

- Fig. 3. The same,  $\times 4$ . Showing the sac filled with spermatie coil.  
 4. Spermatophores as seen lying within the spermatheca of *A. gigas*,  $\times 8$ .  
 5. The cervicorn processes of the capreolus of *A. gigas*, var. *minor*,  $\times 20$ .  
 6. Junction of the spermatheca and oviduct in *A. gigas*,  $\times 4$ .  
 7. The amatory organ or dart-sac, cut open, exposing the dart, much enlarged.  
 8. Generative organs of *A. gigas*, var. *minor*, nat. size.

## PLATE XXVII.

- Fig. 1. Animal of *Girasia brunnea*, Godw.-Aust., from nature, nat. size.  
 2. Spirit-specimen, *G. hookeri*, Gray. View of right side, nat. size.  
 3. The same. View of left side, nat. size.  $\times$  points where muscles are attached internally.  
 4. Mantle showing lobes, respiratory and anal orifices, enlarged.  
 5. Portion of the foot, showing segmentation, of *G. shillongensis*.  
 6. Generative organs of *G. shillongensis*, G.-A., nat. size.  
 7. The ovo-testes and hermaphrodite duct to the albumen gland in *G. brunnea*,  $\times 4$ .  
 7a. Ovo-testis under higher power.  
 8. The capreolus or spermatophore of *G. shillongensis*,  $\times 4$ .  
 8a. One of its branch-like processes broken off,  $\times 20$ .  
 8b. Terminal point,  $\times 50$ .  
 9. Jaw of *A. gigas*, var. *minor*,  $\times 8$ .  
 10. Teeth of the odontophore in same species,  $\times 340$ . C=central; M=median; L=lateral.

## 2. On the Duration of Life of the Animals in the Zoological Garden at Frankfort-on-the-Main. By Director Dr. MAX SCHMIDT.

[Received March 18, 1880.]

He who has occupied himself with the rearing and keeping of animals, is well aware of the care and attention that are needful to succeed, and that, in spite of the greatest pains, he is not always free from failure. The director of a zoological garden has more occasion than other persons to make this experience. His wards, so manifold in shape, constitution, and disposition, require every moment his circumspection, precaution, and perseverance. Again and again he is compelled to devise new means of relief and expedients to preserve the feeble health and the so-easily-destroyed life of the poor creatures that come to his hands, often heavily damaged by conveyance. Many a time he would be happy to avail himself of the experience of others; but he misses sadly all literary resources; for although, in the course of the last 20 years, zoological gardens of considerable account have been established in different parts of the continent, subsidiary books and periodicals, containing communications about particulars of importance for the keeping and management of animals, are very scarce.

The Zoological Society in Frankfort-on-the-Main early conceived the importance of such publications, and for this purpose founded the professional newspaper the 'Zoological Garden,' which has arrived at



its twenty-first anniversary. In this Journal I have recorded my observations, and not only those referring to the living animal, but at the same time those respecting the symptoms of disease previous to death, and the anatomical results of the autopsy.

On the keeping of birds there exists a comparatively rich literature; and special periodicals treat of this matter.

Now it would be of great use if the age the different animals are able to arrive at could be ascertained; and in order to contribute my share of experience, I added my own knowledge to the few notices I could find in literature, and published them two years ago.

I note with satisfaction that my example has been followed by the Zoological Garden of Hamburg.

For further completing these statistics I have drawn up the following two summaries. The first contains the duration of life of the different animals in our garden, as far as it could be ascertained, while the second expresses the average amount of life-time of the individual specimens of the different classes of Mammals and Birds.

In reference to the first, I have to add that the record has been continued up to the 31st of December, 1879, and states how long the still living animals have been in our garden. It is evident that the numbers denote the real age only of those animals that were born there, while to that of the others the time they have lived before coming to our hands must be added. This difference cannot be estimated as very great, as the animals are generally acquired in their youth.

Of course it is impossible to point out the age of every single specimen we have ever possessed, but only such numbers have been chosen as are sufficient to show distinctly how long such an animal is at all able to live. No notice has been taken of exceedingly short periods of existences, as it must be presumed that adverse circumstances were the cause of them. Wherever it was feasible the time of life has been given strictly to a day. In other cases only the number of years is recorded; and there can be, at the utmost, a difference of but a few months, more or less.

Out of a greater number of statements concerning the same class, only those have been selected that show the principal variations of length of life. The numbers relating to animals that were still living on the 31st of December 1879 are marked with asterisks (\*).

