Facts, observations, and conjectures relative to the generation of the opossum of North-America / In a letter from Professor Barton to Mons. Roume, of Paris.

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FACTS,

OBSERVATIONS, AND CONJECTURES

RELATIVE TO

THE GENERATION

OF

THE OPOSSUM

OF NORTH-AMERICA.

IN A LETTER FROM PROFESSOR BARTON

TO

MONS. ROUME, OF PARIS.

PHILADELPHIA:

PRINTED BY THOMAS AND GEORGE PALMER,

116, HIGH-STREET.

1806.

FACTS, OBSERVATIONS, &c.

DEAR SIR,

IN looking over my list of correspondents, I find that I am indebted to you a letter. I cannot think of writing a mere formal letter of apology, for my long silence; and, therefore, I shall contrive to send you something that may, at least, *amuse* you.

You and I have often talked together, and speculated, about the Generation of the Opossum of North-America (the Virginian Opossum of Pennant; my Didelphis *Woapink**). I think I informed you, when I had the

* There is not a little confusion concerning the nomenclature of the different species of Didelphis, in the writings of Linnæus, Gmelin, and other naturalists. See the articles "Didelphis marsupialis," and "D. Opossum," in the *Systema Naturæ*, as published by Linnæus himself, and by Gmelin. I have, therefore, thought

pleasure of seeing you in Philadelphia, that I had, for several years, been engaged in an extensive series of experiments and observations relative to this curious animal; this "prodigiosum animal," as Benzoe calls it*. The result of my inquiries will be communicated to the public, in two memoirs, the second (and most difficult) of which is nearly finished.

In the first of these memoirs, I shall detail, at length, the general natural history of the animal; examine its place in the system; its food; its manners; its geographical range through the continent, &c., &c. I shall,

it most adviseable to impose a new, and more determinate, name upon the animal, which has been the subject of my experiments. The specific name of *marsupialis* is not very happily applied to any particular species of Didelphis, since most of the species of this singular genus are furnished with the *marsupium*, or abdominal sack. I object to Dr. Shaw's specific name, *Virginica*, (taken from Mr. Pennant), because it implies, that our Opossum is restricted to, or especially common in, Virginia; whereas this animal is nearly equally common in every part of the United-States (east of the Missisippi), from the latitude of 40 to that of 25, and even much further south. The name *Woapink*, which I have chosen, signifies "white-face." I should, perhaps, have preferred the Tuscarora or Cheerake names, *Chera*, or *Seequa*, but that I know not the precise meaning of these appellations. I may add, in this place, that the specific name of "*dorsigera*," which Linnæus has applied to another species of didelphis (the Merian opossum of Pennant) is likewise exceptionable; for I have discovered, that my Didelphis Woapink often carries her young ones upon her back.

* Lib. ii. p. 215.

also, particularly notice the periods of the intercourse of the sexes, and shall pursue the female through the whole progress of what I call the *uterine* gestation, which comprehends a period of between twenty-two and twenty-six days.

The other memoir will commence with the second term of gestation, which I call the *marsupial* gestation. This, which dates its beginning from the first reception of the embryons from the uterus, into the marsupium, *bourse*, or pouch, is much longer than the uterine gestation, and comprehends, even in a physiological point of view, by far the most interesting era in the history of the animal. I have been so fortunate as to ascertain the size and weight of several embryons *immediately* after their exclusion from the uterus. One of them weighed only one grain! The weight of each of the six other young ones was but little more than this.

The young opossums, unformed and perfectly sightless as they are at this period, *find* their way to the teats by the power of an invariable, a *determinate* instinct, which may, surely, be considered as one of the most wonderful that is furnished to us by the science of natural history*. In this new *domicilium*, they continue

* It is not true, as has been often asserted, that the mother, with her paws, *puts* the young ones into the pouch. In my first me-

for about fifty days, that is, until they attain the size of a common house-mouse (Mus musculus), when they begin to leave the teats *occasionally*, but return to them again, until they are nearly of the size of rats (Mus rattus), at which time they seem to be no longer *necessarily* supported by the milk of the mother, but eat meat and vegetables of various kinds.

The female Didelphis Woapink sometimes produces sixteen young ones at a birth. I have actually seen this number, *attached to the teats;* but never a greater number*. When they are first excluded from the uterus, they are not only very small, but very obscurely shaped. The place of the future eyes is merely marked by two pale-bluish specks: we see no ears; in short, the animal is a mere mishaped embryon. Its mouth, which is afterwards to become very large, is, at first, a minute hole, nearly of a triangular form, and just of a sufficient size to receive the teat, to which the little creature adheres so firmly, that it is scarcely matter of surprise, that

moir, I shall show, to the satisfaction of every one, that the common opinions, on this subject, are altogether erroneous.

