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THE
FORTY-NINTH ANNUAL REPORT

OF THE

BOARD OF DIRECTORS

OF THE

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MUSEUM OF ZOOLOGY
CAMBRIDGE, MASS.
ZOOLOGICAL SOCIETY

OF PHILADELPHIA.

(INCORPORATED MARCH 21ST, 1859.)

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

APRIL 28th, 1921.

PHILADELPHIA:
PRESS OF ALLEN, LANE & SCOTT
1211-1213 Clover Street,
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THE UNIVERSITY OF CHICAGO

THE
ZOOLOGICAL SOCIETY OF PHILADELPHIA.
(FAIRMOUNT PARK.)

BOARD OF DIRECTORS.

ELECTED BY THE SOCIETY.

CHARLES B. PENROSE, M.D., <i>President.</i>	ROBERT G. LE CONTE, M.D., HENRY PRATT McKEAN, CLEMENT B. NEWBOLD, CHARLES S. W. PACKARD, <i>Treasurer.</i>
CHRISTIAN C. FEBIGER, <i>Vice-President.</i>	
CHARLES M. LEA, THOMAS DEWITT CUYLER, OWEN WISTER, D. M. BARRINGER,	GEORGE L. HARRISON JR., ALFRED GRATZ, RICHARD H. HARTE, M.D. WILLIAM L. ABBOTT, M.D. WILSON CATHERWOOD, B. DAWSON COLEMAN. WITMER STONE, D. Sc.
W. B. CADWALADER, M.D., <i>Secretary.</i>	

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.

PHILADELPHIA, April 28th, 1921.

The Board of Directors of the Zoological Society of Philadelphia presents to the members and loanholders its forty-ninth annual report, for the year ending February 28th, 1921.

GENERAL AFFAIRS AND FINANCES.

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

Annual members.....	135
Life members.....	979
Honorary members.....	9
Perpetual memberships.....	243
Junior members.....	29
Total members.....	1,395

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

Adults (paying at gates).....	329,454
Children (paying at gates).....	110,724
Members (including life and annual members, loanholders' annual, and complimentary annual tickets).....	1,776
Loanholders' single tickets.....	7,038
Free admissions (charitable institutions, donors' tickets, &c.)*.....	6,424
	455,416

* 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 1920-1921, with corresponding account for 1919-1920.

MONTH	1919-1920	1920-1921	COMPARISON	
March.....	\$4,386.40	\$4,252.05	Decrease	\$134.35
April.....	8,148.10	7,098.65	Decrease	1,049.45
May.....	9,001.25	14,286.30	Increase	5,285.05
June.....	8,010.75	11,074.65	Increase	3,063.90
July.....	7,318.55	16,294.35	Increase	8,975.80
August.....	12,086.40	18,332.40	Increase	6,246.00
September..	10,017.35	19,019.00	Increase	9,001.65
October.....	5,639.60	14,828.65	Increase	9,189.05
November..	5,937.60	4,671.10	Decrease	1,266.50
December...	1,414.95	3,226.30	Increase	1,811.35
January....	1,057.05	5,257.55	Increase	4,200.50
February...	1,244.05	3,047.85	Increase	1,803.80
	\$74,262.05	\$121,388.85	Increase	\$47,126.80

The total receipts from admissions during the year were the largest in the history of the Gardens. But the cost of maintenance has progressively increased; so much so, that it became necessary to increase the admission rate to thirty-five cents for adults and fifteen cents for children to take effect June first, 1920. In spite of this, the exceptionally large number of visitors admitted during the year clearly shows the continued growth in the popularity of the Garden.

Because of the unsettled condition of labor and the difficulty in procuring materials, little new building was undertaken. Nevertheless, the north wing of the Lion House has been altered, and six new cages erected. An enclosure for the Himalayan Thars, and also an outdoor enclosure for the exhibition during the summer

months of non-poisonous snakes were constructed. The buildings have been much improved by painting, and more than the usual number of repairs and minor improvements have been completed during the year.

Through the co-operation of the New York Zoological Society and the National Zoological Park in Washington, the Society has been fortunate in being able to obtain many specimens collected for them and brought to this country from South Africa by Dr. A. K. Haagner, arriving in Philadelphia September 3rd by the Steamer "Chinese Prince." Dr. Haagner deserves much credit for having brought these animals so long a distance in such excellent condition. Among the more important may be mentioned the Southern Giraffe, a species which we have not hitherto had in our collection; the Greater Kudu; the Gemsbok; the Brindled Gnu; Chapman's Zebra; and many other interesting mammals and rare birds. On November the 10th, Mr. Ellis S. Joseph arrived in New York for the first time in three years with a very large shipment of birds, mammals and reptiles from Australia, Tasmania and New Guinea. From this collection the Society purchased many specimens.

Your board announces with deep regret the death on August 11th, 1920, of Dr. William Henry Furness, 3rd, who was elected a member of the Board of Directors November the 8th, 1916.

TREASURER'S REPORT.

INCOME AND EXPENDITURES.

For the fiscal year ending February 28th, 1921.

INCOME.

Admission receipts.....	\$121,388.85
Rents at Garden.....	1,500.00
Interest.....	3,177.87
Sale of animals.....	2,583.00
Sale of guides.....	1,189.25
Sale of souvenir booklets.....	624.30
Sale of souvenir post cards.....	597.00
Donkey rides.....	2,543.85
Sundry receipts.....	3,613.67
From estate of Lewis S. Ware.....	2,898.13
Received from the City of Philadelphia through the Commissioners of Fairmount Park.....	50,000.00
Total income.....	<u>\$190,115.92</u>

EXPENDITURES.

Salaries.....	\$41,126.93
Office expenses.....	1,351.36
General expenses.....	81,846.66
Purchase of animals.....	20,825.59
Permanent improvements.....	19,699.25
Transferred to Emergency Fund....	25,000.00
Total expenditures.....	<u>\$189,849.99</u>
Excess of income over expenditures.....	265.93
	<u>\$190,115.92</u>

C. S. W. PACKARD,
Treasurer.

Audited and found correct, April 26, 1921.

STOCKTON BATES & SONS.

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

MAMMALS.....	671
BIRDS.....	1,719
REPTILES.....	771
AMPHIBIANS.....	50
	3,211

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

Rhodesian Baboon, *Papio rhodesiæ*, Haagner.

Hab., Umtali, South Rhodesia.

One presented September 3d by The National Zoological Gardens of Pretoria, South Africa.

This Baboon is a recently discovered species, described by Dr. A. K. Haagner, Director of the National Zoological Gardens of Pretoria, South Africa.

Margay, *Felis tigrina*.

Hab., Mexico to Paraguay.

One by purchase July 21st.

Large-spotted Genet, *Genetta tigrina*, A. Smith.

Hab., South Africa.

One by purchase September 3d.

Small-spotted Genet, *Genetta felina* (A. Smith.)

Hab., South Africa.

One by purchase September 3rd.

Large Gray Mongoose, *Herpestes caffer*, Thomas.

Hab., South Africa.

One by purchase September 3rd.

Yellow Mongoose, *Herpestes gracilis typicus*, Rupp.

Hab., South Africa.

One by purchase September 3rd.

Silver Fox, *Canis chama*, A. Smith.

Hab., South Africa.

One by purchase September 3rd.

Striped Zorilla, *Zorilla striata*, Layard.

Hab., Central and South Africa.

Two by purchase May 4th.

Collared Bear, *Ursus collaris*, Cuvier.

Hab., Northern Islands of Japan.

One by purchase December 16th.

This very rare bear was purchased from the Captain of the Steamship "William H. Webb," who secured it in Japan.

Syrian Bear, *Ursus syriacus*, Ehrenb.

Hab., Asia Minor.

One by presentation August 26th.

South African Ground Squirrel, *Xerus capensis*, Tuntink.

Hab., South Africa.

Three by purchase September 3rd.

South African Porcupine, *Hystrix africae-australis*, Peters.

Hab., South Africa.

Two by purchase September 3rd.

Gemsbok, *Oryx gazella*, Gray.