The time of observation has not in all cases proved long enough for definite statements—some of the animals having been in our keeping only for a short time, while others that have lived in our Garden from its beginning are still enjoying life and health, and promise to live on for some time longer.



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
MAMMALIA.				
QUADRUMANA.				
Chimpanzee ( <i>Anthropopithecus troglodytes</i> ).	....		5	2
			5	28
		1	5	20
Orang-Outang ( <i>Simia satyrus</i> ) .....	....		3	4
		*1	10	4
Grivet Monkey ( <i>Cercopithecus griseo-viridis</i> ).	....	1	11	3
Patas Monkey ( <i>Cercopithecus ruber</i> ) ..	....	1	0	5
		1	0	27
		2	1	20
		2	2	20
Mona Monkey ( <i>Cercopithecus mona</i> ) ..	....	1	9	5
			3	21
		1	7	11
White-collared Mangabey ( <i>Cercocebus collaris</i> ).	....	2	1	13
		3	0	27
		3	7	29
		1	0	25
Sooty Mangabey ( <i>Cercocebus fuliginosus</i> )	....	7	2	11
		2	3	11
		1	2	10
		*1	6	7
Bonnet-Monkey ( <i>Macacus radiatus</i> ) ..	....	*6	6	13
		*5	6	17
		*5	3	19
		*1	7	12
		1	8	23
		1	3	15
Macaque Monkey ( <i>Macacus cynomolgus</i> )	....	13	9	16
		12	7	14
		3	11	5
		4	3	6



Names of the animals.	Duration of life.			
	Approximative.	Ascertained.		
	years.	years.	months.	days.
Pig-tailed Monkey ( <i>Macacus nemestrinus</i> ).	....	1	5	10
		2	5	5
Rhesus Monkey ( <i>Macacus erythræus</i> )	....	5	11	18
		3	5	27
		4	4	25
Wanderoo Monkey ( <i>Macacus silenus</i> )..	....	8	10	27
Ashy-black Macaque .....	....	1	3	29
		1	6	19
Barbary Ape ( <i>Macacus inuus</i> ) .....	....	3	4	5
Black Ape ( <i>Cynopithecus niger</i> ) .....	....	1	0	22
		1	2	23
		3	6	6
Arabian Baboon ( <i>Cynocephalus hamadryas</i> ).	....	13	8	22
Anubis Baboon ( <i>Cynocephalus anubis</i> )	....	13	5	17
		4	9	18
Yellow Baboon ( <i>Cynocephalus babuin</i> )	....	*9	7	16
Guinea Baboon ( <i>Cynocephalus sphinx</i> )	....	*16	7	0
Drill ( <i>Cynocephalus leucophæus</i> ) ....	....	14	0	19
		3	10	11
		3	10	17
Black-faced Spider Monkey ( <i>Ateles ater</i> )	....	1	9	12
Black-fronted Spider Monkey ( <i>Eriodes frontatus</i> ).	....	3	5	16
		*1	3	2
Capuchin ( <i>Cebus capucinus</i> ) .....	7, 10, or 11	4	11	22
		4	0	7
		5	3	4
		6	4	16



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
		years.	months.	days.
Three-banded Douroucouli ( <i>Nyctipithecus trivirgatus</i> ).	....	3	0	2
Squirrel Monkey ( <i>Chrysothrix sciurea</i> )	....	*1	3	23
Common Marmoset ( <i>Hapale jacchus</i> )	....	1	1	21
Ruffed Lemur ( <i>Lemur varius</i> ).....	....	*3	7	6
Mongoose Lemur ( <i>Lemur mongoz</i> ) ....	....	1 3	3 10	4 1
Black-headed Lemur ( <i>Lemur brunneus</i> )	....	3 4	11 0	25 26
White-fronted Lemur ( <i>Lemur albifrons</i> )	....	*2	1	26
Red-bearded Lemur ( <i>Lemur xanthomystax</i> ).	....	*4	3	21
Galago ( <i>Otolicnus senegalensis</i> ) .....	....	*2	2	8
CHIROPTERA.				
Indian Fruit-Bat ( <i>Pteropus medius</i> ) ..	....	1	6	5
CARNIVORA.				
Lion ( <i>Felis leo</i> ) .....	....	*10 8	1 4	7 27
Tiger ( <i>Felis tigris</i> ) .. .....	....	*8	0	4
Leopard ( <i>Felis pardus</i> ) .....	....	11 4 5	4 5 3	29 26 26
Angora Cat .....	....	8 8	3 7	9 23
Striped Hyæna ( <i>Hyæna striata</i> ).....	....	*7	9	9