* I have been informed, that female opossums have been seen with more than sixteen young ones, of the *same birth*. I cannot, however, place implicit dependence upon this information, especially as I have never seen an opossum with *more* than sixteen teats.

Beverley* and other writers have asserted, that the young are originally produced in the marsupium, where they grow fast to the teats: an opinion very generally adopted, in many parts of the United-States.

It is not true, that the young cannot be detached from the mother, without the loss of blood. I can assert the contrary from many experiments, made upon embryons weighing nine grains, and upwards.——I have fully satisfied myself as to all the various circumstances, both in the structure and in the exertions of the minute animal, which enable it, while yet a mere speck, as it were, of living matter, to cling so firmly to the fountain of its support.

It is truly an interesting task to pursue the various steps in the progressive evolution of the parts of the young opossum, while in the marsupium, and especially so long as it is *necessarily* attached to the teat. It is natural to suppose, that the all-careful hand of Nature first evolves those parts, which are the most immediately important to the animal. In this supposition we are not

* "The young ones (says this writer) are bred in this false Belly, without ever being within the true one. They are form'd at the Teat, and there they grow for several weeks together into perfect Shape," &c. The History of Virginia, &c., page 136. London: 1722.

mistaken. It is a long time before the embryon has any occasion for the senses of sight and hearing: but a mouth and the powers of deglutition, as well as of breathing, are necessary to it, *immediately* after its exclusion from the uterus. Accordingly, its mouth and nostrils are open; and, for a long time, all the air which it respires is received through, and passes out of, the latter channels. The stomach seems to perform its digestive office in the embryon immediately after its first attachment to the teat*; and the wonderful little didelphis is by no means the inanimate or the passive being some physiologists and naturalists have represented it†.

The toes of the fore-feet of the new-born embryon-opossum are furnished with sharp and hard nails, or claws: but this is not the case with the hind-feet. The latter are, for some weeks, of little use to the animal; but by means of the former it is enabled to cling, most firmly, to the teat; and especially to the hair, in the

* In an opossum weighing only forty-one grains, I have seen the stomach very considerably distended with a white matter, or milk. But the milk that is afforded to the embryons, for a few days after their first reception into the marsupium, is nearly pellucid, or transparent.

† Mr. Pennant says they adhere to the teats "as if they were inanimate, till they arrive at a degree of perfection in shape, and attain sight, strength, and hair: after which they undergo a sort of second birth." Arctic Zoology. Vol. i. page 84.

marsupium, immediately around the teat. I cannot suppose, with the respectable Mr. E. Home, of London, that the viscous fluid which surrounds the body of the embryon, when it is first excluded from the uterus, is of *any* service in facilitating its attachment to the teat*.

There is one instance of the evolution of the parts of the embryon-opossum, which has greatly surprised me, and seems, with many other facts, to show, that Nature will, for a long time at least, confound our endeavours to unravel her *rete mirabile* of final causes. In an embryon-opossum, weighing only sixty or eighty grains, and entirely destitute of the senses of sight and hearing, you may observe, with the naked eye, the marsupium of the female *distinctly* formed, and even count the number of the teats.

The humane and ingenious conjecture of Buffon, concerning the preservation of human embryons, or at least fetus, far from being arrived at their last stage of growth, has received some confirmation from my experiments†:

* Speaking of the Kanguroo, Mr. Home says, "It would seem probable, that the mouth of the fœtus is originally attached to the nipple by means of the gelatinous substance contained in the uterus." Observations on the Mode of Generation of the Kanguroo.

† "Personne n'a observé la durée de la gestation de ces ani-
"maux, que nous présumons être beaucoup plus courte que dans
"les autres; & comme c'est un exemple singulier dans la Nature

but I cannot, at present, detail these experiments. I shall only observe, that an opossum-embryon, or fetus, which weighed sixty-seven grains, lived upwards of thirty hours after I had detached it from the teat. Another, which weighed one hundred and sixteen grains, lived thirty-eight hours, at which time I killed it, by putting it into spirits.

At the end of about fifty or fifty-two days, from its first reception into the pouch (the period varies somewhat, even among the different individuals of the same birth), the eyes of the young begin to open. At this period, and for a short time before, it is capable of *retaking* the teat, after having been separated from it, by the hand, or otherwise.