Hab., South Africa.

One by purchase September 3rd.

Greater Kudu, *Strepsiceros capensis*, A. Smith.

Hab., South Africa.

One by purchase September 3rd.

Southern Giraffe, *Giraffa capensis*, deWinton.

Hab., South Africa.

One by purchase September 3rd.

Nail-tailed Wallaby *Macropus unguifer*, Gould.

Hab., N.-W. Coast of Australia.

Two by purchase November 10th.

Thigh-striped Wallaby, *Macropus thetidis*, Cuvier.

Hab., New South Wales.

Three by purchase November 10th.

Australian Catbird, *Ælurædus viridis*, Latham.

Hab., New South Wales to Eastern Australia.

Two by purchase November 10th.

Red-shouldered Green Glossy Starling, *Lamprocolius phænicopterus*, Bonaparte.

Hab., Cape Colony, South Africa.

Four by purchase September 3rd.

Raggi's Bird of Paradise, *Paradisea raggiana*, Selater.

Hab., S.-E. New Guinea.

One pair by purchase November 6th.

Indian Oriole, *Oriolus kundoo*, Sykes.

Hab., India.

One by purchase May 18th.

Parrot Finch, *Erythrura psittacea*, Gmel.

Hab., New Caledonia.

Two presented November 10th by Ellis S. Joseph.

Buffalo Weaver, *Textor niger*, Strickl. & Selater.

Hab., South Africa.

Two by purchase September 3rd.

Sclater's Yellow-fronted Tanager, *Euphonia sclateri*, Bonaparte.

Hab., Porto Rico.

Two presented October 9th.

Common African Sparrow, *Passer griseus*.

Hab., South Africa.

Two by purchase September 3rd.

Gray-headed Cape Sparrow, *Passer melanorous*.

Hab., South Africa.

Ten by purchase September 3rd.

White-cheeked Lark, *Pyrrhulauda australis*, Smith.

Hab., South Africa.

One by purchase August 3rd.

White Wagtail, *Motacilla alba*, Linn.

Hab., Europe and Northern Asia.

Two by purchase July 21st.

Bay-backed Shrike, *Lanius vittatus*, Val.

Hab., India.

One by purchase May 18th.

Red-backed Shrike, *Lanius collurio*, Linn.

Hab., South Africa.

One by purchase September 3rd.

Australian Olivaceous Thrush, *Pachycephala olivacea*,
Vig. and Horsf.

Hab., Tasmania and South Australia.

Two by purchase November 10th.

Verditer Flycatcher, *Stoparola melanops*, Blyth.

Hab., Indian Peninsula into Southern China.

Two by purchase May 18th.

Pied Babbler, *Crateropus bicolor*, Jard.

Hab., Interior of South Africa.

One by purchase August 3rd.

Black-faced Thrush, *Dryonastes chinensis* (Scop).

Hab., Southern China.

Two by purchase July 21st.

Yellow-winged Bulbul, *Hemixus flavala*, Hodgs.

Hab., Himalayan Mountains.

Two by purchase May 18th.

Black-headed Pitta, *Pitta novæ-guinææ*, Mull.

Hab., New Guinea and Aru Islands.

One by purchase November 10th.

Sulphur and White Toucan, *Rhamphastos vitellinus*,
Licht.

Hab., Northern South America.

One by purchase July 21st.

Lineated Barbet, *Cyanops lineata*, Viell.

Hab., India.

Two by purchase May 18th.

Lilac-breasted Roller, *Coracias caudatus*, Linn.

Hab., South Africa.

One by purchase September 3rd.

Trinidad Motmot, *Momotus swainsoni*, Sclater.
 Hab., Islands of Trinidad and Tobago.
 Two by purchase April 20th.

Great-headed Goatsucker, *Podargus strigoides*.
 Hab., Australia and Tasmania.
 One by purchase November 10th.

Horned Parrakeet, *Nymphicus cornutus*, Rehnw.
 Hab., New Caledonia.
 One by purchase November 10th.

Swift Parrakeet, *Nanodes discolor*, Vig. and Horsf.
 Hab., S. E. Australia; Victoria and Tasmania.
 Two by purchase November 10th.

White-bellied Sea Eagle, *Haliastur girrenera*, Viell.
 Hab., Australia; New Guinea.
 Two by purchase November 10th.

Whistling Kite, *Haliastur sphenurus*, Gray.
 Hab., Australia; New Caledonia.
 Three by purchase November 10th.

African Sea Eagle, *Haliaeetus vocifer*, Cuvier.
 Hab., Africa.
 One by purchase September 3rd.

African Hawk Eagle, *Nisæetus spilogaster*, Bonaparte.
 Hab., South Africa.
 One by purchase September 3rd.

Brown Carrion Hawk, *Ibycter chimango*, Kaup.
 Hab., Southern South America.
 Two by purchase June 9th.

African Eared Vulture, *Otogyps auricularis*, G. R. Gray.
 Hab., South and Northeast Africa to Egypt.
 One by purchase September 3rd.

Red-legged Partridge, *Caccabis rufa*, Linn.
 Hab., Europe.
 Two by purchase June 9th.

Coqui's Francolin, *Francolinus coqui*, Bohm.

Hab., East, South and Southwest Africa..

Two by purchase September 3rd.

Red-winged Francolin, *Francolinus garipeensis*, Smith.

Hab., South-east Africa.

Three by purchase September 3rd.

Horsfield's Pheasant, *Gennæus horsfieldi*, Gray.

Hab., Eastern India.

Two by purchase August 3rd.

Douglas' Quail, *Lophortyx douglasi*, Vig.

Hab., Western Mexico.

Thirty-two by presentation January 5th.

Australian Green-winged Dove, *Chalcophaps chrysochlora*, Gould.

Hab., Timor Group; Australia; New Caledonia;
S.-E. New Guinea.

Eight by purchase November 10th.

New Guinea Bronze-winged Pigeon, *Henicophaps albifrons*, G. R. Gray.

Hab., New Guinea and Papuan Islands.

Two by purchase November 10th.

Yellow-heart Pigeon, *Phlogænas rufigula*.

Hab., New Guinea and Northwest Papuan Islands.

Two by purchase November 10th.

Amethyst Dove, *Phlogænas margaritæ*, Salvad.

Hab., New Guinea.

Two by purchase November 10th.

Red-necked Rail, *Hypotaenidia brachypus*, Ramsay.

Hab., Western and Southern Australia; Tasmania.

Two by purchase November 10th.

Pectoral Rail, *Hypotaenidia philippinensis*, Linn.

Hab., Indo-Malayan Islands to Celebes; Moluccas to
Australia and New Zealand.

Two by purchase November 10th.

Purple-throated Trumpeter, *Psophia napensis*, Scl. and Salv.

Hab., Ecuador.

Two by purchase July 21st.

American Oystercatcher, *Hæmatopus palliatus*, Temm.

Hab., Temperate and Tropical America.

One by purchase December 2nd.

Pacific White-necked Heron, *Notophoyx pacifica*, Lath.

Hab., Australia.

Two by purchase November 10th.

Nankeen Heron, *Nycticorax caledonicus*, Gm.

Hab., Australia, north to Celebes.

One by purchase November 10th.

White-bellied Stork, *Abdimia abdimii*, Bonaparte.

Hab., Tropical Africa.

One by purchase September 3rd.

Lesser White-fronted Goose, *Anser erythropus*, Newt.

Hab., Lapland eastwards and Siberia.

Two by purchase August 4th.

Ashy-headed Goose, *Chlæphaga poliocephala*, Scl.

Hab., Patagonia and Chiloe Islands.

Two by purchase May 18th.

Eyton's Tree Duck, *Dendrocygna eytoni*, G. R. Gray.

Hab., Australia.

Two by purchase November 10th.

Yellow-billed Tree Duck, *Anas undulata*, Dubois.

Hab., South and East Africa.

Two by purchase May 18th.

Crimson-billed Duck, *Pæcilonetta erythrorhyncha*, Gurn.

Hab., South Africa.

Two by purchase September 3rd.