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Common Genet ( <i>Genetta vulgaris</i> ) . . . .	....	4	11	12
Common Paradoxure ( <i>Paradoxurus typus</i> ).	....	4	4	3
Egyptian Ichneumon ( <i>Herpestes ichneumon</i> ).	....	3	5	3
Common Wolf ( <i>Canis lupus</i> ) . . . . .	....	12	2	27
Common Badger ( <i>Meles taxus</i> ) . . . . .	....	2	11	9
Common Otter ( <i>Lutra vulgaris</i> ) . . . . .	....	*5	2	10
		*4	8	8
		8	5	23
Raccoon ( <i>Procyon lotor</i> ) . . . . .	....	4	11	27
		5	4	29
White-nosed Coati ( <i>Nasua narica</i> ) . . . .	5			
Polar Bear ( <i>Ursus maritimus</i> ) . . . . .	....	18	0	1
Brown Bear ( <i>Ursus arctos</i> ) . . . . .	....	*21	4	25
		*16	3	25
Syrian Bear ( <i>Ursus syriacus</i> ) . . . . .	....	7	0	18
		7	8	7
Common Seal ( <i>Phoca vitulina</i> ) . . . . .	....	2	5	2
RODENTIA.				
Common Squirrel ( <i>Sciurus vulgaris</i> ) . .	....	5	4	3
Grey Squirrel ( <i>Sciurus cinereus</i> ) . . . . .	....	*5	9	10
		3	6	23
Hudson's-Bay Squirrel ( <i>Sciurus hudsonius</i> ).	3½	4	3	2



Names of the animals.	Duration of life.			
	Approximative.	Ascertained.		
	years.	years.	months.	days.
Vulpine Squirrel ( <i>Sciurus vulpinus</i> ) ..	.....	2	10	13
		2	11	18
		5	2	1
Red-bellied Squirrel ( <i>Sciurus variegatus</i> ) ....		3	4	29
American Flying Squirrel ( <i>Sciuropterus volucella</i> ). ....		1	1	21
Japanese Flying Squirrel ( <i>Pteromys momoga</i> ). ....		*4	1	8
Chipping Squirrel ( <i>Tamias striatus</i> ) ..	4			
European Souslik ( <i>Spermophilus citillus</i> ) ....		3	0	21
Alpine Marmot ( <i>Arctomys marmotta</i> ) ..	7	3	6	13
		6	8	18
		*6	9	20
		7	5	12
European Beaver ( <i>Castor fiber</i> ) .....	.....	*6	1	28
Crested Porcupine ( <i>Hystrix cristata</i> ) ..	.....	6	5	8
Agouti ( <i>Dasyprocta aguti</i> ) .....	8			
MARSUPIALIA.				
Bennett's Wallaby ( <i>Halmaturus bennetti</i> ). ....	4	*5	3	15
Rat-Kangaroo ( <i>Hypsiprymnus murinus</i> )	6-7			
Rabbit-eared Perameles ( <i>Perameles lagotis</i> ). ....		4	0	22
		7	2	0
Common Wombat ( <i>Phascolomys wombat</i> ) ....		15	9	14
EDENTATA.				
Two-toed Sloth ( <i>Cholopus didactylus</i> ) ..	.....	4	5	29



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
<b>EQUIDÆ.</b>				
Burchell's Zebra ( <i>Equus burchellii</i> ) . . . . .	....	13	16	0
		*15	7	19
		*9	7	21
		*6	8	22
<i>Equus caballus nanus</i> from Iceland . . . . .	....	*12	6	23
		*10	6	5
<b>PACHYDERMATA.</b>				
Indian Elephant ( <i>Elephas indicus</i> ) . . . . .	....	*16	6	0
African Elephant ( <i>Elephas africanus</i> ) . . . . .	....	*5	4	4
Wild Swine ( <i>Sus scrofa</i> ) . . . . .	....	9	0	13
		4	10	5
Masked Pig ( <i>Sus pliciceps</i> ) . . . . .	....	5	6	7
		6	9	26
<b>RUMINANTIA.</b>				
Common Camel ( <i>Camelus dromedarius</i> ) . . . . .	....	16	5	12
Bactrian Camel ( <i>Camelus bactrianus</i> ) . . . . .	....	15	9	19
Llama ( <i>Lama peruana</i> ) . . . . .	10	7	2	5
Reindeer ( <i>Rangifer tarandus</i> ) . . . . .	5-6	*4	3	0
Indian Muntjac ( <i>Cervulus muntjac</i> ) . . . . .	....	4	2	22
Fallow Deer ( <i>Cervus dama</i> ) . . . . .	....	*15	6	14
		*11	6	6
		*11	5	28
		*8	6	24
		*6	5	3
		14	10	10
		13	0	0
		11	8	15
Red Deer ( <i>Cervus elaphus</i> ) . . . . .	12			



