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FORTY-EIGHTH ANNUAL REPORT  
OF THE  
BOARD OF DIRECTORS  
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OF THE  
ZOOLOGICAL SOCIETY,  
CAMBRIDGE, MASS.  
OF PHILADELPHIA.

(INCORPORATED MARCH 21ST, 1859.)

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READ AT THE ANNUAL MEETING OF THE MEMBERS AND LOAN  
HOLDERS OF THE SOCIETY.

APRIL 22d, 1920.

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PHILADELPHIA:  
PRESS OF ALLEN, LANE & SCOTT  
1211-1213 Clover Street;  
1920.

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1920.





THE  
ZOOLOGICAL SOCIETY OF PHILADELPHIA.

(FAIRMOUNT PARK.)

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BOARD OF DIRECTORS.

ELECTED BY THE SOCIETY.

CHARLES B. PENROSE, M.D.,  
*President.*

CHRISTIAN C. FEBIGER,  
*Vice-President.*

CHARLES M. LEA,  
THOMAS DEWITT CUYLER,  
OWEN WISTER,  
D. M. BARRINGER,

W. B. CADWALADER, M.D.,  
*Secretary.*

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HENRY PRATT McKEAN,  
CLEMENT B. NEWBOLD,  
CHARLES S. W. PACKARD,  
*Treasurer.*

GEORGE L. HARRISON JR.,  
ALFRED GRATZ,  
RICHARD H. HARTE, M.D.  
WILLIAM L. ABBOTT, M.D.  
WM. H. FURNESS 3d, M.D.  
WILSON CATHERWOOD,  
B. DAWSON COLEMAN.

ELECTED BY THE CITY COUNCIL.

GEORGE CONNELL

SUPERINTENDENT OF THE GARDEN.

C. EMERSON BROWN.

CLERK.

F. ROBERT GILPIN.

PATHOLOGIST.

HERBERT FOX, M.D.

ASSISTANT PATHOLOGISTS.

FRED D. WEIDMAN, M.D.,

E. P. CORSON-WHITE, M.D.

SOLICITOR.

W. W. MONTGOMERY.



# REPORT

OF THE

## BOARD OF DIRECTORS.

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PHILADELPHIA, April 22d, 1920.

The Board of Directors of the Zoological Society of Philadelphia presents to the members and loanholders its forty-eighth annual report, for the year ending February 29th, 1920.

### GENERAL AFFAIRS AND FINANCES.

The number of members at the close of the year was:—

Annual members.....	137
Life members.....	986
Honorary members.....	9
Perpetual memberships.....	243
Junior members.....	26
	1,401
Total members.....	1,401

The following is a report in detail of the admissions and receipts for the year:—

Adults (paying at gates).....	260,975
Children (paying at gates).....	88,383
Members (including life and annual members, loanholders' annual, and complimentary an- nual tickets).....	1,543
Loanholders' single tickets.....	5,593
Free admissions (charitable institutions, donors' tickets, &c.)*.....	13,202
Coupon tickets.....	108
Excursion tickets.....	1,452
	371,256

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\* In addition to these 200,000 tickets were issued for the admission of pupils of the Philadelphia Schools.

*Monthly Record of Receipts from Admissions for 1919-1920, with corresponding account for 1918-1919.*

MONTH	1918-1919	1919-1920	COMPARISON	
March.....	\$4,150.70	\$4,386.40	Increase	\$235.70
April.....	4,126.10	8,148.10	Increase	4,022.00
May.....	5,754.80	9,001.25	Increase	3,246.45
June.....	7,364.80	8,010.75	Increase	645.95
July.....	9,262.70	7,318.55	Decrease	1,944.15
August.....	8,231.40	12,086.40	Increase	3,855.00
September..	8,908.40	10,017.35	Increase	1,108.95
October.....	3,010.75	5,639.60	Increase	2,628.85
November..	3,014.15	5,937.60	Increase	2,923.45
December...	2,181.20	1,414.95	Decrease	766.25
January....	2,265.40	1,057.05	Decrease	1,208.35
February...	3,253.80	1,244.05	Decrease	2,009.75
	\$61,524.20	\$74,262.05	Increase	\$12,737.85

The receipts from admissions for the year have been much greater than ever before in the history of the Garden, as have also the receipts from the sale of guides, souvenirs and other privileges of the Garden. The cost of maintenance, however, has greatly increased.

It has been a rather trying year throughout, as specimens have been very scarce and hard to secure on account of the war embargo, and other causes. Those that have come into the country have been received in more or less bad condition, and this, added to the extreme and continued cold weather during the winter, has made it difficult to maintain a complete collection. Fortunately, few important specimens have been lost, and in spite of the restricted opportunities nearly all the cages and enclosures are well stocked and the total number of specimens exhibited is equal to last year.

Owing to the unsettled condition of labor and the inability of securing material, very little new building was undertaken, the only important work being the altera-

tions of the old bird house. The former is intended for the exhibition of macaws and parrots and in winter for pelicans, cranes and other birds that are kept out of doors throughout the summer. In addition to this a large outside enclosure for the Barbary sheep was completed. Other buildings, however, have been greatly improved by painting, and many minor improvements completed during the year, as usual.

The Board of Directors announce with deep regret the death of Mr. Robert D. Carson on February 19th, 1920.

Mr. Carson was first employed by the Society as clerk in the office at the Gardens on November 1st, 1879. He became Assistant Superintendent February 9th, 1899, and was appointed Superintendent in 1905, succeeding Dr. Arthur E. Brown. On November 1st, 1918, he was forced to retire because of ill health.

# TREASURER'S REPORT.

## INCOME AND EXPENDITURES.

For the fiscal year ending February 29th, 1920.

### INCOME.

Admission receipts.....	\$74,262.05
Rents at Garden.....	750.00
Interest.....	2,885.78
Sale of animals.....	1,055.00
Sale of guides.....	1,008.50
Sale of souvenir booklets.....	397.05
Sale of souvenir post cards.....	346.70
Donkey rides.....	1,706.60
Sundry receipts.....	3,467.05
Received from the City of Philadelphia through the Commissioners of Fairmount Park.....	50,000.00
Total income.....	<u>\$135,878.43</u>

### EXPENDITURES.

Salaries.....	\$36,866.96
Office expenses.....	754.15
General expenses.....	72,046.56
Purchase of animals.....	6,348.15
Permanent improvements.....	827.34
Transferred to Emergency Fund....	19,000.00
Total expenditures.....	<u>\$135,843.16</u>
Excess of income over expenditures.....	35.27
	<u>\$135,878.43</u>

C. S. W. PACKARD,  
*Treasurer.*

Audited and found correct, April 20th, 1920.

STOCKTON BATES & SONS.

TOTAL NUMBER OF ANIMALS EXHIBITED  
IN EACH CLASS DURING THE YEAR.

MAMMALS.....	628
BIRDS.....	1,405
REPTILES.....	818
AMPHIBIANS.....	48
	2,899

Species that have never before been exhibited in the collection are:

Pale Cebus, *Cebus flavescens* Gray.

Hab., Brazil.

One by purchase June 18th.

Reddish Woolly Monkey, *Lagothrix infumatus*, Gray.

Hab., Amazon Valley, South America.

This very rare monkey was received November 25th and was the first specimen ever shown at the Garden. The striking dark, reddish color of its hair is very distinctive and was well shown when the animal was placed in the same cage with the Humboldt's Woolly Monkey with its dull blue-gray color.

Variiegated Agouti, *Dasyprocta viriegata*, Tsch.

Hab., Colombia.

One by purchase January 30th.

Black-crested Jay, *Xanthura sanblasiana* Lafr.

Hab., Western Mexico.

Two by purchase December 9th.

Citril Finch, *Chrysomitris citrinella* Boie.

Hab., Central & Southern Europe.

Two by purchase November 13th.

Rufous-bellied Finch, *Spermophila hypoxantha* Pelz.

Hab., Brazil.

Two by purchase June 17th.

Black Finch, *Spermophila luctuosa* Lafr.

Hab., From Colombia to Ecuador, Peru and Bolivia.

Four by purchase June 17th.

Yellow-fronted Green Tanager, *Chlorophonia frontalis* Selater.

Hab., Venezuela.

Five by purchase January 29th.

Pileated Sparrow, *Zonotrichia pileata* (Bodd.).

Hab., Central and South America.

Two by purchase June 17th.

Thick-billed Grosbeak, *Oryzoborus crassirostris* ScL.

Hab., Venezuela; Colombia.

Two by purchase September 4th.

Rufous-bellied Thrush, *Turdus rufiventer* Vieill.

Hab., Central and Eastern South America.

Three by purchase September 13th.