White-eyed Duck, *Nyroca australis*, Gould.

Hab., Australia; Tasmania; New Zealand.

Two by purchase August 3rd.

Fresh Water Turtle, *Pelomedusa galeata*.

Hab., South Africa; Madagascar.

One by purchase September 3rd.

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

- 1 green monkey (*Cercopithecus callitrichus*) ♂, May 1st.
- 3 rhesus macaques (*Macacus rhesus*) ♀, March 21st;
♂s May 15th and June 12th.
- 1 bonnet macaque (*Macacus sinicus*), ♀, January 13th.
- 1 Guinea baboon (*Papio sphinx*), ♀, July 4th.
- 2 ring-tailed coati (*Nasua nasua*), July 9th.
- 2 California hair seals (*Zalophus californianus*), March
11th and June 2nd.
- 5 prairie dogs (*Cynomys ludovicianus*), June 9th.
- 34 waltzing mice (*Mus wagneri rotans*) 5, November 8th;
6, November 10th; 6, December 13th; 9, January
29th; 3, February 18th and 5, February 22nd.
- 4 coypus (*Myocastor coypus*), August 11th
- 1 Prjevalsky's wild horse (*Equus prjevalskii*), ♂, May
16th.
- 1 Burchell's zebra (*Equus b. burchelli*) ♀, April 24th.
- 1 zebu (*Bos indicus*) ♀, July 21st.
- 1 American bison (*Bison bison*) ♀, November 15th.
- 1 Indian antelope (*Antilope cervicapra*) ♀, November
5th.
- 1 nylghaie (*Boselaphus tragocamelus*) ♂, October 19th.
- 2 Himalayan tahrs (*Hemitragus jemlaicus*) ♀, May 26th;
♂, June 4th.
- 2 aoudads (*Ovis tragelaphus*) ♀, March 28th; ♂,
March 31st.
- 2 red deer (*Cervus elaphus*) May 24th and June 23rd.
- 2 American elk (*Cervus canadensis*) ♂s, June 9th and
18th.
- 4 fallow deer (*Cervus dama*) 2 ♂s, June 4th; ♀s June
7th and 9th.
- 1 axis deer (*Cervus axis*) ♂, February 21st.
- 3 hog deer (*Cervus porcinus*) ♀s, May 20th and 27th
and January 31st.
- 4 Japanese sika deer (*Cervus sika typicus*) May 23rd,
June 9th and 27th and July 6th.
- 1 Kashmir deer (*Cervus cashmirianus*) ♂, June 26th.
- 1 Barasingha deer (*Cervus dudauceli*) ♀, March 11th.

- 4 white-tailed deer (*Mazama virginiana*) ♂s, June 15th and July 4th; ♂ and ♀, July 6th.
- 2 llamas (*Lama glama*) ♂s, August 9th and January 10th.
- 1 hippopotamus (*Hippopotamus amphibius*) ♂, December 8th.
- 9 silver pheasants (*Gennæus nycthemerus*) 7, April 30th; 2, May 16th.
- 2 American herring gulls (*Larus argentatus*) June 8th and 10th.
- 19 common water snakes (*Tripidonotus s. sipedon*), September 29th.
- 18 common garter snakes (*Thamnophis s. sirtalis*), August 21st.
- 6 ground rattlesnakes (*Sistrurus miliaruis*), June 9th.
- 9 banded rattlesnakes (*Crotalus horridus*), September 29th.
- 14 western diamond rattlesnakes (*Crotalus a. atrox*), October 21st.

LIST OF ADDITIONS TO THE COLLECTION FOR THE YEAR ENDING
FEBRUARY 28TH, 1921.

1920.

- Mar. 2. 1 red-shouldered hawk presented by the Pennsylvania Game Commission, Harrisburg, Pa.
10. 1 blue and yellow macaw presented by Fred Miller, Philadelphia.
11. 1 Barasingha deer and 1 California hair seal born in the garden.
18. 2 demoiselle cranes purchased.
1 alligator presented by John W. Graham, Philadelphia.
21. 1 rhesus macaque born in the garden.
25. 1 bald eagle purchased.
28. 1 aoudad ♀ born in the garden.
30. 3 mallard ducks ♂s presented by Mrs. Schwindt, Philadelphia.
31. 1 aoudad born in the garden.
6 American coots, 2 Egyptian geese, 4 common waxbills, 2 Senegal fire finches, 4 red-beaked weavers, 2 Bishop weavers, 1 great green macaw and 4 cape sparrows purchased.
- April 1. 1 muskrat ♂ presented by Eugene Crowe, Philadelphia.
2. 1 common marmoset ♀ presented by Miss May D. Brauner, Philadelphia.
3. 1 common box tortoise presented by Miss Mabel W. MacSorley, Philadelphia.
3. 3 black gorgeted jay thrushes and 6 chestnut-eared finches purchased.
4. 1 common box tortoise presented by George W. Bassett, Philadelphia.
6. 2 Japanese teal, 6 American black ducks and 4 pin-tailed ducks purchased.
8. 3 Indian porphyrio and 2 cape doves ♂ ♀ purchased.
11. 1 alligator presented by B. F. Miller, Camden, N. J.
20. 1 capybara ♂, 2 pinche marmosets, 2 banded toucans, 2 pileated jays, 2 blue-crowned conures, 2 Trinidad motmots, 1 crimson-backed tanager, 1 Cayenne red-breasted blackbird, 2 Wagler's orioles and 1 orchard oriole purchased.
23. 1 undulated grass parakeet presented by Mrs. Eaton Cromwell, Philadelphia.
3 chacma baboons and 2 Stanley cranes purchased.
24. 1 pileated jay presented by Henry Bartels, New York.
1 blue-crowned conure purchased.
1 Burchell's zebra ♀ born in the garden.
27. 1 red-crested cardinal, 1 sooty mangabey, 1 Chukar partridge and 1 red kangaroo purchased.
28. 1 Barbary turtle dove presented by Mrs. J. F. Mayer, Philadelphia.
7 chicken snakes, 4 black snakes, 7 king snakes, 1 long-nosed sand snake, 1 harlequin snake and 2 Mexican guans purchased.
29. 2 silver-blue tanagers, 1 palm tanager, 1 chestnut-capped tanager, 1 yellow hangnest, 2 pileated jays, 4 Derby's tyrans, 1 gray clarin, 1 black-headed grosbeak, 2 Wagler's orioles, 4 lark sparrows, 2 Peruvian squirrels, and 2 variegated teguixins purchased.
30. 8 silver pheasants born in the garden.
- May 1. 1 green monkey born in the garden.
4. 1 American green lizard presented by Miss L. B. Thatcher, Philadelphia.
2 striped zorillas purchased.
5. 1 common opossum presented by Harry Gurlock, Philadelphia.
8. 5 water moccasins, 5 whip snakes, 5 Lindheimer's snakes, 5 Emory's snakes and 5 Say's pine snakes purchased.
11. 5 black snakes, 3 chicken snakes, 1 corn snake, 3 common garter snakes, 3 Sacken's garter snakes, 5 king snakes, 5 keeled green snakes, 5 common hog-nosed snakes, 5 black hog-nosed snakes, 1 scarlet snake, 5 banded water snakes, 5 brown water snakes, 1 cyclops water snake and 5 whip snakes purchased.
12. 1 alligator presented by Ralph Bozorth, Philadelphia.
1 pine snake presented by Clarence Fisher, Ambler, Pa.
13. 2 banded toucans purchased.
14. 1 common opossum presented by George H. Mitchell, Philadelphia.
2 banded rattlesnakes purchased.
15. 1 American green lizard presented by Miss Betty Shenton, Philadelphia.
1 rhesus macaque born in the garden.
1 alligator presented by Arnold H. Moses, Merchantville, N. J.
16. 1 American green lizard presented by Mrs. T. Hart Smith, Philadelphia.
1 alligator presented by Mrs. Kern Dodge, Philadelphia.
1 gilla monster purchased.
1 Prjevalsky's wild horse born in the garden.
18. 1 California hair seal, 2 yellow-billed ducks, 2 ashy-headed geese, 1 wandering tree pie, 1 yellow-billed whistling thrush, 2 Malabar green bulbuls, 2 white throated jay thrushes, 1 bay-backed shrike, 2 lined barbest, 1 Indian oriole, 2 silver-eared lothrix, 3 chestnut-headed buntings, 2 yellow-winged bulbuls, 2 verditer flycatchers, 30 fence lizards, 38 wave-lined lizards 26 six-lined lizards and 19 American green lizards purchased.
20. 1 hog deer born in the garden.