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Wapiti Deer ( <i>Cervus canadensis</i> ).....	.....	10	8	0
		*7	5	2
		*5	6	24
Sambur Deer ( <i>Cervus aristotelis</i> ) ....	.....	17	1	25
Hog Dear ( <i>Cervus porcinus</i> ) .....	10-11	7	3	7
		*5	8	12
Axis Deer ( <i>Cervus axis</i> ) .....	.....	10	0	1
Alpine Chamois ( <i>Rupicapra tragus</i> ) ..	7	9	7	29
Bubaline Antelope ( <i>Alcelaphus bubalis</i> ) ....	.....	16	8	29
		*12	10	0
Duyker-bock ( <i>Cephalophus mergens</i> ) ..	.....	2	6	24
		7	5	5
Dama Gazelle ( <i>Gazella dama</i> ).....	.....	3	4	8
Gazelle ( <i>Gazella dorcas</i> ) .....	5			
Leucoryx ( <i>Oryx leucoryx</i> ) .....	.....	16	8	14
Nylghaie ( <i>Boselaphus pictus</i> ) .....	.....	8	0	11
		12	2	24
Eland ( <i>Oreos canna</i> ) .....	.....	15	0	4
		*11	2	10
<i>Antilope redunca</i> .....	.....	8	4	3
Mouflon ( <i>Ovis musimon</i> ) .....	.....	*12	9	3
		*9	8	21
		*7	8	1
		*6	8	3
		13	9	19
<i>Ovis strepsiceros</i> .....	.....	*7	9	11
		*5	8	15
		10	4	24
		11	10	16



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
		years.	months.	days.
<i>Ovis campestris</i> .....	.....	*13	8	10
		*9	9	0
		*9	8	20
		*6	9	10
African Domestic Sheep ( <i>Ovis aries</i> ) ..	.....	13	3	2
American Bison ( <i>Bison americanus</i> ) ..	.....	9	6	5
		8	8	19
		*6	9	27
Yak ( <i>Poephagus grunniens</i> ) .....	.....	14	9	12
		15	3	8
		12	8	24
AVES.				
ACCIPITRES.				
Common Buzzard ( <i>Buteo vulgaris</i> )....	.....	3	5	28
Bateleur Eagle ( <i>Helotarsus ecaudatus</i> )	7			
White-headed Sea-Eagle ( <i>Haliaetus leucocephalus</i> ).	.....	13	7	11
Golden Eagle ( <i>Aquila chrysaetos</i> ) ....	.....	13	11	21
		10	2	0
Common Kestrel ( <i>Tinnunculus alaudarius</i> ).	.....	6	7	4
Cinereous Vulture ( <i>Vultur monachus</i> )..	.....	*15	4	22
Sociable Vulture ( <i>Vultur auricularis</i> ) ..	.....	*17	4	4
Griffon Vulture ( <i>Gyps fulvus</i> ) .....	.....	14	9	28
		*17	4	6
Black Vulture ( <i>Cathartes atratus</i> ) ....	.....	*19	3	23
Condor Vulture ( <i>Sarcorhamphus gryphus</i> ).	.....	20	0	24