Black-gorgeted Jay Thrush, *Garrulax pectoralis* (Gould).

Hab., Northern India.

Two fine specimens purchased April 3rd.

Rufous-headed Falcon, *Heterospizias meridionalis* Sharpe.

Hab., Colombia and Guiana.

One by purchase September 4th.

Swainson's Francolin, *Pternistes swainsoni* Gray.

Hab., South Africa.

One male by purchase July 2nd.

Prince Albert's Curassow, *Crax alberti* Fraser.

Hab., Colombia.

Two by purchase August 26th.

Picui Dove, *Columbula picui* Temm.

Hab., South America.

Two by purchase September 13th.

Purple Heron, *Phoyx purpurea* (Linn.).

Hab., Europe—winters in Africa.

Two by purchase April 19th.

Southern Musk Turtle, *Aromochelys tristycha* (Agassiz).

Hab., Southeastern United States.—Florida to Texas.

Four by purchase May 26th.



Baur's Box Tortoise, *Cistudo bauri* (Taylor).

Hab., Georgia to Florida.

One by purchase May 26th.

Variable Swift, *Sceloporus variabilis* (Weig.).

Hab., Mexico and Texas.

Four by purchase May 13th.

Couch's Garter Snake, *Eutænia elegans couchi* (Kennicott).

Hab., Arizona, California.

Two by purchase July 12th.

Red-bellied Water Snake, *Tropidonotus fasciatus erythrogaster* Blgr.

Hab., Central and Eastern United States.

One by purchase October 1st.

Storer's Red-bellied Snake, *Storeria occipitomaculata* (Storer).

Hab., United States east of the Rockies.

One presented September 3rd.

Among the many interesting specimens obtained during the year the following are noteworthy:

On June 17th and 18th a large lot of South American Birds and Mammals were received, among which was one specimen of the rare Crab-eating Raccoon, a Noisy Dourocouli, a male King Vulture and a Pale Cebus Monkey, which latter we had never before had in the collection.

On August 26th a pair of the rare Prince Albert's Curassows was purchased with other South American birds.

On September 3rd the Society was fortunate in securing by purchase two fine Victoria Crowned Pigeons besides several Blue-cheeked Barbets, a species that had not been imported for several years.

On September 4th, among a large collection of small birds, two fine pairs of the Hooded Siskins were received.

On September 13th a fine Humboldt's Woolly Monkey was purchased. This is by far the largest and finest specimen that we have ever had in the collection.

On October 22nd a male Huanaco was received from the National Zoological Park.

On November 25th the Society was fortunate in securing a Reddish Woolly Monkey. On the same date two Green-thighed Caica Parrots, a Cuvier's and a Toco Toucan were received; the latter variety has not been exhibited for a number of years.

Animals that were born in the Garden during the year were:

- 1 pig-tailed macaque (*Macaus nemestrinus*) ♀, Dec. 30th.
- 3 rhesus macaques (*Macaus rhesus*), June 7th and 14th and September 13th.
- 4 grizzly bears (*Ursus horribilis*), January 8th.
- 5 prairie dogs (*Cynomys ludovicianus*), May 16th and February 1st.
- 4 Richardson's kangaroo rats (*Perodipus richardsoni*), August 29th.
- 1 Prjevalsky's wild horse (*Equus prjivalskii*), May 14th.
- 1 American bison (*Bison bison*), May 14th.
- 1 zebu (*Bos indicus*), ♂, August 10th.
- 1 Indian buffalo (*Bos bubalis*), ♀ June 27th.
- 4 Indian antelope (*Antilope cervicapra*), May 21st, June 13th, December 1st and January 10th.
- 2 nylghaie (*Boselaphus tragocamelus*), ♂ ♀, March 19th.
- 1 urial (*Ovis vignei*) ♀, May 6th.
- 3 aoudads (*Ovis tragelaphus*), April 16th and 18th.
- 2 Himalayan tahrs (*Hemitragus jemlaicus*), May 7th and 30th and June 1st.
- 1 red deer (*Cervus elaphus*), ♂, May 28th.
- 2 American elk (*Cervus canadensis*), ♀ ♂, June 29th and July 12th.
- 2 axis deer (*Cervus axis*), ♂ ♀, March 5th and January 29th.
- 2 Barasingha deer (*Cervus duvauceli*), ♀s, March 28th and July 31st.

- 1 Kashmir deer (*Cervus cashmirianus*), May 24th.
- 8 Japanese sika deer (*Cervus sika typicus*), May 27th and 28th, June 2nd, 4th and 24th and July 12th.
- 5 fallow deer (*Cervus dama*), June 7th, 9th, 11th and 14th and September 8th.
- 3 Virginia deer (*Mazama virginiana*), 2 ♂s and 1 ♀, May 30th and June 30th.
- 2 hog deer (*Cervus porcinus*), ♀ and ♂, August 6th and October 3rd.
- 2 Eld's deer (*Cervus eldi*), ♂ and ♀, September 4th and 5th.
- 3 llamas (*Lama glama*), ♂s, November 4th, December 12th and January 23rd.
- 1 red kangaroo (*Macropus rufus*), August 19th.
- 1 robust kangaroo (*Macropus robustus*), October 12th.
- 1 black wallaby (*Macropus ualabatus*), March 15th.
- 19 eastern wild turkeys (*Meleagris gallopavo*), May 23rd and 29th.
- 4 herring gulls (*Larus argentatus*), June 16th.
- 15 red-barred garter snakes (*Thamnophis sirtalis parietalis*), August 15th.
- 3 ground rattlesnakes (*Sistrurus miliarius*), September 11th.

LIST OF ADDITIONS TO THE COLLECTION FOR THE YEAR ENDING  
FEBRUARY 29TH, 1920.

1919.

- Mar. 4. 6 yellow-bellied liothrix, 6 European skylarks, 4 wood pigeons, 2 European jays, 1 mealy red-poll, 1 Guinea baboon, 1 chaema baboon, 1 anubis baboon purchased.
5. 1 axis deer ♂ born in garden.
10. 1 alligator presented by Miss Emma Bowdish, Philadelphia.
11. 1 ocelot purchased.
15. 1 black wallaby born in the Garden.
19. 2 nylghaie ♂ and ♀ born in the Garden.
21. 1 common canary presented by M. L. Stovell, Haverford, Pa.
28. 1 Barasingha deer ♀ born in the Garden.
29. 1 beaver purchased.
- April 1. 1 Humboldt's woolly monkey purchased.
2. 2 black gorgeted jay thrushes and 1 hog-nosed snake purchased.
5. 3 wave-lined lizards presented by Rev. W. H. McClellan, Woodstock, Md.
6. 2 common musk turtles and 4 painted terrapin presented by Morris M. Steinberg, Philadelphia.
- 1 alligator presented by A. L. Brice, Philadelphia.
10. 6 warty newts purchased.
12. 1 common garter snake presented by F. Elwood Yarnell, Philadelphia.
- 1 ring-necked pheasant presented by Lieut. A. H. Johnson, Philadelphia.
- 1 common opossum presented by Thomas Oakes, Overbrook, Pa.
- 1 alligator presented by Master Morton McMichael, Philadelphia.
13. 1 common garter snake presented by S. M. Samuelson, Philadelphia.
15. 1 red-masked conure purchased.
16. 2 aoudads born in the Garden.
18. 1 aoudad born in the Garden.
19. 1 Brazilian ocelot, 2 goliath herons, 2 purple herons, 4 common teal, 2 pin-tailed ducks, 1 corn snake and 1 pine snake purchased.
- 1 undulated grass parakeet presented by Alice L. Cox, Lawrence, Long Island, N. Y.
21. 2 painted terrapin and 3 spotted terrapin presented by Alfred R. Allen, Philadelphia.
22. 1 alligator presented by Francis Lea Maddox, Narberth, Pa.
24. 1 alligator presented by Dr. Marion Mackenzie, Philadelphia.
25. 1 alligator snapping turtle purchased.
26. 1 red-bellied snake purchased.
27. 1 harlequin snake, 1 ground rattlesnake, 6 water moccasins, 4 keeled green snakes, 2 chicken snakes, 1 rainbow snake, 5 black hog-nosed snakes, 6 common hog-nosed snakes, 5 common whip snakes, 6 black snakes, 6 common garter snakes, 6 king snakes, 2 brown water snakes, 5 banded water snakes, 1 red-bellied snake and 3 baby snakes purchased.
29. 1 common opossum presented by Emerson P. Jennings, Leighton, Pa.
- 4 common skunks purchased.
30. 1 Levallant's amazon presented by Mrs. E. W. Elliott, Philadelphia.
- May 2. 1 jumping mouse presented by Frank G. Speck, Philadelphia.
- 1 alligator presented by William Weinert & Co., Philadelphia.
4. 25 fence lizards, 12 six-lined lizards, 13 wave-lined lizards and 13 American green lizards purchased.
5. 1 milk snake presented by Chas. McIntosh, Philadelphia.
6. 1 urial born in the Garden.
- 2 Derbian screamers, 5 silver-blue tanagers, 4 crimson-backed tanagers.
- 2 sulphur-breasted toucans, 2 white-throated cebus monkeys, 4 spider monkeys, 4 marmosets and 1 noisy douroucoul purchased.
- 1 garter snake presented by Alfred R. Allen, Philadelphia.
7. 1 Himalayan tahr ♂ born in the Garden.
10. 1 Prjevalsky's wild horse born in the Garden.
12. 2 raccoons presented by J. L. Pancoast, Rosemont, Pa.
13. 1 Himalayan tahr ♂ born in the Garden.
- 2 alligators presented by M. J. Achey, Philadelphia.
- 2 nine-banded armadillos ♂s, 2 ring-tailed bassaras, 5 Lindheimer's snakes, 5 whip snakes, 5 Holbrook's water snakes, 2 LeConte's snakes, 2 elegant bull snakes, 1 gila monster, 1 black iguana, 11 common horned lizards, 5 spiny lizards, 3 six-lined lizards and 4 variable swifts purchased.
14. 1 American bison born in the Garden.
16. 4 prairie dogs born in the Garden.
19. 1 water thrush purchased.
- 1 black snake and 1 painted terrapin presented by Dr. Grillett, Philadelphia.
20. 1 red-tailed hawk purchased.
- 1 white-footed mouse presented by Chas. J. Harrison, Jr., Somerset, Pa.
21. 1 Indian antelope born in the Garden.
23. 12 wild turkeys born in the Garden.
24. 1 Kashmir deer born in the Garden.
- 4 barn owls purchased.
25. 1 alligator presented by John Hallman, Philadelphia.

