

## THE FLYING SQUIRREL\*.

THIS animal is related, by certain characters only, to the squirrel, the rat, and the *hair*, or fat squirrel. It resembles the squirrel in nothing but the largeness of its eyes, and the form of its tail, which, however, is neither so long, nor so bushy. It approaches the fat squirrel

\* Squirrel with round naked ears, full black eyes, and a lateral membrane from fore to hind-legs. The hair of the tail is long, disposed horizontally, and longest in the middle. The colour above is a brownish ash, and beneath, it is white tinged with yellow. It is much less than the common squirrel; Pennant's *Essays*, of *Quadr.* p. 293.

Buffon calls this animal *Le Palomache*, from *Polanucha*, its Russian name. It is also called *Letaga* in Muscovy; *Wiewuscha*, *lawiera*, in Poland; *Sabowyskuma* by the savages of Canada; and *Quimichpatlan* by other Indians of North America.

Mss *Psittacus* aut *Scythicus*, *scitrusre* alius, quem volantem cognominant; *Gyffer. Icon. Quadr.* p. 111. 743.

*Sciurus Americanus volans*, flying squirrel; *Rall. Synops. Quadr.* p. 215.

*Euvreill-volant*; *Catagly, Hist. Nat. de la Caroline, tom. ii.* p. 76.

*Sciurus volans*; *Seba, vol. i. p. 67. tab. 41. fig. 3.*

*Sciurus volans*, hypochondriis prolixis volitans, cauda rotunda; *Linn. Syst. Nat. p. 88. Fenn. Succ. No. 88.*

*Sciurus* obscure cinereus aut rufescens, cute ab anticis cranibus al pollita, membrana in modum extensa, volans; *Brisson, Quadr.* p. 110. ill. No. 12, 13.

The flying squirrel; *Edwards's Hist. of Birds, part iv. p. 191. Phil. Trans. ann. 1733, p. 35. Loxford's Caroline, vol. ii. p. 76. Kalm, vol. i. p. 321. tab. 1. De Pratz, vol. ii. p. 69.*

Affipanic; *Smith's Virginia, p. 27. Taffel's Voy. p. 86. De Lart, p. 88.*

rel by the figure of its body, by the shortness and nakedness of its ears, and by the hairs on its tail, which are of the same figure and length. But it is not, like the fat squirrel, subject to be reduced to a torpid state by the action of cold. Hence the flying squirrel is neither a rat, a squirrel, nor a fat squirrel, though it participates of the nature of each of the three species.

Mr. Klein gave the first exact description of this animal in the Philosophical Transactions, 1733. It was known, however, long before that time. It is found equally in all the northern regions of the Old and New Continents\*. But it is more common in America than in Europe, where they are rare, and confined to some northern

\* In the country of the Herons, there are three kinds of squirrels. . . . The flying squirrels, called *Sabazofpanes*, are most valued. They are ash-coloured; their head is thick, and a membrane, or expansion of the skin, extends from the fore to the hind-feet, which they stretch out when about to fly. . . . The females produce three or four at a time, &c.; *Voy. du Pays des Herons, par Sagard Thedat*, p. 306.—There is another small animal, called *Apanick* by the Virginian Indians, and flying squirrel by the English, which, by extending the skin attached to its legs, in the form of wings, flies three or four hundred feet at a time; *Hist. de Nouve. Monde par Jean Leitch*, lib. iii. p. 88.—The flying squirrels are of the size of a large rat, and of a grayish white colour. They are as drowsy and indolent as the other squirrels are vigilant and active. They are called flying squirrels, because they fly from one tree to another by means of a membrane which extends, in the form of wings, when they take their little flights; *Voy. de la Floride*, tom. ii. p. 42.—The flying squirrels come from North America; but they have lately been discovered in Poland; *Edw. Hist. of Birds*, p. 191. *Cassidy, Hist. Nat. Carol.* tom. ii. p. 76.

countries, as those of Lithuania and Russia. This small animal dwells upon trees, like the squirrel. It moves about from branch to branch; and, when leaping from one tree to another considerably distant, the loose skin or membrane is stretched forward by the fore-feet, and backward by the hind-feet. The skin being thus stretched, and drawn out laterally above an inch, augments the surface of the body, without increasing its quantity of matter, and, of course, retards so much the acceleration of the fall, that, by a single leap, the creature is enabled to sail to a considerable distance. This motion has no resemblance to the flying of birds, or the fluttering of bats, both of which are performed by striking the air with repeated vibrations. It is only a simple leap, depending on a single impulse: The motion produced by that impulse is prolonged, because the animal's body is rendered specifically lighter, is more powerfully resisted by the air, and, consequently, falls more slowly. The expansion of the skin from foot to foot is peculiar to the flying squirrel; and this character is sufficient to distinguish it from all other squirrels, rats, and dormice. But the most remarkable peculiarities of Nature are seldom confined to a single species. In the same genus, there is another animal with a similar skin, which extends not only from foot to foot, but from the head to the tail. This animal, a figure and description