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
STRIGES.				
Wood-Owl ( <i>Syrnium aluco</i> ) . . . . .	....	13 9	2 11	19 2
Great Eagle-Owl ( <i>Bubo maximus</i> ) . . . .	12			
Virginian Eagle-Owl ( <i>Bubo virginianus</i> ) . . . .	....	16	2	18
Naked-footed Owlet ( <i>Athene noctua</i> ) . . . . .	....	6	8	13
PSITTACI.				
Rose-crested Cockatoo ( <i>Cacatua moluccensis</i> ). . . . .	....	*20 *10 18	5 2 0	16 28 18
Greater White-crested Cockatoo ( <i>Cacatua cristata</i> ). . . . .	....	*9	9	6
Greater Sulphur-crested Cockatoo ( <i>Cacatua galerita</i> ). . . . .	....	*17 *15 *9	9 2 6	4 26 28
Leadbeater's Cockatoo ( <i>Cacatua leadbeateri</i> ). . . . .	....	*17	9	23
Slender-billed Cockatoo ( <i>Licmetis tenuirostris</i> ). . . . .	....	*17	8	13
Ganga Cockatoo ( <i>Callocephalon galeatum</i> ). . . . .	....	9	10	0
Great Black Cockatoo ( <i>Microglossa aterrima</i> ). . . . .	...	2	7	14
Alexandrine Parrakeet ( <i>Palæornis alexandri</i> ). . . . .	....	13	2	0
Ring-necked Parrakeet ( <i>Palæornis torquatus</i> ). . . . .	....	16 *17	6 6	23 21



Names of the animals.	Duration of life.			
	Approximative.	Ascertained.		
	years.	years.	months.	days.
<i>Palæornis pondicerianus</i> . . . . .	....	4	10	15
Müller's Parrakeet ( <i>Tanygnathus muel-leri</i> ).	10			
Pennant's Broadtail ( <i>Platycercus pennanti</i> ).	4	3	1	1
Rose-Hill Broadtail ( <i>Platycercus eximius</i> ).	....	2 3	10 1	7 20
Pale-headed Broadtail ( <i>Platycercus palidiceps</i> ).	....	3	7	10
Bauer's Broadtail ( <i>Platycercus zonarius</i> )	....	3 10	8 5	10 13
Beautiful Parrakeet ( <i>Psephotus pulcherrimus</i> ).	....	8	5	0
Grey-headed Love-bird ( <i>Psittacula cana</i> ).	....	8	10	0
Red-and-blue Macaw ( <i>Ara macao</i> ) ....	....	*21 *14	6 7	0 0
Red-and-yellow Macaw ( <i>Ara chloroptera</i> ).	....	*17	5	9
Blue-and-yellow Macaw ( <i>Ara ararauna</i> )	....	*20	3	13
Illiger's Macaw ( <i>Ara maracana</i> ) . . . . .	....	14	11	23
Carolina Conure ( <i>Conurus carolinensis</i> )	....	*10 12	5 3	23 14
Mexican Conure ( <i>Conurus holochlorus</i> )	....	3	10	17
Golden Conure ( <i>Conurus luteus</i> ) . . . . .	....	9	11	17
Grey-breasted Parrakeet ( <i>Bolborhynchus monachus</i> ).	7	5	4	22



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
White-fronted Amazon ( <i>Chrysotis leucocephala</i> ).	....	*5	5	19
Red-fronted Amazon ( <i>Chrysotis vittata</i> )	....	8	7	21
PASSERES.				
Song-Thrush ( <i>Turdus musicus</i> ) .....	....	12	8	29
Fieldfare ( <i>Turdus pilaris</i> ) .....	....	*5	3	0
Rock-Thrush ( <i>Monticola saxatilis</i> )....	....	*6	2	8
Common Bluebird ( <i>Sialia wilsoni</i> ) ....	....	*3	6	8
Yellow-bellied Liothrix ( <i>Liothrix luteus</i> ).	....	*3	8	10
<i>Crithagra brasiliensis</i> .....	7-8			
Red-shouldered Starling ( <i>Agelæus phæniceus</i> ).	....	5	3	10
Green Glossy Starling ( <i>Lamprocolius chalybeus</i> ).	....	7	9	23
Long-tailed Glossy Starling ( <i>Lamprolornis æneus</i> ).	....	1 5	9 8	4 5
Common Mynah ( <i>Acridotheres tristis</i> )	....	*5	5	19
Black Troupial ( <i>Quiscalus lugubris</i> ) ..	....	*4	7	12
Common Starling ( <i>Sturnus vulgaris</i> ) ..	....	*9 *7 *6	5 7 3	12 5 4
Sardinian Starling ( <i>Sturnus unicolor</i> )..	....	9	7	3
Rose-coloured Pastor ( <i>Pastor roseus</i> ) ..	....	2 *2	7 6	8 7