- May 26. 1 spiny soft-shelled turtle, 1 Florida terrapin, 1 Baur's box tortoise, 1 gopher tortoise, 2 chicken terrapin and 4 southern musk turtles purchased.  
 5 barn owls presented.  
 27. 1 Japanese sika deer ♀ born in the Garden.  
 28. 1 red deer ♂ and 2 Japanese sika deer ♀s born in the Garden.  
 2 Indian antelope ♀s and 1 lioness purchased.  
 29. 7 eastern wild turkeys born in the Garden.  
 30. 1 Himalayan tahr and 2 white-tailed deer ♂ and ♀ born in the Garden.  
 1 common crow presented by Josephine Malone, Philadelphia.  
 31. 2 American green lizards presented by Robert McInnes, Philadelphia.  
 1 hermit thrush presented.
- June 1. 1 spotted turtle and 2 painted turtles presented by Alfred R. Allen, Philadelphia.  
 1 Himalayan tahr ♀ born in the Garden.  
 1 Green tortoise presented by Madam W. de Morsie-Panton.  
 1 common box tortoise presented by Morris Steinberg, Philadelphia.  
 1 Japanese sika deer ♂ born in the Garden.  
 2. 1 alligator presented by Louis F. Beneke, Philadelphia.  
 3. 1 screech owl, young, presented by Geo. L. Morris, Villa Nova, Pa.  
 4. 1 American green lizard presented by Mrs. G. L. Hollick, Philadelphia.  
 1 Japanese sika deer ♀ born in the garden.  
 5. 2 raccoons ♂ and ♀ presented by Joseph Heinrichs, Philadelphia.  
 1 Graham's water snake, 6 Say's pine snakes, 6 yellow-bellied black snakes, 3 whip snakes, 7 red-skinned garter snakes, 6 hog-nosed snakes, 7 western sand snakes, 1 Say's king snake, 5 Evans' king snakes and 1 Holbrook's water snake purchased.  
 6. 1 alligator presented by Harry W. Lee, Philadelphia.  
 7. 1 rhesus macaque ♂ and 1 fallow deer ♀ born in the garden.  
 1 red-eared terrapin presented.  
 8. 3 common garter snakes and 2 DeKay's snakes presented by Gus Komanarsky.  
 9. 1 fallow deer ♀ born in the garden.  
 11. 1 fallow deer born in the Garden.  
 1 black-eared marmoset presented by Miss Helen Ramdon, Philadelphia.  
 13. 1 Indian antelope born in the garden.  
 14. 1 rhesus macaque and 1 fallow deer born in the Garden.  
 16. 4 herring gulls born in the Garden.  
 2 snapping turtles presented by Morris Steinberg, Philadelphia.  
 17. 3 blue-headed green jays, 2 rufous-bellied finches, 2 graceful mocking-birds, 2 Columbian grackles, 2 pileated sparrows, 2 Cayenne tanagers, 1 South American rice grackle, 2 Brazilian blue grosbeaks, 4 saffron finches, 4 black finches, 2 groove-billed anis and 2 grass quits purchased.  
 18. 1 noisy douroucouli ♀, 1 crab-eating raccoon ♀, 1 sulphur-breasted toucan, 1 king-vulture ♂, 3 Brazilian tree ducks and 1 pale cebus monkey purchased.  
 2 alligators presented by Louise and Elizabeth Shmidheiser, Philadelphia.  
 20. 1 alligator presented by Frank M. Wolf, Philadelphia.  
 21. 1 box tortoise presented by Alfred R. Allen, Philadelphia.  
 24. 2 Japanese sika deer born in the Garden.  
 3 red-tailed hawks presented by B. O. Jones, Philadelphia.  
 27. 1 Indian buffalo ♀ born in the garden.  
 1 alligator presented by Mrs. C. L. Sheppard, Philadelphia.  
 28. 4 barn owls presented by R. L. Elliott, Marcus Hook, Pa.  
 29. 1 American elk ♀ born in the Garden.  
 1 alligator presented by Geo. H. Buchanan, Philadelphia.  
 30. 1 white-tailed deer ♂ born in the Garden.
- July 1. 1 American elk ♂ born in the Garden.  
 2. 2 cactus conures, 1 festive amazon, 2 European owls, 1 Swanson's francoline, 2 Coscoroba swan and 2 upland geese purchased.  
 3. 1 screech owl purchased.  
 5. 1 snapper terrapin presented by I. N. Brandruff, Cedarville, N. J.  
 1 alligator presented by M. P. Gatlin, Philadelphia.  
 8. 21 prairie dogs purchased.  
 1 banded rattlesnake presented by Joseph W. Hendren, Lewistown, Pa.  
 9. 1 Levaillant's amazon presented by Mrs. Harris, Darby, Pa.  
 10. 1 alligator presented by C. Barnett Fairchild, Philadelphia.  
 11. 1 woodchuck purchased.  
 1 wood owl presented by Louis Ruhe, New York.  
 12. 2 Boyle's king snakes, 1 Graham's leaf-nosed snake, 2 western water snakes, 1 red-skinned garter snake, 2 bridled whip snakes, 1 pine snake, 2 Pacific rattlesnakes, young, 1 many-keeled lizard and 2 Clark's spiny lizards purchased.  
 1 blue-fronted amazon presented by W. Vivian Chappel, Philadelphia.  
 1 Japanese sika deer ♂ born in the Garden.  
 13. 1 Mexican horned lizard presented by Sidney Osborn, Philadelphia.  
 1 Levaillant's amazon presented by Mr. M. J. Carrell, Philadelphia.  
 14. 1 Boyle's king snake purchased.  
 1 yellow-throated parrakett presented by Miss Gene A. Hilly, Philadelphia.  
 16. 1 alligator presented by R. P. Jugel, Philadelphia.