scription of which is given by Seba\* under the name of the *Virginian flying squirrel*, seems to differ so greatly from our flying squirrel, as to constitute a distinct species. We cannot, however, determine the nature of this animal; it may exist, and be of a different species from our flying squirrel. But it may be a simple variety only, or perhaps an accidental or monstrous production; for it is mentioned by no traveller or naturalist. Seba is the only person who has seen it in the cabinet of *Vincent*. I am always suspicious of descriptions made in cabinets; for the animals in these repositories are often manufactured in such a manner as to render their appearance most singular.

We have kept the flying squirrel a long time in a living state. It has been pointed out by many travellers. It is mentioned by Sagard Theodat †, Jean de Laet ‡, Fernandes §, La Hontan ¶, Denys ¶, Catesby,

\* Seba, vol. I. p. 72. tab. 44. fig. 3.

† Voyage au Pays des Herons, p. 305.

‡ Hist. du Nouveau Monde, p. 88.

§ *Quinchaspian, seu mus volans, fides pile nigroque premissa tegitur, qui prope brachia et crura est prolatus, ac parcaurum alarum ferunt.* . . . Est autem ceteris minor, parvus et murice castus, magnis artibus, &c.; Fernand. Hist. Nov. Hisp. p. 9. But this author is wrong when he says, that the long hair serve the animal for wings; for it is unquestionably the prolongation of the skin which answers this purpose.

¶ Voyage de la Hontan, tom. II. p. 42.

¶ The hair of the flying squirrels is blacker than in the French squirrels. Their wings extend from the fore to the hind-feet, are about two inches broad, very thin, and covered with fine down.

Catesby\*, Dumon†, Le Page de Pratz‡, &c.; and good descriptions and figures of it are given by Klein, Seba, and Edwards. Our own observations, with regard to this animal, correspond very well with what these authors relate. It is much smaller than the squirrel. The one in our possession weighed two ounces only, which is nearly the weight of a common bat; but the squirrel weighs eight or nine ounces. Some of them, however, are larger. We have a skin of a flying squirrel, which, from its dimensions, must have belonged to a larger animal than the ordinary kind.

The membrane, or expansion of the skin, which unites the fore and hind-legs of the flying squirrel, and supports it in the air, makes it approach to the bat. It also resembles the bat in its natural disposition; for it reposes and sleeps

down. Their flight seldom exceeds thirty or forty paces; but, if they fly from tree to tree, double these distances will be necessary; *Describe. Gog. de Amerique Septentr. tom. II. p. 331.*

\* Hist. Nat. de la Caroline, p. 76.

† In Louisiana, two species of squirrels are very common; the one is entirely similar to those of France, the other has a little more of the ash-colour, and between the two fore-feet there is a membrane, by means of which it springs from one tree to another at considerable distances; *Mém. sur la Louisiane, p. 81.*

‡ The flying squirrels have received their denomination from their faculty of leaping from one tree to another, at the distance of above twenty-five or thirty feet. Their hind-feet are connected to the fore-feet by a membrane, which supports them in the air when they leap. They seem to fly; but they sink lower down, &c.; *Hist. de la Louisiane, par M. le Page de Pratz, tom. II. p. 58.*

during the day, and resumes its activity in the evening. It is easily tamed; but it is subject to become enraged, and must be kept in a cage, or restrained by a small chain. Flying squirrels are fed with bread, fruits, and seeds. They are particularly fond of the buds and young shoots of the pine and birch trees. They search not for nuts and almonds, like the squirrels. They make a bed of leaves, in which they sleep during the whole day, and never depart from it till night, when stimulated by hunger. As they have little activity, they become an easy prey to pine-weasels, and other animals which climb trees; and, of course, the species is not numerous, though the females generally bring forth three or four young at a time.

## S U P P L E M E N T.

### The SAILING, or Great FLYING-SQUIRREL\*.

I Formerly remarked, p. 311. that there were larger flying squirrels than those of which we have

\* Le Taguan; *Eupia*.

*Sciurus Sagitta*, *hypochoeritis prolixus volitans*, *canda planopinnata lanceolata*; *Less. Syst. Nat.* p. 88.

*Sciurus petauricus*; *Pallas, Mysl. Zool.* p. 54. tab. 6.

*Sciurus maximus volans*, seu *felis volans*; *Eriof. Zool.* p. 12.