- May 22. 4 American green lizards presented by Charles Jefferson, Philadelphia.
 4 screech owls ♀, 3 young) presented by E. Heacock, Wyncote, Pa.
 1 Salle's amazon presented.
 23. 1 black snake presented by William Pepper, Newtown Square, Pa.
 1 striped water snake presented by Mrs. Kern Dodge, Philadelphia.
 1 Japanese Sika deer born in the garden.
 24. 1 crowned horned lizard presented by George Agnew, Ardmore, Pa.
 1 red deer born in the garden.
 26. 2 banded rattlesnakes presented by Gurdon Scoville, Haverford, Pa.
 4 alligators presented by Dr. G. Bumcke, Harrison, N. J.
 1 yellow-fronted amazon presented by Mr. Stohrer, Philadelphia.
 1 Himalayan tahr ♀ born in the garden.
 1 Say's king snake, 1 Say's pine snake, 5 common horned lizards and 11 colored lizards purchased.
 27. 1 hog deer born in the garden.
 28. 1 California hair seal purchased.
 31. 1 alligator presented by J. J. Krider, Philadelphia.
 June 1. 1 blue-fronted amazon presented by James D. Gibson, Philadelphia.
 2. 1 California hair seal born in the garden.
 1 milk snake presented.
 4. 2 fallow deer and 1 Himalayan tahr born in the garden.
 6. 2 American green lizards presented by Theodore Turner, Philadelphia.
 7. 1 fallow deer born in the garden.
 8. 1 American herring gull hatched in the garden.
 2 roseate spoonbills, 3 white ibis and 2 boat-billed herons purchased.
 9. 1 Japanese Sika deer ♀, 1 American elk ♂, 1 fallow deer, 5 prairie dogs and 6 ground rattlesnakes born in the garden.
 1 Tamandua anteater, 2 brown carrion hawks, 4 wood owls, 2 Chukar partridges, 2 Daubenton's curassows and 2 gila monsters purchased.
 10. 1 American herring gull hatched in the garden.
 1 raccoon ♂ presented by Clarence O. Rubright, Philadelphia.
 12. 1 rhesus macaque born in the garden.
 13. 2 barred owls (young) presented by George Shadels, Philadelphia.
 14. 1 alligator presented by Master Roy Moore, Hainseville, Fla.
 1 red-bellied terrapin presented by Dr. A. R. Renninger, Philadelphia.
 15. 1 white-tailed deer ♂ born in the garden.
 16. 1 box tortoise presented by Edward W. Mathers, Philadelphia.
 18. 1 American elk ♂ born in the garden.
 22. 1 Dekay's snake presented by Robert Parker, Philadelphia.
 23. 1 red deer ♀ born in the garden.
 1 sparrow hawk presented by Charles Levy, Philadelphia.
 26. 1 hybrid (red-Kashmir) deer ♂ born in the garden.
 27. 1 Japanese sika deer born in the garden.
 2 common box tortoise presented by Dr. Farrant, Philadelphia.
 28. 1 common garter snake presented by Robert Parker, Philadelphia.
 1 alligator presented by R. G. Stewart, Leslie, Mich.
 30. 1 common opossum ♀ presented by George J. Schwartz, Philadelphia.
 July 2. 1 striated terrapin presented by Dr. Chas. B. Penrose, Philadelphia.
 3. 1 milk snake presented by J. F. Sladen, Philadelphia.
 2 western diamond rattlesnakes and 1 whip snake presented by Louis J. Blank, Philadelphia.
 3 painted terrapin, 3 Muhlenberg's terrapin, 3 spotted terrapin and 3 common box tortoise purchased.
 4. 1 Guinea baboon ♀ and 1 white-tailed deer ♂ born in the garden.
 6. 2 white-tailed deer ♂ ♀ and 1 Japanese sika deer born in the garden.
 7. 1 alligator presented by Chas. H. Grakelow, Philadelphia.
 9. 2 ring-tailed coati born in the garden.
 15. 1 common box tortoise presented by Morris Steinberg, Philadelphia.
 16. 1 American green lizard presented by Mrs. J. F. Winkler, Philadelphia.
 20. 2 gray-breasted parrakeets presented by Francis C. Norris, Mt. Airy, Pa.
 21. 1 zebu ♀ born in the garden.
 1 red-faced spider monkey ♂, 1 margay, 1 jaguar ♂, 1 Brazilian tapir ♀, 1 capybara, 3 European robins, 2 white wagtails, 2 black bulbuls, 2 European redstarts, 2 scarlet ibis, 2 sun bitterns, 2 Yarell's curassows, 2 red-breasted guans, 2 purple-throated trumpeters, 2 Cayenne parrakeets, 2 yellow-headed coures, 2 white-eared coures, 1 festive amazon, 1 violet parrot, 3 common troupials, 2 white-faced tree ducks, 1 Brazilian teal, 2 black-faced thrushes, 1 Trinidad motmot and 1 sulphur and white toucan purchased.
 22. 2 peacock pheasants ♂ ♀ purchased.
 1 night heron presented by F. J. Braceland, Philadelphia.
 23. 1 alligator presented by Pennsylvania State Sanatorium for Tuberculosis, Hamburg, Pa.
 24. 1 black snake, 1 common water snake and 1 striped water snake purchased.
 25. 1 spotted terrapin presented by Wm. Bell, Philadelphia.
 1 European land tortoise presented by Chas. F. Kacy, Philadelphia.
 28. 2 woodchucks presented by Wm. Mosconi, Philadelphia.
 30. 1 California hair seal purchased.
 31. 2 alligators presented by Masters Frank T. and Geo. H. Siebert, Philadelphia