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Raven ( <i>Corvus corax</i> ) . . . . .	....	7	10	24
Common Jay ( <i>Garrulus glandarius</i> ) ..	....	*4	6	23
		5	11	0
Blue-bearded Magpie ( <i>Cyanocorax cyanopogon</i> ).	....	*3	4	0
		4	2	25
Blue Jay ( <i>Cyanocitta cristata</i> ) . . . . .	....	4	9	0
		8	2	22
		6	7	19
Wandering Tree-Pie ( <i>Dendrocitta vagabunda</i> ).	....	2	4	27
Chinese Tree-Pie ( <i>Dendrocitta sinensis</i> )	....	*3	4	25
Alpine Chough ( <i>Pyrrhocorax alpinus</i> )	....	*6	9	8
		3	6	5
White-backed Piping Crow ( <i>Gymnorhina leuconota</i> ).	....	*4	8	6
Black-and-yellow Tanager ( <i>Euphonia chlorotica</i> ).	....	*2	3	15
Archbishop Tanager ( <i>Tanagra ornata</i> )	....	*2	0	27
Brazilian Tanager ( <i>Ramphocælus brasilius</i> ).	....	*2	4	7
		*2	7	15
		*2	2	16
Red Tanager ( <i>Pyrrhura rubra</i> ) . . . . .	....	*3	6	8
		3	4	4
Black-headed Finch ( <i>Munia malacca</i> )	10			
Shining Weaverbird ( <i>Hypocheranus nitens</i> ).	5			
Red-faced Weaverbird ( <i>Foudia erythrops</i> ).	....	9	0	27



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Red-beaked Weaverbird ( <i>Quelea sanguirostris</i> ).	5			
Masked Weaverbird ( <i>Hyphantornis personata</i> ).	....	8	0	4
		8	3	14
		9	0	10
Black-bellied Weaverbird ( <i>Euplectes afer</i> )	6			
Red-headed Cardinal ( <i>Paroaria dominicana</i> ).	....	*14	8	0
		13	0	9
Red-crested Cardinal ( <i>Paroaria cucullata</i> ).	....	*2	3	20
Black-crested Cardinal ( <i>Gubernatrix cristatella</i> ).	....	10	2	5
		8	2	0
Cardinal Grosbeak ( <i>Cardinalis virginianus</i> ).	....	2	5	1
		*3	8	0
		*4	0	13
Laughing Kingfisher ( <i>Dacelo gigantea</i> ).	....	6	2	17
		9	10	17
		*4	8	6
Red-billed Hornbill ( <i>Toccos erythrorhynchus</i> ).	....	*7	8	24
Ground-Hornbill ( <i>Bucorvus abyssinicus</i> )	....	*5	6	24
Violaceous Plain-tail-cutter ( <i>Musophaga violacea</i> ).	....	1	0	14
Buffon's Touracou ( <i>Corythaix buffoni</i> )	2			
Senegal Touracou ( <i>Corythaix persa</i> ) ..	....	1	5	28
		*3	4	25
		2	8	7
Ariel Toucan ( <i>Ramphastos ariel</i> ) ....	....	5	2	18
		2	8	11



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
		years.	months.	days.
Green-billed Toucan ( <i>Ramphastos di-colorus</i> ).	....	11 13	2 10	3 21
<i>Ramphastos piscivorus</i> .....	....	3	2	25
Banded Aracari ( <i>Pteroglossus torquatus</i> )	....	2	10	24
COLUMBÆ.				
White-crowned Pigeon ( <i>Columba leucocephala</i> ).	2			
Passenger Pigeon ( <i>Ectopistes migratorius</i> ).	....	3 *6	3 6	25 19
Carolina Dove ( <i>Zenaidura carolinensis</i> )	....	5	3	7
Barred Dove ( <i>Geopelia striata</i> ) .....	....	4 4	1 2	13 20
Passerine Ground-Dove ( <i>Chamæpelias passerina</i> ).	9			
Talpacoti Ground-Dove ( <i>Chamæpelias talpacoti</i> ).	....	7	8	11
Bronze-winged Pigeon ( <i>Phaps chalcoptera</i> ).	....	15	3	25
Blue-headed Pigeon ( <i>Sturnænas cyanocephala</i> ).	....	2	0	5
GALLINÆ.				
Pallas's Sand-Grouse ( <i>Syrhaptas paradoxus</i> ).	....	2 3	3 4	21 17
Black Grouse ( <i>Tetrao tetrix</i> ) .....	....	*3 *2	6 3	0 4
Capercaillie ( <i>Tetrao urogallus</i> ) .....	....	1 *2	9 8	5 9