Flying cat; *Nesbitt, p.* 354.

given descriptions, and that there is, in the royal cabinet, a skin five and a half inches long, while that of the common species exceeds not four inches. But this difference is nothing, when compared to that which subsists between our flying squirrel, and the East India *taguan*, whose skin was sent from Machian to the Prince de Conde, who was so obliging as to allow me to examine it. This great flying squirrel, which is preserved in the cabinet of Chantilly, was twenty-three inches long, from the point of the nose to the extremity of the body. These animals are found not only at Machian, but in the Philippine islands, and probably in many other parts of India. The one just mentioned was taken on the Malabar coast. Its size is gigantic, when compared with the flying squirrels of Russia and America; for the latter exceeds not four and a half or five inches in length. Nevertheless, the *taguan*, or great flying squirrel, resembles the other species in figure and in the prolongation of the skin, which is perfectly similar. But, as the difference of size is so remarkable, it ought to be considered as a distinct species.

The great flying squirrel differs from the small, 1. In size, being twenty-three inches long. 2. In the length of the tail, which is twenty-one inches. Besides, the tail is not flat, like that of the common kind, but round, like that of the cat, and covered with long blackish brown hair. 3. The eyes and ears of both species are similarly situated,

given

situated, and the black whiskers are proportionally the same; but the head of the large kind is smaller in proportion to the size of its body. 4. The face is entirely black; the sides of the head, and the cheeks, are mixed with black and white hairs; on the top of the nose, and round the eyes, the hair is a mixture of black, white, and red. Behind the ears there are dark long brown hairs, which cover the sides of the neck; these are not to be found in the common kind. The top of the head, and of the whole body, as far as the tail, is sprinkled with black and white hairs, where the black predominates, because the white hairs are black at the roots, and become white near their extremities only. The under part of the body is of a dirty white colour, which extends below the belly. 5. The prolongation of the skin is covered above with dark brown hair, and below with yellowish ash-coloured hair. The legs are of a reddish black colour, and the upper part of the tail is brown. This brown shade grows gradually deeper till it becomes black at the extremity of the tail. 6. The feet of the great flying squirrel have the same number of toes as in the common kind; but those of the former are covered with black, and those of the latter with white hair. The claws are thin and hooked like those of a cat. From this resemblance, and that of the tail, the animal has received the name of the *flying cat*. The large claw of the fore-feet is five lines and a half long,

long, and the longest of the hind-feet only five lines. The figure of this animal, drawn by M. de Seve as perfectly as the state of the dried skin would permit, is here represented. We have called it *le taguan*, in consequence of the following passage in the General History of Voyages\*:

‘ In the Philippine islands, there is a species of flying cat, of the size of a hare, and of the colour of a fox, which the natives call *taguan*. It has wings like a bat, but covered with hair, which they make use of in leaping from one tree to another, at the distance of thirty palms.’

After writing this article, a work of M. de Vosmaër, containing descriptions of several quadrupeds and birds, has come to my hands. I there read with pleasure the description of the great flying squirrel, and some remarks concerning the smaller species.

M. de Vosmaër informs us, that he saw, in the possession of the Prince of Orange, two of the small flying squirrels alive; but that they did not live long.

‘ They slept,’ he says, ‘ almost the whole day. When briskly pushed, they made a small effort, as if they intended to fly; but they stole away immediately, being exceedingly timid. They are fond of heat; and, when uncovered, they quickly concealed themselves under the wool which formed their bed. Their food was

\* Hist. Gen. des Voyages, tom. x. p. 410.

‘ soaked



‘ soaked bread, fruits, &c. which they eat, like  
 ‘ the squirrels, by sitting on their posteriors, and  
 ‘ holding the food with their fore paws. At  
 ‘ the approach of night, they become more vi-  
 ‘ vacious and restless. The difference of climate  
 ‘ had unquestionably great influence on these  
 ‘ animals, which appeared to be extremely de-  
 ‘ licate\*.’

These remarks of M. de Vosmaër correspond with my own observations. I have just now one of these little animals (March 17. 1775) living in a cage, with a small box in its bottom. It continues the whole day covered with the cotton, and comes out in the night only to take food. It has a faint cry, like that of a mouse, which is never heard but when the animal is forced out from among the cotton. Though its teeth are very small, it bites severely. Its hair is extremely smooth and agreeable to the touch. There is no way of making it extend its wings, but by obliging it to fall from a height. It is so remarkably chilly, that I cannot conceive how it can defend itself from the cold in the northern climates; since in France, if not kept in a chamber, and furnished with wool or cotton to lie on, and even to wrap itself all over, it would perish in a very short time.