- Aug. 2. 2 musk turtles presented by F. Elwood Yarnall, Collingdale, Pa.
 3. 1 red-billed hornbill, 1 yellow-billed hornbill, 2 black-necked swans, 2 Horsfield's pheasants, 2 red-beaked weavers, 2 green glossy starlings, 4 crimson-eared waxbills, 2 red-shouldered whydah birds, 2 golden-headed weavers, 1 white-cheeked lark, 1 pied babbler, 2 Alexandrine parrakeets, and 2 white-eyed ducks (young) purchased.
 4. 2 lesser white-fronted geese purchased.
 7. 1 common hog-nosed snake presented by Irvin Haig, Philadelphia.
 8. 1 alligator presented by Mrs. Elizabeth M. Cook, Philadelphia.
 9. 1 green monkey presented by H. R. Mercer, Philadelphia.
 1 llama born in the garden.
 11. 4 coypus born in the garden.
 14. 2 red-eared terrapin presented by R. Tindell, Philadelphia.
 15. 1 alligator presented by Bertus Halvorsen, Philadelphia.
 1 night hawk presented by Calvin Wright, Philadelphia.
 18. 1 common hog-nosed snake presented by E. H. Matson, Peach Bottom, Pa.
 19. 1 great blue heron presented by Women's S. P. C. A., Philadelphia.
 21. 18 common garter snakes born in the garden.
 1 alligator presented by Mrs. Thos. S. Gassner, Glenside, Pa.
 22. 1 common box tortoise presented by Francis Lawrence, Philadelphia.
 25. 1 golden-crowned thrush caught in the garden.
 1 common chameleon presented by John A. Krause, Philadelphia.
 1 common box tortoise presented.
 26. 1 sparrow hawk presented by V. A. Grillett, Philadelphia.
 1 Syrian bear ♂ presented by Capt. W. Baggaley, New York City.
 27. 1 common black snake presented by Matthew Herdel, Philadelphia.
 28. 1 black bear ♂ presented by R. H. Hazen, Philadelphia.
- Sept. 1. 1 snapper terrapin presented by Master Francis Harkins, Villanova, Pa.
 2. 1 common box tortoise presented by R. N. Temple, Philadelphia.
 1 rhesus macaque ♂ presented by Dr. J. W. Seltzer, Pottsville, Pa.
 3. 4 waltzing mice born in garden, 1 southern giraffe ♂, 1 greater kudu ♂, 3 southern elands ♂♂♀, 1 Chapman's zebra ♂, 1 Leche antelope ♂, 1 gemsbock ♂, 2 brindled gnu ♂s, 2 blessing ♂♀, 2 springbock ♂♀, 2 chacma baboons ♂s, 2 vervet monkeys, 3 South African ground squirrels, 2 South African porcupines, 2 dingoes, 1 silver fox, 1 cape hyrax, 1 yellow mongoose, 1 large gray mongoose, 1 cape ratel, 1 large-spotted genet, 1 small-spotted genet, 1 African civet, 1 black-backed jackal, 1 fresh water turtle, 3 leopard tortoises, 5 gigantic zonurus, 1 angulated tortoise, 1 pied babbler, 1 Transvaal barbet, 3 Senegal turtle doves, 2 cape doves, 2 yellow-billed ducks, 2 crimson-billed ducks, 1 cape crowned crane, 1 tawney eagle, 2 bateleur eagles, 1 Africansea eagle, 1 African hawk eagle, 2 helmeted guinea fowl, 1 Coqui's Francolin, 3 red-winged francolins, 2 Swainson's francolins, 2 black spur-winged geese, 3 Egyptian geese, 6 yellow-billed hornbills, 2 rosy-faced lovebirds, 2 spotted eagle owls, 2 Meyer's parrots, 4 dark-backed pigeons, 1 lilac-breasted roller, 1 red-backed shrike, 4 red-shouldered green glossy starlings, 1 Burchell's glossy starling, 1 white-bellied stork, 3 gray touracous, 2 buffalo weavers, 1 African eared vulture, 1 Kolb's vulture, 15 red-headed finches, 1 Senegal fire finch, 2 maja finches, 2 scaly-fronted finches, 9 gray-headed cape sparrows, 3 common African sparrows, 6 yellowish-rumped seedeaters, 4 grenadier weavers, 1 golden-headed weaver, 10 red-beaked weavers, 1 long-tailed weaver, 4 great weavers, 4 crimson-eared waxbills, 3 black-faced finches, 31 zebra waxbills, 47 St. Helena waxbills, 6 violet-eared waxbills, 3 regal whydah birds, 17 black-throated seedeaters and 5 diamond sparrows received from African expedition.
 4. 1 yellow-bellied terrapin presented by Miss Mable Baltzer, Philadelphia.
 7. 1 alligator presented by Martin Kohn, Philadelphia.
 10. 8 common opossums (♀ and 7 young) presented.
 1 common water snake and young, 1 snapper terrapin and 1 painted terrapin presented by A. R. Allen, Philadelphia.
 14. 1 collared paccary presented by A. J. Drexel, Jr., Lakewood, N. J.
 16. 1 white-throated cebus presented by Mrs. Eva B. Guyer, Elkins Park, Pa.
 1 coypu presented by C. M. Fisher, Philadelphia.
 17. 1 red and yellow macaw presented.
 1 copperhead snake presented by Wallace Cleland, Philadelphia.
 20. 1 alligator presented by Miss Marion C. Nicholson, Haddonfield, N. J.
 2 alligators presented by Mrs. C. B. Grace, Philadelphia.
 21. 1 naked-throated bell bird purchased.
 22. 1 mouflon ♂ purchased.
 23. 1 brown cebus ♀ presented by Samuel Masland, Philadelphia.
 26. 1 loggerhead turtle presented by J. E. Smallwood, Philadelphia.
 1 common water snake presented by V. A. Grillet, Philadelphia.
 2 alligators presented by Anna Peters, Philadelphia.
 27. 19 common water snakes and 9 banded rattlesnakes born in the garden
- Oct. 2. 1 green monkey ♀ presented by Edward H. Weber, Philadelphia.
 1 alligator presented by John Strokch, Philadelphia.
 4. 1 alligator presented by W. S. Wilson, Wilmington, Del.

- Oct. 4. 1 red-bellied squirrel presented by Mrs. A. C. Milliken, Pottsville, Pa.
 5. 1 alligator presented by Dr. J. Hare Taylor, Philadelphia.
 1 alligator presented by N. N. Rosenberger, Philadelphia.
 6. 1 alligator presented by Mrs. G. E. Bradfield, Philadelphia.
 1 broad-winged buzzard presented by Miss Katherine Schmucker, Philadelphia.
 7. 1 spotted salamander presented by Dr. Frank G. Speck, Philadelphia.
 1 common box tortoise presented by Dr. E. S. Bowman, Philadelphia.
 8. 3 common raccoons ♂s presented by Pennsylvania State Game Commission, Harrisburg, Pa.
 9. 2 Selater's yellow-fronted tanagers presented by Jacob E. Gegenheimer, Philadelphia.
 10. 2 red-bellied terrapins presented by Douglas D. H. March, Philadelphia.
 11. 2 western diamond rattlesnakes presented by H. S. Higgins, Camden, N. J.
 2 Canada porcupines purchased.
 12. 1 brown cebus ♀ presented by Louis Burk, Philadelphia.
 14. 1 barred ground dove presented by Mrs. Charles S. Starr, Haverford, Pa.
 15. 1 sharp-shinned hawk and 1 great horned owl presented by S. Siebert Knode, Boonsboro, Md.
 19. 1 song sparrow ♂ caught in the garden.
 1 common ocelot and 1 llama ♀ purchased.
 1 red and yellow macaw presented by C. Ardley Shedaker, Philadelphia.
 1 common opossum ♂ presented by Dr. Chas. Bonney, Philadelphia.
 1 nylghaie ♂ born in the garden.
 21. 14 western diamond rattlesnakes born in the garden.
 31. 1 alligator presented by Luther D. Bieber, Philadelphia.
 1 alligator presented by J. Berger, Philadelphia.
 1 sparrow hawk presented by T. R. Wilson, Reading, Pa.
- Nov. 5. 1 great horned owl presented by Carroll S. Tyson, Jr., Philadelphia.
 1 Indian antelope born in the garden.
 6. 2 painted terrapin and 2 red-bellied terrapin presented by Wm. F. Wagner, Jr., Mt. Airy, Pa.
 8. 5 waltzing mice born in the garden.
 10. 6 waltzing mice born in the garden.
 2 nail-tailed wallabys, 3 yellow-footed rock kangaroos, 4 thigh-striped wallabys, 1 red-necked wallaby, 2 black wallabys, 1 Bernard's kangaroo, 1 robust kangaroo ♂, 4 squirrel-like phalangers, 2 vulpine phalangers, 4 long-nosed bandicoots, 6 White's cyclodus, 2 Raggi's birds of paradise, 1 kagu, 2 Australian catbirds, 4 satin bower birds, 2 Australian glossy starlings, 1 yellow-bellied parakeet, 12 roseate cockatoos, 1 horned parakeet, 5 king parakeets, 2 crimson-winged parakeets, 8 Australian green-winged doves, 4 blood-rumped parakeets, 2 amethyst doves, 4 Pennant's parakeets, 2 red-necked rails, 2 pectoral rails, 2 Swainson's lorikeets, 1 great-headed goatsucker, 4 struthideas, 2 Australian thicknees, 2 Pacific white-necked herons, 2 Australian cranes, 4 giant kingfishers, 4 gray-headed porphyrio, 1 Indian porphyrio, 2 Eyton's tree ducks, 2 maned geese, 1 Australian cassowary, 2 pied crow shrikes, 2 New Guinea bronze-winged pigeons, 2 yellow-heart pigeons, 1 blue-bonnet parakeet, 3 wedge-tailed eagles, 2 white-bellied sea eagles, 2 Pacific gulls, 3 whistling kites, 1 nankeen heron, 2 grand eclectus, 2 swift parakeets, 1 black-headed pitta, 4 spotted-sided finches, 2 long-tailed grass finches, 2 Australian oliveaceous thrushes, 1 American oyster catcher purchased.
 1 satin bower bird, 2 Pennant's parakeets, 2 long-tailed grass finches, 2 parrot finches and 5 white-breasted finches presented.
 13. 3 American green lizards presented by Jos. P. Fink, Darby, Pa.
 15. 1 American bison ♀ born in the garden.
 16. 1 bald eagle presented by Pennsylvania Game Commission, Harrisburg, Pa.
 22. 1 alligator presented by Mrs. Norris Cossaboom, Bridgeton, N. J.
 24. 2 alligators presented by George D. Van Sciver, Philadelphia.
 25. 2 mute swans purchased.
 28. 1 golden eagle presented by Pennsylvania Game Commission, Harrisburg, Pa.
 30. 1 Levaillant's amazon presented by H. R. Roberts, Villanova, Pa.
- Dec. 3. 1 Canada porcupine presented by Melvin Shellenberger, Pine Grove, Pa.
 5. 1 common opossum ♀ presented by Karl Westbrook, Philadelphia.
 8. 1 hippopotamus born in the garden.
 2 screech owls presented by Miss Clarissa Nell, Philadelphia.
 13. 6 waltzing mice born in the garden.
 14. 1 horned grebe presented by Elton M. Harron, Port Carbon, Pa.
 16. 1 collared bear purchased.
 19. 1 alligator presented by G. R. Richman, Wood Lynne, N. J.
 20. 1 white-fronted cebus presented by Mrs. Harry D. Armor, Ardmore, Pa.
 21. 1 alligator presented by Hollinshead T. Martin, St. Martin's, Pa.
 22. 1 barred owl presented by The R. M. Hollingshead Co., Camden, N. J.
 28. 1 Barbary turtle dove presented by Mrs. W. C. Purdy, Philadelphia.
1921.
 Jan. 2. 1 alligator presented by C. Champ, Philadelphia.
 5. 32 Douglas' quail presented by Mr. Daniel M. Barringer, Philadelphia.
 1 South African silver fox ♀ purchased.
 4 grizzly bears born in the garden.