- July** 19. 1 screech owl presented by W. H. Allen, Philadelphia.  
 1 yellow and red macaw and 1 red and blue macaw presented by James Mercer, Wallingford, Pa.  
 25. 1 spiny soft-shelled turtle presented by E. P. Timmons, Philadelphia.  
 26. 1 alligator presented by Mrs. W. R. Matthews, Princeton, N. J.  
 2 American green lizards presented by S. R. Wanamaker, Philadelphia.  
 29. 2 alligators presented by F. G. Richards, Philadelphia.  
 31. 1 Barasingha deer ♀ born in the Garden.
- Aug.** 2. 1 Levaillant's amazon and 1 white-fronted amazon presented by Miss Ardilla Millick, Philadelphia.  
 4. 1 gray parrot presented by William Greenwood, Philadelphia.  
 6. 1 hog deer ♀ born in the Garden.  
 7. 1 American green lizard presented by Miss Marjorie Bunting, Philadelphia.  
 7 Mexican horned lizards born in the Garden.  
 9. 2 sparrow hawks ♀ presented by the Pennsylvania State Museum, Harrisburg, Pa.  
 10. 1 snapper terrapin presented by Irvin N. Wood, Jr., Philadelphia.  
 1 banded rattlesnake and 1 Woodhouse's water snake presented by Dr. Henry Morris, Rutherford, N. C.  
 1 zebu ♂ born in the Garden.  
 11. 1 reddish milk snake presented by Leo Perrino, Philadelphia.  
 12. 1 great blue heron purchased.  
 14. 1 common pigeon presented by Dr. A. L. Barcus, Philadelphia.  
 15. 15 red-barred garter snakes born in the Garden.  
 17. 1 European red fox presented by Mr. C. Pardee, Philadelphia.  
 18. 1 mountain black snake presented by Dr. H. C. Masland, Philadelphia.  
 1 Levaillant's amazon presented by W. C. Wilson, Philadelphia.  
 19. 1 red kangaroo born in the Garden.  
 26. 1 brown spider monkey, 1 black-handed spider monkey, 2 Brazilian ocelots, 1 crab-eating raccoon, 2 Prince Albert's curassows, 6 blue-orbited passerine parakeets, 1 Derbian screamer, 2 chattering guans, 1 rufous-vested gaun, 6 fire-tailed finches, 2 black finches, 7 white-fronted finches, 8 barred ground doves and 4 blue tanagers purchased.
- Sept.** 27. 1 alligator presented by William Funston, Philadelphia.  
 1 mallard duck presented by James D'Arcy, Philadelphia.  
 29. 4 Richardson's kangaroo rats born in the Garden.  
 3. 2 jackdaws, 2 white-headed jay thrushes, 6 amadavine finches, 1 crowned hornbill, 2 Victoria crowned pigeons, 2 blue-cheeked barbets, 2 Malabar green bulbuls, 1 fruit pigeon and 2 upland geese purchased.  
 2 ring-necked snakes and 1 Storer's red-bellied snake presented by C. F. Strumnyre, Altoona, Pa.  
 4. 4 Canada porcupines, 2 Cayenne tanagers, 1 ashy-breasted tanager, 2 palm tanagers, 4 hooded siskins, 2 thick-billed grosbeaks, 3 yellow-winged sugarbirds, 1 yellow hangnest, 3 common troupials, 2 brown-fronted macaws, 3 passerine parakeets and 1 rufous-headed falcon purchased.  
 1 Eld's deer ♂ born in the Garden.  
 1 Eld's deer ♀ born in the Garden.  
 6. 1 sulphur-breasted toucan presented by E. F. Bramin, Ancon, Canal Zone.  
 7. 2 alligators presented by Miss Frances Phillips, Woodlynne, N. J.  
 8. 1 fallow deer ♀ born in the Garden.  
 9. 2 Indian shamas and 1 blue-cheeked barbet purchased.  
 10. 1 banded rattlesnake presented by James E. Richardson, Philadelphia.  
 11. 2 alligators presented by W. C. Shafer, Philadelphia.  
 3 ground rattlesnakes born in the Garden.  
 13. 1 common horned lizard presented by Mr. Vandergrift, Philadelphia.  
 13. 1 Humboldt's woolly monkey ♀, 2 black-backed grisons ♂, 2 black-eared marmosets ♂ and ♀, 2 picui doves, 2 blue-bearded jays, 2 Brazilian blue grosbeaks, 2 cactus coures, 2 golden-headed coures, 2 Boddart's tanagers, 2 red-headed cardinals, 3 rufous-bellied thrushes, 1 naked-throated bellbird and 1 blue-crowned coure purchased.  
 1 ring-necked pheasant ♀ presented by Victor R. Bieber, Germantown, Philadelphia.  
 1 alligator presented by W. H. Quigley, Philadelphia.  
 1 alligator presented by Frederick Baum, Logan, Philadelphia.  
 1 rhesus macaque ♂ born in the Garden.
17. 1 red-bellied terrapin presented by Paul Keebler, Philadelphia.  
 25. 1 ring-tailed coati ♀, 3 common iguanas and 2 surinam ameiva purchased.  
 1 prairie wolf presented by Miss Elsie C. Linder, Norwood, Pa.  
 27. 1 scarlet tanager ♀ purchased.  
 1 ring-necked pheasant presented by Clarence Alvord, Manayunk, Philadelphia.
28. 1 striated terrapin presented.  
 30. 1 short-tailed parrot purchased.
- Oct.** 1. 1 red-bellied water snake, 2 banded water snakes, 4 brown water snakes, 1 chicken snake, 2 black snakes, 2 baby American glass snakes, 1 baby king snake and 4 baby water snakes purchased.  
 2. 3 red foxes ♂ and 2 ♀s purchased.

- Oct. 3. 1 hog deer ♂ born in the Garden.  
 1 common opossum ♂ presented by Dr. Frank Fisher, Philadelphia.
4. 1 Levaillant's amazon presented by Mr. Friedland, Philadelphia.  
 1 weeper cebus ♀ presented by W. H. Roberts, Philadelphia.
6. 1 puma ♂ purchased.  
 1 Nepal parakeet ♂ presented by K. L. Heiss, Philadelphia.
7. 1 red and yellow macaw presented by H. Vanfosses, Philadelphia.  
 2 common garter snakes presented by Frank G. Speck, Philadelphia.
8. 1 vervet monkey ♂ presented by Dr. Frank B. Swartzlander, Doylestown, Pa.
9. 1 alligator presented by Oscar Schick, Philadelphia.  
 2 six-lined lizards, 39 wave-lined lizards and 33 American green lizards purchased.
11. 1 red salamander presented by Edith Stratton, Philadelphia.  
 1 box tortoise presented by Horace Berman, Philadelphia.  
 2 alligators presented.
12. 1 robust kangaroo born in the Garden.
13. 1 alligator presented by William D. Hall, Philadelphia.  
 1 alligator presented by William Anderson, Philadelphia.
16. 5 white-throated sparrows 3 ♂s and 2 ♀s purchased.  
 1 American green lizard presented by H. J. Smith, Philadelphia.  
 1 Brazilian ocelot ♀ presented by J. B. B. Stryker, Lansdale, Pa.
18. 1 alligator presented by Miss Adrian Batchelder, Philadelphia.  
 1 blue and yellow macaw presented by Mrs. J. S. Sketon, Atlantic City, N. J.
19. 1 yellow-throated parakeet presented by Miss Marguerite Loftus, Philadelphia.  
 1 white-fronted amazon presented by Mrs. L. T. Price, Wayne, Philadelphia.
20. 1 towhee purchased.
21. 1 turkey vulture, young, presented by Phillip Federici, Conshohocken, Pa.
22. 1 wave-lined lizard presented by Frank G. Speck, Philadelphia.  
 1 huanaco ♂ purchased.
24. 1 puma ♀ purchased.
25. 1 rhesus macaque ♂ presented by Dr. Edw. B. Krumbhaar, Philadelphia.
28. 1 American long-eared owl purchased.  
 1 hawk and 1 black spider monkey ♀ purchased.  
 1 alligator presented by Mrs. D. Schwartz, Philadelphia.
29. 1 screech owl presented by Fred Schoneman, Philadelphia.  
 2 goldfinches ♂, 4 siskin finches, 2 bulfinches ♂ and ♀, 2 common linnets, 2 yellow ammers, 2 Java sparrows, 4 Say's pine snakes, 4 hog-nosed snakes, 5 Holbrook's water snakes, 2 red-skinned garter snakes, 1 snapper terrapin, 4 red-eared terrapin, 10 Bell's painted terrapin, 1 Troost's terrapin, 3 painted box tortoises and 1 yellow-necked mud turtle purchased.
31. 1 hawk, 6 keeled green snakes, 5 chicken snakes, 7 ground rattlesnakes, 5 harlequin snakes, 3 Sacken's garter snakes, 1 scarlet king snake, 2 banded water snakes, 6 hog-nosed snakes, 2 common garter snakes, 6 black snakes, 3 whip snakes and 2 pine snakes purchased.
- Nov. 1. 2 common opossums, young ♀s, presented by Arthur Vanstan, Philadelphia.  
 2 undulated grass parakeets and 2 ring-necked turtle doves presented by Frank E. Wilkinson, Merchantville, N. J.
2. 1 alligator presented by Harlow Miles, Philadelphia.  
 3 alligators presented by C. B. Peironnet, Philadelphia.  
 1 common camel ♀ purchased.
4. 1 llama ♂ born in the Garden.
5. 2 banded rattlesnakes purchased.
8. 1 indigo snake presented by M. A. Caldwell, Philadelphia.
11. 1 alligator presented by Dr. M. J. Lawles, Philadelphia.  
 1 painted terrapin presented by Dr. F. M. Cleveland, Philadelphia.  
 1 banded rattlesnake presented by Dr. J. M. DeKay, Mt. Home, Pa.
12. 1 wood duck ♂ presented by Emlen Martin, Bristol, Pa.
13. 2 common iguana, 14 fence lizards, 2 double-striped thickness, 2 gray Java sparrows, 2 citril finches, 3 mountain finches, 1 common bullfinch ♀ and red-vented parrot purchased.
14. 1 DeKay's snake presented by Marion Waigelin, Point Pleasant, N. J.
16. 2 red salamanders presented by Harry A. Motz, Philadelphia.
20. 1 California hair seal ♂ purchased.
24. 3 alligators presented by W. H. Dehls, Atlantic City, N. J.
25. 1 American green lizard presented by Arnold H. Moses, Merchantville, N. J.  
 1 reddish woolly monkey ♂, 4 squirrel monkeys, 1 ring-tailed coati ♂, 2 green-thighed caica parrots, 1 hawk-headed caica parrot, 1 festive amazon, 1 gray parrot, 1 golden-headed parakeet, 2 sun bitterns, 1 Cuvier's toucan and 1 toco toucan purchased.
28. 1 alligator presented by John Smoker, Philadelphia.  
 1 screech owl purchased.
29. 2 common garter snakes, 1 musk turtle and 3 painted terrapin presented by William Beisel, Philadelphia.