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Common Quail ( <i>Coturnix communis</i> ) ..	5			
Sonnerat's Jungle-Fowl ( <i>Gallus sonnerati</i> ).	....	4	3	21
Globose Curassow ( <i>Crax globicera</i> ) ..	....	*5	8	5
Razor-billed Curassow ( <i>Mitua tuberosa</i> ).	....	5 7	4 6	17 11
Brush-Turkey ( <i>Talegalla lathamii</i> )....	....	*6 7	10 3	8 18
STRUTHIONES.				
Ostrich ( <i>Struthio camelus</i> ) .....	...	7 2	8 9	6 9
Common Rhea ( <i>Rhea americana</i> ) ....	....	4 7 4 4	11 8 10 5	14 5 14 26
Common Cassowary ( <i>Casuarus galeatus</i> ) ....	....	6	6	0
Emu ( <i>Dromæus novæ hollandiæ</i> ) ....	....	15 16 7 *8	1 5 10 7	0 6 12 14
GRALLÆ.				
Hyacinthine Porphyrio ( <i>Porphyrio cæruleus</i> ).	....	*4	1	27
Grey-headed Porphyrio ( <i>Porphyrio poliocephalus</i> ).	....	*4	1	24
Sarus Crane ( <i>Grus antigone</i> ) .....	....	*5	9	9
White American Crane ( <i>Grus americana</i> )	....	*8	8	3
Demoiselle Crane ( <i>Anthropoides virgo</i> )	....	13	2	25



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
		years.	months.	days.
Balearic Crowned Crane ( <i>Balearica pavonina</i> ).	14			
Cape Crowned Crane ( <i>Balearica regulorum</i> ).	....	*5	3	14
Oyster-catcher ( <i>Hæmatopus ostralegus</i> ).	....	*5	5	9
		*5	3	18
Black-tailed Godwit ( <i>Limosa melanura</i> )	5			
Ruff ( <i>Machetes pugnax</i> ) .....	5			
European Avocet ( <i>Recurvirostra avocetta</i> ).	3			
Little Egret ( <i>Ardea garzetta</i> ) .....	....	*6	9	23
		*4	2	13
		6	1	29
		3	5	16
Black Stork ( <i>Ciconia nigra</i> ) .....	....	*4	5	6
White Stork ( <i>Ciconia alba</i> ) .....	....	*6	5	10
		*3	8	20
Marabou Stork ( <i>Leptoptilus crumeniferus</i> ).	....	*12	4	3
Saddle-billed Stork ( <i>Xenorhynchus senegalensis</i> ).	....	3	4	10
Common Spoonbill ( <i>Platalea leucorodia</i> ).	....	*5	4	26
		*2	6	13
Sacred Ibis ( <i>Ibis æthiopica</i> ) .....	....	3	6	16
Scarlet Ibis ( <i>Eudocimus ruber</i> ) .....	....	3	2	25
		*10	5	14
NATATOIRES.				
Spur-winged Goose ( <i>Plectropterus gambensis</i> ).	....	8	9	10
		9	8	26
		9	9	11



Names of the animals.	Duration of life.			
	Approximative.	Ascertained.		
	years.	years.	months.	days.
Egyptian Goose ( <i>Chenalopex ægyptiaca</i> ).	....	16	6	12
		16	8	17
		17	0	0
		11	4	0
Cereopsis Goose ( <i>Cereopsis novæ hollandiæ</i> ).	....	2	9	7
		2	9	12
		2	10	4
		*3	7	4
Pink-footed Goose ( <i>Anser brachyrhynchus</i> ).	....	*15	9	4
Bean-Goose ( <i>Anser segetum</i> ) .....	....	*19	0	16
		*18	11	6
Little Goose ( <i>Anser erythropus</i> ).....	18			
Bernicle Goose ( <i>Bernicla leucopsis</i> ) ..	12	*5	4	22
Canada Goose ( <i>Bernicla canadensis</i> ..	10	*5	1	6
Brant Goose ( <i>Bernicla brenta</i> ) .....	....	*7	8	19
		*5	11	16
Common Swan ( <i>Cygnus olor</i> ) .....	....	*15	7	11
		10	1	2
Black Swan ( <i>Cygnus atratus</i> ).....	....	15	9	25
		8	6	19
		*6	7	6
		*5	3	15
Common Sheldrake ( <i>Tadorna vulpanser</i> ).	....	*6	6	9
		*5	4	11
Ruddy Sheldrake ( <i>Tadorna rutila</i> )....	....	*6	10	8
		*6	7	13
Common Teal ( <i>Querquedula crecca</i> ) ..	....	*5	10	20
Garganey Teal ( <i>Querquedula circia</i> ) ..	....	*5	11	5