- Jan. 8. 1 alligator presented by Frank D. Laws, Philadelphia.
 9. 8 red salamanders presented by John Sladen, Philadelphia.
 10. 6 painted terrapins and 1 Muhlenburg's terrapin purchased.
 1 llama ♂ born in the garden.
 13. 1 bonnet macaque ♀ born in the garden.
 20. 1 common opossum ♀ presented by Earnest C. Schranz, Philadelphia.
 22. 2 alligators presented by National Metal Edge Box Co., Philadelphia.
 23. 2 brown bears born in the garden.
 2 alligators presented by Miss Anna Scheel, Philadelphia.
 24. 1 rhesus macaque ♂ presented by Mr. Brenner, Camden, N. J.
 28. 4 pumas, ♀ and 3 young, purchased.
 29. 9 waltzing mice born in the garden.
 31. 1 hog deer ♀ born in the garden.
- Feb. 2. 1 short-eared owl presented by Mrs. F. Bartels, Philadelphia.
 10. 1 alligator presented by Mr. A. F. Russell, Philadelphia.
 12. 1 alligator presented by Wm. Harold Flood, Jr., Philadelphia.
 14. 19 red salamanders presented by J. Sladen, Philadelphia.
 16. 1 alligator presented by William White, Philadelphia.
 18. 3 waltzing mice born in the garden.
 3 common peafowl ♂s purchased.
 19. 1 yellow-fronted amazon presented by James Peirsol, Philadelphia.
 21. 1 axis deer ♂ born in the garden.
 22. 5 waltzing mice born in the garden.
 26. 1 sulphur-crested cockatoo presented by Mrs. Clara Ordwein, 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 28TH, 1921.

Your laboratory has been the seat of unusual activity during the past twelve months because the increase of exhibition specimens has brought a rise in the number of postmortems. As is usual many new arrivals die before they become accustomed to their surroundings and before the personnel of the Garden can study them enough to appreciate their individual requirements of food and habitation. The London Garden has repeatedly emphasized this point and credits itself in the death list with specimens dying within six months of arrival. This, it would seem, is a generous allowance and in order to be somewhat more strict in a critical analysis of our own statistics, a list of deaths in the first and second two weeks and in the second four weeks after arrival has been prepared. The number of deaths in each of these three periods, stands in no peculiar relationship to one another but the total mortality amongst specimens dying within eight weeks after

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....	1888	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
February 28, 1921....	2390	574	24.	671	126	18.7	1719	448	26.

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.

receipt is about 11 per cent. of the totals of new animals and 21 per cent. of our total mortality for the year. It would seem therefore that we might credit our deaths by a reduction of about a fifth, the remainder being about what might be expected of animals fairly well acclimatized.

The past year has seen many new specimens in our Garden, a total of 890 having been received. This being in excess of the average and the total number exhibited being larger than ever in the history of our records, it is not unexpected that our mortality would be high. The accompanying table will show the figures and permit comparisons. The percentage mortality of the mammals is slightly below the average whilst that of the birds is definitely higher than formerly and is the reason for the increase of the total mortality percentage.

The vast majority of the deaths have been in small birds and mammals, and a moderate number of old worn-out specimens have added to the list. There were some unfortunate deaths, as occurs every year, amongst unusual and valuable animals, which therefore deserve special mention. The Great Kudu died from acute gastritis probably due to some excessive quantity of soft food. Ordinarily food of this character passes to the abomasum directly and if spoiled can start trouble there primarily.

During the late autumn and early winter there occurred an outbreak of enteritis amongst the deer and new elands, resulting in six deaths. This was not an infectious process as judged by the necroptical appearances but one of toxic nature. It seemed as if the stomach was relatively little involved, with perhaps the exception of the pyloric end of the abomasum, and that the whole small intestine bore the brunt of intoxication. As a probable cause was a poor dirty grade of hay.

The pair of Raggi's Paradise Birds died shortly after arrival, the first, the female, probably the result of domestic infelicity since she had been vigorously pecked upon the head and neck. The male died later from enteritis of rather serious grade to which he must have

put up some resistance since the changes were quite marked. It may have been incorrect diet upon our part but it is possible that visitors may have been responsible since the birds attracted much attention and I personally saw them being fed by outsiders. The Bower birds died from enteritis also but of a distinctly infective nature, it would seem not directly related to feeding. In September a large consignment of new Marsupials were received numbering amongst them several species never before shown in the Garden (Bernard's Kangaroo, Thigh-striped and Nail-tailed Wallaby). Four of them have died with marsupial streptothricosis, Kangaroo disease of the jaw, a kind of actinomycosis, and present amongst these animals all over the world. They were exhibited in separate freshly cleaned cages well away from the old Kangaroos and where these animals had never been housed. It seems probable that they brought the disease with them. These are but general comments upon the important deaths; more specific discussion of pathological interest will be found in the second part of the report. The museum has been increased by 105 pathological specimens and 198 normal organs. All the monkeys have been retested and careful watch is being kept upon the birds since we have discovered some infestation with worms which carried off so many parrots a few years ago.

The staff remains the same and with the same relative duties. No publications or presentations have been made because of the pressure of routine work but we all have material under way.

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 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, 575.

Total MAMMALIA, 126.

Primates, 19; Lemures, 1; Carnivora, 27; Pinnipedia, 1; Rodentia, 14; Ungulata 43; Edentata, 1; Marsupialia, 20.

Total AVES, 448.

Passeres, 248; Picariæ, 20; Psittaci, 40; Striges, 25; Accipitres, 12; Columbæ, 16; Galli, 39; Hemipodii, 2; Alectorides, 5; Limicolæ, 2; Fulicariæ, 2; Gaviæ, 3; Herodiones, 8; Anseres, 21; Steganopodes, 1; Struthiones, 2.

Total REPTILIA, 1.

Caudata, 1.