- Nov. 30. 1 common opossum ♀ presented by John A. Caraher, Philadelphia.  
 1 alligator presented by Miss Madeleine Holland, Philadelphia.
- Dec. 6. 1 Indian antelope ♂ born in the Garden.  
 1 red-tailed hawk presented by C. R. Futer, Westtown, Pa.  
 5 alligators presented by John Gardner, Philadelphia.  
 8. 26 salamanders presented by William Beisel, Philadelphia.  
 9. 2 white-fronted cebus monkeys, 1 white-throated cebus monkey ♂, 1 diana monkey ♀, 1 purple-faced monkey ♂, 1 entellus monkey ♀, 2 Cuvier's toucans, 2 Yucatan jays, 2 black-crested jays, 1 gray clarin, 3 European blackbirds ♀ ♀ ♀, 2 Gray's thrushes, 2 Mexican crested hangnests, and 1 dusky solitaire purchased.  
 1 red-vented parrot presented by Louis Ruhe, New York.  
 10. 1 alligator presented by Beatrice Zeh, Philadelphia.  
 12. 1 llama ♂ born in the Garden.  
 20. 2 European wild boars ♂ ♀ purchased.  
 30. 1 pig-tailed macaque born in the Garden.
- 1920.
- Jan. 1. 1 alligator presented by William C. Nave, Philadelphia.  
 2. 1 alligator presented by Mrs. S. R. Henderson, Philadelphia.  
 7. 1 screech owl caught in the Garden.  
 8. 4 grizzly bears born in the Garden.  
 10. 1 Indian antelope ♂ born in the Garden.  
 14. 2 bonnet macaques (♀ and young) presented by M. H. Noblet, Philadelphia.  
 1 barn owl presented by Harry Gilbert, Philadelphia.  
 15. 1 festive amazon and 1 bald eagle purchased.  
 22. 1 song sparrow caught in the Garden.  
 23. 1 llama ♂ born in the Garden.  
 26. 3 snow birds caught in the Garden.  
 1 screech owl presented by Paul Histan, Doylestown, Pa.  
 29. 2 silver-blue tanagers, 5 yellow-fronted green tanagers ♂ ♂ ♀ ♀ ♀, 2 graceful mocking birds and 4 hooded siskins ♂ ♂ ♀ ♀ purchased.  
 1 Eld's deer ♀ born in the Garden.  
 30. 1 variegated agouti, 3 European robins, 3 mountain finches, 2 common bullfinches ♂ ♀, 3 chaffinches ♂ ♂ ♂, 4 siskin finches and 2 European goldfinches ♂ ♂ purchased.
- Feb. 1. 1 prairie dog born in the Garden.  
 10. 1 cardinal redbird caught in the Garden.  
 13. 1 white-throated sparrow caught in the Garden.  
 20. 1 alligator presented by William Allen, Philadelphia.  
 21. 1 alligator presented by Gifford Pinchot, Philadelphia.  
 23. 1 chaffinch presented by Edith H. Shoemaker, Philadelphia.  
 1 common opossum ♂ presented by John J. Daly, Philadelphia.  
 26. 1 black bear ♀ presented by Mrs. Benj. H. Thorpp, Scranton, Pa.  
 27. 2 polar bears ♂ and ♀ purchased.  
 29. 1 alligator presented by W. R. Nelson, Philadelphia.

The report of the laboratory of comparative pathology is appended. By order of the Board of Directors,

WILLIAMS B. CADWALADER,

Secretary.



REPORT OF THE LABORATORY OF COMPARATIVE  
PATHOLOGY FOR THE YEAR ENDING  
FEBRUARY 29TH, 1920.

It has been three years since I submitted an annual report from this laboratory and I am glad that it is possible to resume the work, much of which was suspended during my absence in the army. My thanks are due to those who did the work during that time, Dr. Weidman, Dr. Corson-White and Miss Phelps, for continuing the previous system and maintaining the usual records. The museum of the Garden has been enlarged by the addition of considerable shelf space; the total collection now consists of 975 pathological specimens; 363 brains, 116 alimentary tracts, 120 genitalia, and 137 ductless glands, these latter groups representing normal organs which are kept for comparisons and systematic research.

There have been 449 autopsies during the year, of which 300 were birds, 147 mammals and 2 reptilia. A comparison of the accompanying list and above figures will indicate that although our mortality has risen slightly over last year, it is still close to the average for the fourteen years cited.

FOR THE YEAR ENDING	MAMMALIA AND AVES			MAMMALIA			AVES		
	Animals exhib- ited	Deaths	Per cent. mor- tality	Animals exhib- ited	Deaths	Per cent. mor- tality	Animals exhib- ited	Deaths	Per cent. mor- tality
February 28, 1907....	1343	346	25.7	521	109	20.9	822	237	28.8
February 28, 1908....	1439	275	19.1	487	84	17.2	952	191	20.0
February 28, 1909....	1439	267	18.5	487	98	20.1	952	169	15.6
February 28, 1910....	1412	250	17.7	479	90	19.2	933	160	17.1
February 28, 1911....	1467	318	21.6	500	93	18.6	967	225	23.2
February 28, 1912....	1513	360	23.7	516	105	20.3	997	255	25.5
February 28, 1913....	1511	309	20.5	552	124	22.4	959	185	19.2
February 28, 1914....	1543	290	18.9	554	98	17.6	989	192	19.5
February 28, 1915....	1614	347	21.5	562	104	18.4	1052	243	23.
February 28, 1916....	1630	381	23.3	601	108	17.9	1029	273	26.5
February 28, 1917....	1798	337	18.1	596	90	16.7	1292	247	19.1
February 28, 1918....	2019	451	22.3	629	92	14.6	1390	359	25.8
February 28, 1919....	2020	370	18.3	648	114	17.5	1372	256	18.6
February 28, 1920....	2033	447	21.9	628	147	23.3	1405	300	21.3

Since only a few of the reptiles and amphibians are autopsied they have been subtracted from the death list and the percentage computed on basis of mammals and birds only.

Several small groups of birds and mammals died within a few weeks of arrival and this doubtless swelled our death list to some extent. There have been no epizootic outbreaks nor any large groups whose loss was due to any one discoverable factor like poor food. A number of finches were subjected to postmortem and found to have whole white millet seeds in their intestines, this being the only discoverable cause of death. Investigation revealed that mice ate the canary seed in the pans during the night, leaving only the millet which the hungry birds consumed whole. Small birds can take a few millet and crack them when eating leasurly but apparently not when hungry. When the millet was removed at night the trouble ceased.

Dispite the high mortality few important animals were lost, only the following demanding special comment. A very fine Chacma Baboon was ill when received; an existing nephritis was whipped into an acute exacerbation by the injection of tuberculin; this is the only case of this sort since our test dosage passed the experimental stage. A fine young Brazilian ocelot died from the anemia of uncinariasis. The Hyacinthine Macaw, which has been in the garden 26 years, died early in 1920 from intestinal inflammation. It is noteworthy in connection with the well known age to which these birds survive, that no marked evidences of senility were observed. There were mild chronic lesions of the liver and kidney but arteriosclerotic lesions were conspicuous by their absence.

A Mongolian wild horse was born here in April 1919 but lived only a few days, dying from intestinal obstruction due to volvulus. This is unfortunate because these beasts are becoming scarce and rarely breed in captivity.