Names of the animals.	Duration of life.			
	Approximate.	Ascertained.		
	years.	years.	months.	days.
Common Pintail ( <i>Dafila acuta</i> ) . . . . .	....	*17	6	9
		*16	8	15
Bahama Duck ( <i>Dafila bahamensis</i> ) . . . .	5			
Wigeon ( <i>Mareca penelope</i> ) . . . . .	....	*19	11	6
		*18	7	0
		*12	7	25
Summer Duck ( <i>Aix sponsa</i> ) . . . . .	....	3	9	20
		*3	7	8
Tufted Duck ( <i>Fuligula cristata</i> ) . . . . .	....	*18	7	0
		*17	8	0
Red-headed Pochard ( <i>Fuligula ferina</i> ) . . . .	....	*12	6	2
		*5	10	12
Common Cormorant ( <i>Phalacrocorax carbo</i> ).	....	12	6	14
		*6	4	16
White Pelican ( <i>Pelecanus onocrotalus</i> ) . . . .	....	16	6	6
Crested Pelican ( <i>Pelecanus crispus</i> ) ..	....	5	8	27
Herring-Gull ( <i>Larus argentatus</i> ) . . . .	....	*11	7	13
Common Gull ( <i>Larus canus</i> ) . . . . .	....	13	6	25
		*5	11	7
Greater Black-backed Gull ( <i>Larus marinus</i> ).	....	*21	3	15
Black-headed Gull ( <i>Larus ridibundus</i> )	17			

The 31st of December last has been taken as latest date for the following calculation of the average lifetime of the animals in our zoological garden. As the duration of life could be determined with certainty for by far the greater part of the specimens, we simply disregarded such as were entirely unsuited for calculation. Referring to these latter, it should be mentioned that the difference between the entire number of Rodentia and the number of specimens of the same



order the lifetime of which is ascertained follows for the impossibility of giving definite dates for the duration of life of Rabbits, Guinea-pigs, and some other small species of the same kind.

Sheep and Goats cause the differences between the numbers respecting Ruminantia.

We were also obliged to leave out of consideration several sorts of Parrots—namely, *Nymphicus*, *Bolborhynchus*, and others. Of Fowls and Pigeons only the wild species have been selected for the register.

The results are as follows:—

205 Mammals: total of age, 829 years 11 months 27 days; mean duration of life per head, 3 years 9 months 26 days.

784 Birds: total of age, 3549 years — months 7 days; mean duration per head, 4 years 4 months 23 days. Together, 989 animals, 4379 years — months 4 days; mean duration of life per head, 4 years 5 months 6 days.

The mean duration of life of the animals which died in the year 1879 is 2 years 4 months 27 days. This, so much shorter time than that mentioned before, will be easily explained by the fact that the mortality is much greater in the first days after the arrival of animals in a zoological garden.

I am certain that similar statistics would give very useful hints to persons interested in such matters; and I wish that this branch of knowledge were cultivated more specially than it has been heretofore.

*Specification of Average Lifetime.*

	Number of animals at hand Jan. 1, 1880.	Number of animals the age of which is ascertained.	Total of age.			Mean age of individuals.		
			yrs.	mths.	days	yrs.	mths.	days
MAMMALIA.								
Quadrumana.....	36	36	88	0	22	2	5	12
Chiroptera.....	1	1	0	2	29	0	2	29
Carnivora .....	42	42	154	7	23	3	8	8
Rodentia .....	60	8	24	10	1	3	1	7
Marsupialia .....	6	6	19	6	16	3	3	3
Equidæ .....	10	10	88	8	2	8	10	16
Pachydermata .....	7	7	31	2	23	4	5	18
Ruminantia .....	103	95	418	9	1	4	4	28
AVES.								
Accipitres .....	33	33	149	1	26	4	6	9
Striges .....	5	5	8	4	16	1	8	6
Psittaci .....	108	54	347	7	23	6	5	6
Passeres.....	260	233	492	4	10	2	1	11
Columbæ .....	86	17	47	9	17	2	9	26
Gallinæ .....	83	22	49	0	18	2	2	23
Struthionæ .....	1	1	8	7	14	8	7	14
Grallæ .....	84	64	328	0	5	5	1	15
Natatores .....	389	355	2121	11	28	5	11	26





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