The growth of the young opossum, while in the marsupium, and under the immediate care of its mother, is pretty rapid. I have found, that the same embryon has increased, in weight, five hundred and thirty-one grains

"que cette exclusion précoce, nous exhortons ceux qui sont à "portée de voir des sarigues vivans dans leur pays natal, de tâcher "de savoir combien les femelles portent de temps, & combien de "temps encore après la naissance les petits restent attachés a la "mamelle avant que de s'en séparer; *cette observation, curieuse "par elle-même, pourroit devenir utile, en nous indiquant peut-être "quelque moyen de conserver la vie aux enfans venus avant le terme.*" Histoire Naturelle, &c., &c. Tom. xxi. p. 171, 172. A Paris: 1765.

in sixty days: that is, at the rate of almost nine grains daily. But, as you may readily imagine, its increment, in bulk and weight, is much greater one day than another. The animal attains to nearly its full growth in about five months; but never, I believe (in our latitudes, I mean), procreates the first year of its existence.

Possibly, I have been relating nothing but what is familiarly known to you. The following fact, however, will, I flatter myself, be entirely *new* to you; and if the relation of it should give you half of the pleasure that the discovery of it did me, I am persuaded, that this letter will not be altogether unacceptable to you.

On the 14th of May, I purchased a female opossum, with seven young ones. They were, at this time, about the size of rats, two-thirds grown; and subsisted partly upon their mother's milk, and partly upon meats and vegetables. Of course, the period of their *necessary* connection with the mother was at an end.

On the 21st of the month, that is, at the expiration of seven *complete* days, upon looking into the box which contained the animal, I found, that the mother had just excluded from her uterus, seven embryons, the smallest of which scarcely weighed one grain; another barely

two grains; and the remaining five (taken together) exactly seven grains.

You, my dear Sir, who are by no means a stranger to the enthusiasm that is inspired by the contemplation and study of Nature, will readily imagine what were my sensations on the discovery of this *unexpected* new family of didelphides. The fact, which I was so fortunate as to witness, is, in my opinion, one of the most interesting in the whole science of zoology; and, so far as I know, it has never been noticed by any naturalist but myself.

You will, I doubt not, immediately attach to this fact, its proper and full value. We are no longer, it appears to me, at a loss to comprehend the final intention of Nature in furnishing the opossum with a pouch for the reception of the tender embryons, excluded, as we have seen they are, from the uterus, in a very unformed state. Nature has determined, that the female didelphis shall produce, at least, two litters of young ones, in the course of the same year. Superfetation (I should, perhaps, in strict propriety, say *uterine* superfetation) is wholly incompatible with the established laws of the economy of the didelphis. But Nature, always provident, wastes no time. While, therefore, the first litter of young opossums are fast approaching to their adult or more indepen-

dent state, the mother accepts the ardour of the male; she is impregnated; and after a gestation which is not, I think, remarkably short, if we consider the small size of the embryons when they are excluded from the uterus*, the marsupium is destined to perform the office of a second, I was going to say a more important, uterus; just at the time when the first litter have attained such a size, that they are no longer (one or two of them, at the utmost) capable of taking refuge in her pouch; and when, being now provided with teeth, and the requisite strength, they are not *necessarily* dependent upon their mother.

But even after the second litter has been received into the marsupium, the young of the first litter, if any of them be living, still continue with the mother, who does not yet withdraw from them her useful attentions, and assistance. They are no longer, indeed, permitted to take the milk secreted by her breasts; but she sedu-

* Buffon, in the passage which I have quoted from his work, has very properly observed, that the uterine gestation of his Sarigue is very short: short, indeed, when we compare this first gestation with that of the marsupium. But I have shown, that the female didelphis carries her young *in utero* between twenty-two and twenty-six days, which is no inconsiderable period, if we reflect on the very small size (somtimes *less* than one grain) of the embryons, when they are dislodged from the uterus: for the weight of our female opossum is often, at least, eighteen pounds.

lously watches them, and even conveys them, while they cling to her back and tail, for considerable distances, through the woods, &c.

* * * * *

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But it is time to put an end to this long letter. Believe me, I shall be truly glad if it afford you any information, or amusement.

With the genuine regard of a Naturalist, I remain, my dear Sir, your friend, &c.,

BENJAMIN SMITH BARTON.

Philadelphia, August, 1805.

To Mr. Roume, Paris.