A fine specimen of the rare woolly monkey was accidentally exposed to some spider monkeys with amebic dysentery and succumbed to this infection. A Ceylon entellus monkey, a species not exhibited in the garden for many years, died of peritonitis following perforation

of intestinal ulcers. The male Blessbok died of paralytic ileus, of indeterminate origin, and tuberculosis.

The work of the laboratory has continued on lines similar to that of previous years, that is the collection of statistics of the various lesions in the animal groups, the study of important pathological lesions or definite infections and the determination of parasites. Dr. Weidman still examines our bird arrivals for known dangerous parasites. Dr. Corson-White continues her studies upon the intestinal needs of various groups and has already indicated how cage palsy, in primates at least, may be combatted. I have continued the study of the vascular diseases as the first step in the cardio-vasculo-renal system. Scientific discussion of these will be made in the second part of this report.

Members of the laboratory staff presented papers before the annual meeting and banquet of the Sigma Psi Fraternity of the University of Pennsylvania held in the Garden on June 11th; before the combined Pediatric Societies of Philadelphia, New York and New England which met at the Garden on November 15th; and before the Interurban Clinical Club which met at the Garden on December 4th. I read a preliminary paper upon Arteriosclerosis in Wild Animals before the College of Physicians on February 4th, 1920.

The following is a list of the animals dying during the year. The total will be found not to tally with the records upon the table, as some specimens have died from injury and some were decomposed. Moreover, in many instances animals are included in the figures of more than one heading, since lesions of importance may have been found in more than one of the anatomical systems. It is seldom the case that only one of the systems is sufficiently affected to be the only cause of death.

Total animals examined, 449.

Total MAMMALIA, 147.

Primates, 32; Insectivora, 2; Lemures, 3; Carnivora, 25; Pinnipedia, 3; Rodentia, 18; Ungulata, 43; Hyracoidea, 1; Edentata, 2; Marsupialia, 18;

Total AVES, 300.

Passeres, 160; Striges, 12; Picariæ, 3; Psittaci, 42; Accipitres, 7; Galli, 26; Columbæ, 8; Alectorides, 5; Impennes, 1; Steganopodes, 1; Herodiones, 9; Odonotoglossæ, 2; Palamedæ, 2; Anseres, 18; Struthiones, 3; Crypturi, 1.

Total REPTILIA, 2.

Testudinata, 2.

#### DISEASES OF THE DIGESTIVE SYSTEM:

Leukoplakia: Impennes, 1.

Gastritis: Carnivora, 2; Ungulata, 1; Marsupialia, 1; Striges, 1; Anseres, 1.

Gastric ulcers: Insectivora, 1; Carnivora, 1; Hyracoidea, 1; Passeres, 3; Galli, 1; Struthiones, 1.

Enteritis: Primates, 10; Insectivora, 1; Lemures, 1; Carnivora, 5; Rodentia, 2; Ungulata, 1; Marsupialia, 3; Passeres, 23; Picariæ, 1; Psittaci, 8; Striges, 3; Galli, 4; Accipitres, 2; Alectorides, 1; Anseres, 3; Palamedæ, 1; Steganopodes, 1; Impennes, 1.

Liver:

Acute (degenerations, inflammations, etc.): Primates, 3; Rodentia, 4; Ungulata, 3; Marsupialia, 2; Passeres, 7; Psittaci, 4; Striges, 2; Galli, 1; Anseres, 1; Alectorides, 1.

Chronic (Cirrhoses, etc.): Primates, 1; Carnivora, 3; Rodentia, 1; Ungulata, 2; Marsupialia, 1; Passeres, 2; Psittaci, 2; Herodiones, 1; Anseres, 1.

Cholelithiasis: Anseres, 1.

Cholecystitis: Primates, 2; Carnivora, 2; Accipitres, 1; Alectorides, 1; Struthiones, 1.

Prolapse of cloaca: Passeres, 1.

Volvulus with gangrene: Ungulata, 2.

Hernia with gangrene: Rodentia, 1.

Ischiorectal abscess: Rodentia, 1.

Pancreas disease: Primates, 1; Ungulata, 3.

#### DISEASES OF THE CIRCULATORY SYSTEM:

Pericarditis: Primates, 1; Ungulata, 1; Marsupialia, 1; Passeres, 2; Picariæ, 1; Accipitres, 1; Struthiones, 1.

Myocarditis: Primates, 1; Carnivora, 1; Psittaci, 1; Accipitres, 1; Alectorides, 1.

Vegetative endocarditis: Marsupialia, 1; Struthiones, 1.

Atheroma: Ungulata, 2; Carnivora, 1; Marsupialia, 1; Passeres, 1; Psittaci, 1; Galli, 1; Alectorides, 1; Anseres, 1.

Arteriosclerosis: Ungulata, 1; Passeres, 1; Psittaci, 1; Striges, 1; Accipitres, 1; Herodiones, 1; Anseres, 2.

#### DISEASES OF THE GENITO-URINARY SYSTEM:

**Nephritis:**

Acute: Primates, 11; Carnivora, 6; Ungulata, 9; Rodentia, 4; Marsupialia, 4; Edentata, 1; Passeres, 12; Psittaci, 4; Striges, 1; Galli, 3; Herodiones, 2; Alectorides, 1; Anseres, 1.

Chronic: Primates, 3; Lemures, 1; Carnivora, 5; Rodentia, 1; Ungulata, 1; Marsupialia, 1; Passeres, 5; Picariæ, 1; Psittaci, 6; Striges, 3; Galli, 3; Accipitres, 2; Herodiones, 1; Alectorides, 3; Steganopodes, 1; Palamedæ, 1; Anseres, 3; Struthiones, 1.

Pyelonephritis: Carnivora, 1; Marsupialia, 1; Psittaci, 1.

Nephrolithiasis: Ungulata, 1; Testudinata, 1.

Congenital hydrometra: Ungulata, 1.

#### DISEASES OF THE RESPIRATORY SYSTEM:

**Pneumonia:**

Broncho: Primates, 1; Carnivora, 3; Rodentia, 1; Ungulata, 1; Marsupialia, 4; Passeres, 18; Psittaci, 2; Galli, 1; Columbæ, 1.

Lobar: Primates, 1; Carnivora, 1; Ungulata, 3; Marsupialia, 1; Anseres, 1.

Septic: Rodentia, 1; Ungulata, 1.

#### DISEASES OF THE LYMPHATIC SYSTEM:

Splenitis: Primates, 7; Carnivora, 2; Rodentia, 1; Ungulata, 1; Marsupialia, 4;

Edentata, 1; Passeres, 19; Psittaci, 6; Picariæ, 1; Striges, 2; Galli, 4; Palamedæ, 1; Accipitres, 1; Alectorides, 1; Anseres, 2.

#### DISEASES OF THE SKELETON:

Osteomalacia: Primates, 3; Lemures, 1; Hyracoidea, 1; Passeres, 2; Psittaci, 2; Galli, 3; Accipitres, 1; Columbæ, 1.

Rickets: Marsupialia, 3.

Polyarthrits: Carnivora, 1.

#### DISEASES OF THE SEROUS MEMBRANES:

Pleuritis: Primates, 1; Carnivora, 1; Ungulata, 1; Marsupialia, 1.

Peritonitis: Carnivora, 2; Ungulata, 2; Marsupialia, 1.

Serositis: Passeres, 7; Picariæ, 1; Psittaci, 2; Alectorides, 1; Anseres, 2.

**INFECTIONS:**

Acute general infections: Ungulata, 1; Passeres, 3; Psittaci, 1; Picariæ, 1; Galli, 1; Struthiones, 1.

Mould: Passeres, 3; Psittaci, 2; Striges, 1.

Tuberculosis: Ungulata, 2; Passeres, 10; Psittaci, 6; Galli, 9; Columbæ, 2; Anseres, 2; Odontoglossæ, 2; Accipitres, 1; Alectorides, 1; Crypturi, 1; Herodiones, 1.

**MISCELLANEOUS:**

Tumors: Insectivora, 1; Marsupialia, 2; Passeres, 1; Psittaci, 2; Striges, 1; Anseres, 1; Struthiones, 1.

Amyloidosis: Carnivora, 3; Marsupialia, 1; Passeres, 2; Alectorides, 1.

"Scaly leg": Galli, 1.

Goitre: Carnivora, 2; Passeres, 1; Psittaci, 1.

## PART II.

When the last report was made no monkeys remained in the detention rooms awaiting test injections. Twenty-six animals were received during the year of which 22 passed at the first or second test, the remaining four, constituting the last arrivals, being still held because of unsatisfactory charts. Although not being considered tuberculous they will be put in separate outside cages when good weather permits. There have been no monkeys returned from the exhibition house for retesting.