DISEASES OF THE DIGESTIVE SYSTEM:

Abscess of mouth: Ungulata, 1.

Esophagitis: Primates, 1; Marsupialia, 1.

Proventriculitis: Passeres, 2; Picariæ, 1; Columbæ, 1; Galli, 1.

Gastritis: Marsupialia, 8; Carnivora, 6; Primates, 5; Ungulata, 3; Rodentia, 1;

Passeres, 1; Psittaci, 1; Accipitres, 1; Alectorides, 1; Herodiones, 1.

Gastric ulcers: Primates, 1; Carnivora, 1; Marsupialia, 1.

Enteritis: Carnivora, 15; Primates, 6; Ungulata, 5; Marsupialia, 5; Pinnipedia, 1;

Rodentia, 1; Passeres, 35; Psittaci, 13; Striges, 12; Galli, 8; Picariæ, 6; Anseres, 5; Herodiones, 3; Accipitres, 3; Columbæ, 3; Alectorides, 3; Fulicariæ, 2; Struthiones, 2; Limicolæ, 1; Steganopodes, 1.

Ileus and Volvolus: Primates, 1; Marsupialia, 1; Striges, 1.

Prolapse of Rectum: Ungulata, 1.

Liver:

Acute (degenerations, inflammations, etc.): Carnivora, 11; Ungulata, 5; Primates, 3; Marsupialia, 3; Rodentia, 2; Passeres, 23; Psittaci, 6; Striges, 3; Anseres, 3; Picariæ, 2; Columbæ, 2; Galli, 2; Herodiones, 1; Fulicariæ, 1; Struthiones, 1.

Chronic (Cirrhoses, etc.): Primates, 4; Marsupialia, 3; Carnivora, 1; Ungulata, 1; Passeres, 1; Striges, 1.

Cholelithiasis: Carnivora, 1; Marsupialia, 1.

Cholecystitis: Primates, 1; Passeres, 1.

Cholelithiasis: Rodentia, 1.

Pancreas disease: Carnivora, 2; Rodentia, 2; Ungulata, 1; Fulicariæ, 1; Struthiones, 1.

DISEASES OF THE CIRCULATORY SYSTEM:

Endocarditis: Carnivora, 1; Marsupialia, 1; Passeres, 1; Anseres, 1.

Pericarditis: Rodentia, 2; Primates, 1; Ungulata, 1; Galli, 2; Striges, 1; Accipitres, 1; Alectorides, 1.

Myocarditis: Rodentia, 2; Primates, 1; Edentata, 1; Anseres, 4; Passeres, 2; Accipitres, 2; Psittaci, 1.

Arteriosclerosis: Ungulata, 4; Psittaci, 2; Anseres, 2; Passeres, 1; Striges, 1; Herodiones, 1.

Atheroma: Ungulata, 3; Struthiones, 2; Picariæ, 1; Psittaci, 1; Accipitres, 1; Herodiones, 1.

Aneurysm: Psittaci, 1.

Thrombus: Ungulata, 1; Rodentia, 1.

DISEASES OF THE GENITO-URINARY SYSTEM:

Nephritis:

Acute: Ungulata, 6; Primates, 5; Carnivora, 5; Rodentia, 4; Marsupialia, 2; Edentata, 1; Passeres, 10; Striges, 5; Picariæ, 3; Galli, 2; Columbæ, 2; Herodiones, 1; Anseres, 1; Steganopodes, 1.

Chronic: Carnivora, 5; Primates, 3; Marsupialia, 2; Rodentia, 1; Pinnipedia, 1; Anseres, 3; Striges, 2; Passeres, 1; Picariæ, 1; Psittaci, 1; Galli, 1; Columbæ, 1; Accipitres, 1; Limicolæ, 1; Alectorides, 1.

Pyelonephritis: Psittaci, 1.

Cysts in kidney: Carnivora, 1; Psittaci, 1; Galli, 1.

Renal calculi: Ungulata, 2.

Cystic ovaries: Carnivora, 1.

Subinvolution of uterus: Marsupialia, 1.

Endometritis: Carnivora, 1.

DISEASES OF THE RESPIRATORY SYSTEM:

Pneumonia:

Broncho: Carnivora, 4; Ungulata, 4; Marsupialia, 4; Primates, 2; Rodentia, 1; Passeres, 17; Psittaci, 4; Picariæ, 1; Columbæ, 1.

Lobar: Primates, 2; Carnivora, 1; Passeres, 1; Striges, 1.

Fibroid: Rodentia, 2; Ungulata, 1; Psittaci, 1.

Congestion of lung: Carnivora, 2; Primates, 1; Ungulata, 1; Passeres, 43; Galli, 6; Striges, 4; Psittaci, 3; Struthiones, 2; Columbæ, 1; Accipitres, 1; Alectorides, 1; Fulicariæ, 1; Anseres, 1.

Abscesses in lung: Marsupialia, 1.

Infarct: Passeres, 3.

Sinusitis: Primates, 1; Marsupialia, 1; Psittaci, 1.

Bronchitis: Ungulata, 1; Marsupialia, 1.

Pleuritis: Ungulata, 1; Rodentia, 1; Marsupialia, 1.

DISEASES OF THE LYMPHATIC SYSTEM:

Splenitis: Carnivora, 7; Primates, 5; Marsupialia, 5; Rodentia, 3; Ungulata, 1; Passeres, 25; Striges, 10; Psittaci, 9; Galli, 4; Picariæ, 2; Anseres, 2; Columbæ, 1; Accipitres, 1; Fulicariæ, 1; Steganopodes, 1; Struthiones, 1.
 Lymphadenitis: Primates, 2; Ungulata, 2.
 Amyloid: Passeres, 1; Striges, 1.

DISEASES OF THE SKELETON:

Osteomalacia: Primates, 3; Psittaci, 2; Columbæ, 2; Galli, 2; Passeres, 1.
 Rickets: Carnivora, 1.
 Osteomyelitis: Ungulata, 1; Passeres, 1.
 Septic Osteitis: Primates, 1.
 Arthritis: Passeres, 1; Striges, 1; Herodiones, 1; Struthiones, 1.
 Osteitis deformans: Primates, 1.

DISEASES OF THE SEROUS MEMBRANES:

Serositis: Passeres, 7; Psittaci, 2; Galli, 2; Anseres, 1.
 Peritonitis: Ungulata, 2.

INFECTIONS:

Mould: Passeres, 10; Psittaci, 2; Galli, 2; Accipitres, 1.
 Tuberculosis: Primates, 1; Ungulata, 1; Galli, 8; Passeres, 5; Anseres, 5; Picariæ, 3; Columbæ, 3; Accipitres, 2; Psittaci, 1; Alektorides, 1; Hemopodii, 1.
 Actinomycosis: Marsupialia, 1.
 Kangaroo Disease: Marsupialia, 3.
 Fowl Cholera: Picariæ, 1.

MISCELLANEOUS:

Tumors: Carnivora, 2; Primates, 1; Rodentia, 1; Psittaci, 3; Passeres, 1; Columbæ, 1; Struthiones, 1.
 Botryomycosis: Pinnipedia, 1.

PART II.

TUBERCULOSIS.

The quarantine rooms contained four monkeys awaiting retest at the end of the 1920 report period. 79 monkeys remained in the collection. Twenty new monkeys were received, four by birth which were not tested. 94 tuberculin tests were made, it being the year when all monkeys in the Garden are retested. None of the specimens in the old collection showed tuberculosis although 15 had to be retested and seven of these passed to separate cages. Amongst the new arrivals two monkeys gave such suspicious charts that they were killed, one showing tuberculosis at autopsy, the other failing to do so. At the end of the year no monkeys are being held.

There has been no tuberculosis in the exhibition cages since August 18, 1918, when the Orang "Silvia" died and with this exception none for 57 months.