With regard to the taguan, or great flying squirrel, let us attend to the remarks of M. de Vosmaër: ‘ The small flying squirrel described

\* Descript. d’une Ecureuil Volant, par M. Vosmaër, p. 9.  
 ‘ by

‘ by M. de Buffon, has a great affinity to the  
 ‘ larger species. They both have similar mem-  
 ‘ branes, not for flying, but for supporting them-  
 ‘ selves in the air, when they leap from branch  
 ‘ to branch.

‘ The skin of the *great flying squirrel*, which  
 ‘ is a more proper appellation than that of the  
 ‘ *flying cat*, was sent me in a dried state. M.  
 ‘ Alamand has given a short description of this  
 ‘ animal from a female subject preserved in the  
 ‘ cabinet of the Leyden academy.

‘ Valentine first mentioned these animals, and  
 ‘ says, that they are found in the island of Gilolo, and go by the name of *flying civets*. He  
 ‘ remarks, that they have long tails like those of  
 ‘ the monkeys; that, when at rest, their wings  
 ‘ are not seen; that they are wild and timid;  
 ‘ that their head is reddish, with a mixture of  
 ‘ gray; that their wings, or rather membranes,  
 ‘ are covered on both sides with hair; that their  
 ‘ bite is so strong, that they easily escape from a  
 ‘ wooden cage in a single night; that, by some  
 ‘ people, they are called *flying monkeys*; that they  
 ‘ are also found in the island of Ternat, where  
 ‘ they were first mistaken for squirrels, only the  
 ‘ head was thinner and larger, there was gray  
 ‘ hair above the muzzle, and a black line run  
 ‘ the whole length of the back; that the ex-  
 ‘ tensible skin, which adheres to their bodies,  
 ‘ is garnished with hair, as white, on the under  
 ‘ side, as that of the belly; and that, when they  
 ‘ leap

' leap from tree to tree, they extend their membranes, and have then the appearance of being flat.'

In the work of M. l'Abbé Prevost, it is said, that this animal is found in the Philippine islands, where it is called *toguan*.

' I have seen two females, the one in the Leyden cabinet, the other in that of *M. Heisteria* at the Hague. The colour of the body was a light chestnut, deeper on the back, and the end of the tail was blackish. The difference of sex is distinguishable by six small paps, placed at equal distances, in two rows, from the breast to the belly. I have also seen two males in the Prince of Orange's cabinet. The length of the body, in Rhenish measure, was one foot five inches, and that of the tail one foot eight. The head is more pointed than that of the squirrel.

' The ears are small, pointed, and covered on the outside with short, fine, clear brown hair. Above the eyes, there are two long brownish yellow hairs; but there are none on the eyelids. On each side of the muzzle, there are long, black, rigid whiskers. The nose is naked; the teeth, like those of the squirrels, are two above and two below, of a deep yellow colour, and very long. The grinders are at the bottom of the muzzle.

' Both fore and hind-feet, especially the latter, are concealed by the membrane, which covers

' them nearly as far as the paws. The fore-feet are divided into four black toes, the two middlemost, and particularly the third, being much longer than the other two. The hind-feet are also black, and divided into five toes, four of which are of equal length; but the fifth, or innermost, is much shorter, and has the appearance of a simple appendage. The claws are large, sharp, black before, white below, and broad at the origin. The articulations of the toes are similar to those of the squirrels.

' The skin or membrane is thinnest in the middle, where it is about four inches broad on each side, and exceeds not the thickness of fine Indian paper. In other parts, it is also very thin, of a clear texture, and garnished with small chestnut hairs. Near the fore and hind-feet, it becomes thicker, and rises in the form of a bag, widest at the thighs, and growing gradually narrower towards the paws. This part is closely covered with brown and black hairs. Upon the fore-paws it appears loose, hangs down like a rag, and is covered with thick hair. The external edges of this skin are bounded with a thick selvage of black and gray hairs.

' The upper part of the head, the back, and the origin of the tail, are covered with pretty long, thick hairs, black in the under part, and

' mostly

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' mostly of a grayish white colour at the  
' summits.

' The hairs of the tail are black, more gray  
' near the body, and so disposed as to make the  
' tail appear round.

' The cheeks are of a grayish brown colour;  
' and the throat, breast, and belly, are of a clear  
' whitish gray. On the under side of the mem-  
' brane there are also gray hairs; but they are  
' very thinly scattered.'

Plate CXLII.



FLYING SQUIRREL.



PLATE CXLII



FLYING SQUIRREL

PLATE CXLIII



FLYING SQUIRREL.

*A. Hallenbeck*

Plate CXLV.



*A. Bellin sculp.*

FALING, or great FLYING SQUIRREL.

Plate CXLV.



*A. Bellin sculp.*

Great FLYING SQUIRREL.