The history of tuberculosis among monkeys in the exhibition shows that "Sylvia" the orang-outang, died in the summer of 1918 (discussed in the 1919 report); this is the only death from tuberculosis in 45 months, a very satisfactory record. Thirty-two specimens of the order primates have died, but most of them have been young or small poor animals.

Tuberculosis among the other animals, however, shows a very unsatisfactory rise to 37, higher than for the last ten years. Only two of these were mammals, unculata, while among the remaining thirty-five, 10 were Passerine birds, 6 Psittaci, 9 Galli, 2 Columbæ, 2 Anseres, 2 Odontoglossæ, and one each of Alectorides, Accipitres, and Crypturi; the first three orders deserve some discussion. The high figure among the passerines, mentioned early in this report, was due to the arrival of some sick birds which died within a few weeks. The high rate among the gallinaceous birds and parrots was only realized when making up this report, a fact indicating that no collection or group died close together or our attention would have been attracted to it before; this has proven to be the case upon further scrutiny of the records. However it shows that we have had some infected foci that should be under strict hygiene. It is the practice lately of the laboratory to keep a book arranged by cage distribution of the specimens, into which are posted all deaths occurring from infectious disease. By this means we shall have foresight of possible outbreaks.

## AMYLOID DISEASE.

Last year Dr. Weidman placed on record two cases of apparently primary amyloid in birds. This past report period has brought out two mammals and a bird, a jungle cat (No. 5212), a skunk (No. 5414) and a chestnut-eared finch (No. 5221), with a similar condition. In the first the spleen was involved, in the second the kidney and in the last the liver. Four other instances of amyloid deposit were found but these all have some other lesion to account for it, tuberculosis or long standing inflammation.

## LITHIASIS.

Four instances of calculus or concrement formations were encountered. They do not permit generalizations so that only a few brief observations are reported. In the leopard tortoise (No. 5306) very numerous intrarenal stones were found, ranging in size from granules to 1 cm. They lay deeply and firmly imbedded in the cortices and medullæ and seem surrounded by a moderate amount of connective tissue. No pyelitis existed.

The Barasingha deer (No. 5423) showed two stones in the left renal pelvis, one an irregular dark uric acid stone molded to the calices, the other triangular and free but lying over the opening of the ureter when the pelvis was opened. The pelvis is little if any damaged.

Twenty-six hard dark stones were found in the gall bladder of a brant goose (No. 5128), one of which was impacted in the opening of the gall duct. There was a mild hypertrophic cholecystitis.

Coproliths occurred in the ileum and ceca of a brown pelican (No. 5494). They were well molded to the intestinal lumen but movable enough to let something pass. They seem to consist largely of urates but some dark irregular matter was also present.

## ARTERIOSCLEROSIS.

No progress has been made beyond that reported in the paper read before the College of Physicians, to appear

in the *American Journal of the Medical Sciences* and from which the conclusions are here repeated. "Our study tends to confirm the general opinion of the rarity of arteriosclerosis in lower animals but perhaps a closer study will reveal more cases, especially since we know the groups in which it appears. It is most common in cats and dogs, bovines, predatory birds, parrots, gallinaceous and aquatic birds and in these groups it is most definitely developed in those living on a protein diet. The lesion is very common in the orders showing the greatest numbers of cases of gastro-enteritis; this is especially true of parrots, aquatic birds, herbivorous and carnivorous animals. The aorta is more affected in mammals, the disease is more distributed in birds. A rough similarity to the human aortic lesions is to be seen in the predatory birds and some of the carnivora while the parrots exhibit degenerations in middle size vessels not unlike those of 'arteriocardial fibrosis.'"

"The animals most affected are those prepared by nature for severe or prolonged physical effort, such as in fight and flight. Aneurysms occur rarely, usually at points of branching and always near atheromatous plates; they are small and seem to retain part of all coats of the vessels, seldom becoming large enough to form their wall from the surrounding areolar tissue. More males than females are listed in the series, but as we have many more males on record perhaps the differences would be less marked if the figures were closely comparable."

Dr. E. P. Corson-White's report on Investigations upon the Relation of Diet and Osteomalacia.

Osteomalacia has caused the death of 44 mammals and 34 birds. Fifty per cent. of the mammals were monkeys of the family Cebidæ in which the disease was more severe and extensive than in any other group.

Because the diet has been frequently held as responsible for osteomalacia and it has been possible to reproduce experimentally similar bone changes by certain diets, the food given our animals was studied as



to its ability to supply factors favorable to growth, nutrition and reproduction; attention was also given to the changes necessary to make a satisfactory and adequate diet.

Investigation revealed that in so far as calories, fats and carbohydrates were considered, the food was satisfactory, while it was poor both qualitatively and quantitatively in proteins, especially those containing phosphorus. Vitamine A was low, while Vitamine B was about correct. The mineral ash was insufficient, acid in reaction and improperly balanced, chemical analyses showing high magnesium, sulphur and potassium while sodium and iron were low and calcium and phosphorus very low. This indicates a distinctly acid diet which would make a drain upon the alkalis of the body, no provision for which is made in the food. These results are in accord with the chemical and practical tests of Steinbok, Ettiene and of Voit. It is however curious that Cebidæ are more affected than other monkey families, a fact that can be explained only on the assumption that their basal salt metabolism is peculiar, since Macaques, fed upon the same diet, do not develop osteomalacia, or it would appear that incorrect diet is not the only factor in the causation of the disease but, in cases where salt chemistry is easily unbalanced, may predispose to it.

Dr. Weidman's report on Animal Parasites.

This year the number of animals showing parasites at autopsy has been about the same, expressed in percentages, as in previous years, *i. e.*, 11 per cent.

*Hookworms* were found only once this year, in an ocelot (*Felis chinigonazon*) (No. 5104). It has been customary for us to find at least several cases every year, mostly in the canidæ and felidæ, and then rarely scattering as far out in the animal kingdom as the sea-lions and the giraffe.

*Sarcoptes mutans*, an itch-mite, has been demonstrated by Dr. Corson-White on the skin of a case of "scaly leg" in a pheasant (*Phasianus torquatus*) (No. 5107).

*Intestinal obstruction produced by worms.* This occurred in a very small bird (yellow-bellied liothrix-*Liothrix luteus*—No. 5121). The combination of numerous, comparatively large parasites (tape-worms) and a small gut made this accident possible.

*Coccidiosis in Himalayan Thars.* This year we have had another case of this disease, but this time the beast was not so heavily infested as our first. Note was made of our first case in the 1917 Report (page 37), and in 1918 (page 31) of its disappearance after treatment with castor oil. Theobald Smith has recently reported epizootics of "red diarrhœa" in New Jersey cattle from coccidiosis, as the first appearance of the disease in America. In reply to a personal communication in which his attention was called to the disease here, he states that the two diseases are different. We are not aware yet how the disease originally came to affect our domestic animals, but the analogy between these two coccidioses illustrates the propriety of investigating and reporting imported diseases.

*Hydatid (echinococcus) cysts.* This disease, caused by the presence of the intermediate stage of the dog tape-worm, has been found in several animals this year. The largest examples were found in a camel, *Camelus dromedarius* (No. 5100), but this was not as large as in two others which were affected in past years. The feces of nearly all the nearby canidæ (wolves, foxes, dogs) were examined, but, although several other kinds of parasitic ova were found, none were discovered to indicate that the dog tape-worm was present. From this it is concluded that the animals had brought the disease into the Garden with them. It is not dangerous for other animals, being transmissible to the dog family only and provided the beast eat the uncooked cysts.

Other animals reported this year with the disease are Indian antelope (*Antelope cervicapra* No. 5438) and urial (*Ovis vignei* No. 5410). But all were light cases and showed other diseases as the cause of death. While the number of cases is, therefore, greater than usual it has no hygienic significance.

*Acanthocephalus elegans* has been found in a squirrel monkey (*Saimiri scurius* No. 5374) and another unidentified acanthocephalus in a pale cebus (*Cebus flavescens* No. 5347). The latter is doubtless also of the same species as the first, but is unavailable for determination on account of the value, as an exhibit, of the worms attached to the museum specimen. These worms are about 3 cm. long, are deeply blood stained, the hooklets of their proboscis are deeply imbedded in the colonic wall, and the gut wall is in places externally diverticulated and adherent to the neighboring stomach wall.

*Filaria gracilis* has again been found twice in monkeys this year. Occupying a position in the peritoneal cavity as it does, treatment is not at all promising and careful search of the literature was made without finding any reference to its life cycle; this precludes a hygienic attack aimed at an interruption of it at some point. It appears as though the parasite is only occasionally and accidentally pathogenic.

