petaurists, indeed, display so decided a preference for live birds, as to make it probable that these constitute a main portion of their food in a state of nature; whilst the Opossums, as it is well known, thrive equally well upon fruit and vegetables as upon flesh, and feed indifferently upon either.

Nor are the modifications of dentition proper to the Opossums and Phalangers, respectively, so very different in reality as they appear to be at first sight. The Opossums have ten incisors in the upper and eight in the lower jaw, canines of the usual form and number, and seven molars throughout, of which four only are true molars, and have flat crowns with blunt tubercles, like the *Simiæ* and *Lemuridæ*: the Phalangers and Petaurists, on the contrary, have only six incisor teeth in the upper jaw, and two in the lower; the latter long and procumbent, and both separated from the true molars by a vacant space containing two insulated false molars, generally rudimentary, but sometimes developed to such an extent as to present the appearance and exercise the functions of real canines. In some species, these anomalous canines are in contiguity with the lateral incisors of the upper jaw, and are in all cases situated upon the suture connecting the maxillary and intermaxillary bones; in other instances, the inferior false molars, though rudimentary, are contiguous to the long procumbent incisors, and inclined in the same direction; so that these teeth may be considered, without impropriety, as lateral incisors in both the upper and lower jaws; a view which greatly diminishes the apparent dissimilarity between the dental systems of the Phalangers and Opossums. The molar teeth of these two genera are still more closely allied in form, being equally provided with flat crowns and blunt tubercles; only that those of the Phalangers approach more nearly to the molars of the *Simiæ*, both in form and number, than those of the Opossums. Still it is unquestionable that a considerable hiatus does exist between these two systems of dentition; and, though it might appear in some degree to be filled up by the *Dasyures*, yet more influential parts of their structure exclude that genus from the present group. At all events, whatever difference may exist in the organs of mastication, between the extreme genera which I have associated in this family, there is, as it has been already observed, but little difference of function, and the natural habits and appetites are nearly the same in all.

But there are other and very influential parts of the organic structure of these animals, in which the chain of affinities is less broken, and more easily recognised, than in their dental

systems. From the naked prehensile-tailed Opossums of South America, for instance, we have a gradual and uninterrupted transition, through the equally naked-tailed Coescos (Balántia) of the Indian Isles, to the true Phalangens; and from these to the Petaurists directly on the one hand, and, by means of the Pseudocheirs, to the Koalas on the other. Here the chain is perfectly unbroken, and the affinities of the different genera too obvious to be overlooked; and this new relation, added to their common habits, appetites, and economy, the conformity of structure displayed in their organs of sense and prehension, and the marsupial character of the whole tribe, constitutes a mass of evidence in favour of the approximation of these animals which I have here made, as strong as that which supports almost any other natural family. I propose, therefore, to distinguish the present group by the name of Didélpidae, in allusion at once to its most remarkable character, and to the principal genus of which it is composed.

(To be continued.)

ART. II. *Observations on some Species of the Genus Motacilla of Linnæus.* By JOHN GOULD, Esq., F.L.S., &c.

HAVING recently brought before the notice of the Zoological Society, at one of the scientific meetings, a few remarkable facts respecting the limited range of some of our native birds, and the strictness with which they are confined to certain localities, I hastily transmit a few additional observations, which, as they principally relate to one of the most elegant and familiar of the British birds, may, perhaps, be worthy of a place in the *Magazine of Natural History*, where they will meet the eyes of many devoted exclusively to the study of British ornithology, and, perhaps, induce a more minute investigation of the subject to which the present observations are directed.

The distinctions pointed out by me, a few years since, between the yellow wagtail of the British islands (*Motacilla flava* Ray) and the species commonly seen on the neighbouring continent, which I have named *M. neglécta*, are now, I believe, well known to most of your readers. My views respecting the separation of these species have since been confirmed by the opinions of ornithologists generally; and, although a few solitary specimens have been discovered in Britain, it must be admitted that the shores of France and Holland constitute the western boundary of the species; while, as far as my observations go, the British islands constitute as exclusively