*Spiroptera incerta*. The droppings of 34 newly-arrived parrots in quarantine have failed to show any ova of this parasite.

*Hepaticola hepatica* in prairie dogs. This subject has been mentioned for several years past under the name of *Trichosoma hepaticum*, but the worm has lately been placed by Hall in the new genus *Hepaticola*. Last year we reported the finding of the disease in an advanced stage in the livers of two prairie dogs. The diagnosis was made in the usual way, by laparotomy after trapping the animals. This meant much to us because in the first place it showed that our first case, back in 1915, was no flash in the pan, but that the disease was endemic. It also furnished an explanation why the prairie dog population should decrease in spite of known frequent births, and emphasized, in view of the undoubted rat origin of the disease (1919 Report page 22), the importance of continuing our efforts at rat extermination.

In the second place it gave us prairie dog material for feeding to rats, and we were successful in transmitting

the disease just as last year we reported the transmission in the opposite direction, *i. e.*, from rats to prairie dogs. A full report of the work will shortly be submitted for publication under the title "Hepatic Trichosomiasis, a Frequent and Sometimes Fatal Verminous Infestation of the Livers of Rats and Other Rodents."

*Amoebic colitis (dysentery) in monkeys.* This has been the outstanding parasitic problem of the year. In all it affected, at one time or another, six animals, four black spider monkeys, one marmoset, and one woolly monkey. Only one black spider monkey survives, and this specimen suffers relapses from time to time which threaten to kill each time. We were at first inclined to believe, from the history of their travels, that the disease had accompanied them from the Tropics, but continued study of their tissues has led to the conclusion that it was contracted en route, most likely at the dealer's storehouse. The presence of the disease was first discovered at autopsy upon a woolly monkey. This led to examination of the stools of all monkeys which had been associated with him and amoebæ were found in the feces of four. These beasts were isolated and treated. We found that emetin, administered both hypodermatically and by mouth, had no influence in eliminating the amoebæ. Fresh grated nutmeg promised better for a time, but after a period of discontinuance of the drug the organisms reappeared. Nutmeg, however, certainly causes *symptomatic* improvement, the animal picks up and the stools become firm. The organism is neither the human commensal, *Endamoeba coli* nor the pathogenic *E. histolytica*; it is probably a new species. The manuscript reporting this is written and will shortly be submitted for publication under the title "Report of an Enzootic of Colitis Among Monkeys at the Philadelphia Zoological Garden Associated with a Tissue Invading Amoeba (*Endamoeba browni*, n.s.)."

#### DERMATOLOGICAL STUDIES.

Villous and keratotic tuberculoid of feet of ruddy flamingo (*Phoenicopterus ruber* No. 5066). This bird

had been afflicted with swollen feet for eleven months when brought to the infirmary. The soles of the feet were crusted and from the fissures between the toes and the crusts numerous maggots were extracted. A marked improvement followed regular dressings, with applications of salicylic acid ointment, and then the disease was found to be essentially a villous hyperplasia of the skin over both the sole and dorsum of the feet, with occasional ulceration. Examination of material from the feet by laboratory methods showed at one time the mycelium of a fungus, but this disappeared as treatment was continued. The disease did not, however, also disappear, and the fungus was never seriously considered as the cause. Histological examination of skin from the foot showed connective tissue villi covered by condensed epiderm. No characteristic specific disease like tuberculosis was indicated. After being treated for three months in the infirmary the bird was killed and found tuberculous. In view of this it is probable that the skin lesions was also tuberculous *in nature*, without giving any distinctive morphological evidences of it.

Molluscum contagiosum on head of turkey (*Meleagris gallopavo silvestris* No. 5321).

The bird's head was affected universally from beak to ears by horny nodules up to the size of a pea. They were so large and numerous around the eyes as to completely close them. There were no lesions elsewhere on the body, none of the other turkeys were similarly affected, and though watched, none have since developed a similar condition.

Histological examination shows a keratosis, many of whose cells show characteristic "molluscum bodies" which appear the same and behave the same tinctorially as the human examples. This turkey case differs from the human, however, in that there are none of the pocket-like epithelial extensions deep down into the corium and this turkey case may be very useful in the further study which is contemplated to show that such things as molluscum bodies are not sufficient of themselves to

stamp a dermatosis as a pathological entity, but that they are *general* pathological processes which may occur in a number of different diseases. The disease has been reported in sparrows, pigeons, but never, so far as I can find, in turkeys.

Observations by Dr. E. A. Schumann Upon Interesting Conditions Found in the Female Genital Tract.

The cases here recorded cover the period of the last two years, the work in this line being interrupted by service in the Navy.

No. 4763. Common Opossum (*Didelphys virginiana*). The specimen shows an irregular tumor 4 x 3 cm. involving the floor of the marsupial pouch and one or more nipples. The growth in places is a smooth, nodular tumor and in other areas shows results of deep ulcerations. Microscopically the growth is a typical adeno-carcinoma, the glands in places being entirely replaced by masses of carcinomatous cells. In certain areas the growth has broken down into necrotic masses.

No. 4798. Mandrill Baboon (*Papio maimon*). This specimen is interesting by reason of the presence of many larvæ of a fly, species undetermined, the eggs evidently having gained access to the body by way of the vagina and the larvæ having penetrated the mucous and muscular coats of the vagina just at the junction with the uterus. Many larvæ are found scattered through the peritoneal cavity and liver.

No. 5028. White-footed Mouse (*Peromyscus leucopus*). This animal shows a tumor of the right posterior mammary gland measuring 3 x 4 cm. The tumor presents no areas of ulceration, being entirely covered with fur. On section the growth is found to be a scirrhus carcinoma with many areas of hemorrhage scattered through the cell masses.

No. 5037. Springbok (*Gazella enchore*). A very interesting case is that of the springbok, the animal dying of pneumonia while pregnant. On autopsy the uterus contained a normal fetus of about one-half development. The head of the mother shows most marked

ravages of osteomalacia. There is osteoporosis of the facial and frontal bones, the bony tissues of the upper jaw being almost entirely absorbed. All cranial bones are soft and fragil and show marked absorption. The remainder of the skeleton showed no change. She had miscarried five months before death and had been emaciated since the delivery of a dead fetus nine months before death.

No. 5464. Axis Deer (*Cervus axis*). Congenital hydrometra. This specimen is from a day old animal, consists of the genitalia in which the entire body of the uterus and both uterine cornua have been transformed into a thin walled translucent cystic cavity containing clear fluid. The body of the uterus measures 15 mm. diameter, each cornu reaching the diameter of 5 mm. The two cornua are curled, notun like ram's horns, and are united by a line of adhesions above the body in the midline. From the ends of the convoluted and cystic uterus and cornua spring the normal tubes, each with its ovary.

No. 5474. Leche Antelope (*Cobus leche*). The left uterine cornu is about twice the length and thickness of the right and presents a diverticulum 2 cm. in length and 5 mm. in diameter. This springs from the superior surface of the left cornu at its outer third.

The following tumors are put on record:

No. 5068. Chestnut-eared Finch ♂ (*Amadina castanotis*).

Medullary carcinoma of the kidney becoming scirrhus in places, with metastases to the lungs.

No. 5203. Great Horned Owl ♀ (*Bubo virginianus*).  
Simple papilloma of duodenum.

No. 5229. Samoli Ostrich ♀ (*Struthio molybdophanes*.)

Myeloid tumor on the periosteum of the pelvic cavity. The exact nature of this tumor is uncertain. No myeloid tissue exists normally in this locality. No other tumor. No knowledge of a leukemia.

No. 5241. Lesser Snow Goose ♀ (*Chen hyperboreus hyperboreus*). Fibroma on clavicle.

Nos. 5294 and 5434. Undulated Grass Parrakeets ♂ (*Melopsittacus undulatus*). Simple adenoma, of kidney. These birds frequently show tumors.

Nos. 5309 and 5343. Common Opossums ♂ ♀ (*Didelphys virginiana*). Osteosarcoma of jaw bones. This was malignant only in the sense that it interfered, by its size, with chewing and thus affected the animal's nutrition.

No. 5461. Common Hedgehog ♂ (*Erinaceus europaeus*).

Sarcoma of lymph-glands, spleen, liver, and lung. This tumor is still to be studied for more detailed report. It bears some resemblance to hypernephroma but if it be, it must be a misplacement tumor as the adrenals seem unaffected.

Respectfully submitted,

HERBERT FOX.

*Pathologist.*



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Persons who wish to become members will please communicate with the Secretary of the Society.

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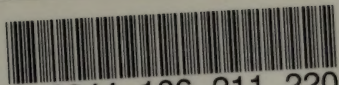












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