Tuberculosis amongst the other animals is less than last year, 30 as against 37, the higher place being taken as usual by Aves. Indeed, the only mammal in the collection to have tuberculosis was the old buffalo. This disease affected 29 birds, 22 in the Bird House and seven outside of it, and occurred in the following orders: Galli, 8; Anseres, 5; Passeres, 5; Columbæ, 3; Picariæ 3; Accipitres, 2; Psittaci, Hemipodii, Alectorides, each one. There are 113 cages in the main house and 22 cases occurred in them. In 1920 14 cages were involved and eight of these cages were involved this year, showing a sterilization of only six. Four cages not containing tuberculous birds in 1920 were found infected this year.

Mould disease was rather important during the summer and fall but has lately dropped off quite materially. Twelve birds died of this disease, 10 in the new house

and two in the Parrot House; only six died in the 1920 period.

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The loss of a very good tapir from exhaustion and infection after prolapse of the rectum prompted a review of the condition and analysis of our records. This rather unusual condition is commonly due to straining during proctitis or colitis especially in the presence of tumors of the lower bowel or hemorrhoids, or to the effect of parasites causing tenesmus. It seems possible that straining might arise from inflammation high in the intestines. In birds one might imagine that trouble in the oviduct or collections within the cloaca might favor eversion or prolapse. Such indeed proves to be the case upon study of the records. There have been 13 cases of prolapse either of rectum or cloaca in ten orders of the 33 on exhibition, eight cases occurring in mammals and five in birds. In regard to the mammals there has been no one thing which stands out as a prominent cause. Three of the animals had enteritis and none was combined with parasites or tumors to favor a prolapse. Stones and parasites were present each once. In three instances the prolapse was entirely independent of demonstrable causes. Birds on the other hand present a definite picture; two of the five cases had general enteritis, one had uratic stones in the cloaca and three had trouble in egg laying; one had a broken egg, one too large an egg and one a salpingitis—all reasons for straining if not for a weakening of the anal muscle. This last factor and the lack of support to the perirectal tissues in the mammal are factors which are difficult to explain particularly in the cases without definite pathology to cause tenesmus. All that one can say, in the absence of a tumor demonstrable during life, is that enteritis in mammals and oviduct disease in birds are prominent predisposing factors.

Dr. Corson-White contributes the following interesting cases:

A Hamadryas Baboon, apparently adult upon arrival, was in the collection two years and died of inanition and

gastro-intestinal irritation. Inspection revealed an unusually small animal with all viscera, brain included, of a size corresponding to infancy, the genitalia being notably underdeveloped. The ductless glands were present and of proportions corresponding to the whole body. The mucosa of the alimentary tract seemed atrophic. The case appears then to be one of infantilism of the Lorrain type probably of gastro intestinal origin.

A Green Monkey was observed, four months before death, to be failing but without distinct signs of trouble until one month before the end, when definite inco-ordination was noted. No convulsion was seen but the animal staggered badly and seemed uncertain in recognition of objects. When received in the laboratory he was mentally dull, apparently quite blind and deaf. Inco-ordination was distinct, equilibrium maintained with difficulty and weakness was more pronounced on the left side. No disturbance of sensation was detected. Autopsy revealed a large abscess involving almost the entire cerebrum but the point of origin of this could not be determined.

The occurrence of Paget's disease of the bones or osteitis deformans in a reddish Woolly Monkey is worthy of record and will at a later time be published with a review of the incidence of the disease in lower animals. Such an observation is of interest because of its rarity since there can be found in the literature to date typical cases only in horses and fowls. In the former it involves chiefly the epiphyses whereas in this monkey and man the skull and diaphyses are principally involved. During life this animal showed a constant and definite retention of calcium, magnesium and phosphorus.

Dr. Weidman reports the following observations upon parasites:

This year very few worms have been reported, *i. e.* in only 4 per cent. of the autopsies as against a usual average of about 10 per cent. This does not include the microscopic blood parasites found this year because all cases were not completely studied in previous years. Including these (16) the percentage rises to eight.

The following parasitological incidents deserve record: *Intestinal obstruction the result of volvolus*. (Screech Owl No. 5550). Tapeworms were present in the loop of bowel.

Physaloptera turgida in the stomach of opossums. (Nos. 5637 and 6027). These worms have cropped out again after a lapse of a year, prior to which they were fairly regular sights at autopsies on opossums. (1914 Report, page 37).

Filaria in muscles of Porcupine. (No. 5678). Great numbers of this thread-like worm were found in practically every muscle of the animal's body. Its larvæ were found in the blood. This is the first time a muscular habitat for filaria has been noted in this laboratory apart from those in wild cats.

Periproventricular Filaria in Birds. These have occurred frequently but scatteringly this year as follows: two jays, three finches, a troupial, a waxbill, a chaffinch, a sparrow and a thrush. We have seen them and with equal frequency in past years, but have never taken active steps in the matter because prophylaxis against them seems impractical. The proposition is different from the spiroptera and other gastro-intestinal worms because the way to diagnosis of infested living birds lies in other directions than an examination of the droppings, that is, it might involve the taking of blood-smears, swabbing of the throat, etc., which would be more severe on the collection, perhaps, than the disease. We propose to watch the subject for another year and decide then whether the importance of the condition is still mounting sufficiently to warrant what would amount to a research and undoubtedly some loss to the collection.

Other Filarial Cases in Birds:—Two instances of this parasite in the abdominal air sacs of jays, and two in the thoracic ones of starlings go hand in hand with the considerations just indicated.

Tropidocerca:—This dangerous-looking, blood-red commensal has been met three times this year, *i. e.*, in a starling, a jay and a barbet. It inhabits the mucosa of

the proventricle, just as does that fatal parasite of birds, *Spiroptera incerta*. This one, however, induces no tissue changes, and furthermore it cannot be producing any important toxic substance to interfere notably with the host's health, because the ova of this parasite were found over eight years ago in the dejecta of our concave horn-bill (still living) and during that time the infestation has not caused any symptoms.

Uncinariasis:—There has been one case of hookworm disease this year, *i. e.*, in a Red Fox (No. 5681).

Hepaticola hepatica:—There has been but one development this year in this subject which has been investigated (and remarked in the annual reports) here for the last four years; but it is an important one because it indicates extension of the disease. Now a beaver (No. 5547) has come to autopsy with an infestation of its liver almost as extreme as any we have seen in the prairie dogs and white rats which we have experimentally infested or which have contracted the disease spontaneously. The course of the disease down-hill from the prairie dog enclosure to the beaver dam (water-borne?) may explain the extension, or it may have been a direct one from the rats just as the prairie dogs contracted it. This is the first time the beaver has been reported as affected by the parasite.

Amæbic Spider Monkeys:—This year the sole survivor of last years dysentery enzootic died. Amæbic cysts had been found in the animals stools, it had been quarantined, and treated with emetine and nutmeg. At autopsy only the healed scars of the ulcers remained, *i. e.*, the beast had recovered from his amæbic infection. We are, from this, inclined to think the better of nutmeg as a therapeutic agent; and we give credit to it rather than to emetine because *amæbæ* were still found in the stools *after* the course of emetine treatment.

We mention in passing that a spider monkey newly arrived in the Garden showed no amæbic structures in the stool.

Notoedres cati in *Capybara* (No. 5603):—This arachnoid induced mange in the capybara, just as it does in the cat and rabbit.

Spiroptera incerta recrudescence. This has been the most important and disturbing parasitological incident of the year. This parasite ran riot in the parrot house up to 1913, having been met with up to that time in 30 per cent. of all Psittaci coming to autopsy, and doubtless causing death in a large number of them. (See 1912 Report, page 41). Following this the disease was cleaned out, and had not reappeared in any birds up to the past year. During these eight years we had been routinely examining every newly arrived parrot to prevent re-entrance of the disease, but without detecting a single infestation.

	Bird	Autopsy No.	Habitat	Date of Arrival	Date of Death	Time in collection	Spi-ropters Species	How detected
Group I (south wing)	Lineated Barbet.	5776	India	5/18/20	9/14/20	4 mos.	Sp?	Autopsy
	Banded Toucan.	5789	Cent. Am.	4/20/20	9/20/20	5 mos.	"	"
	"	5823	"	4/20/20	10/7/20	6 mos.	"	Micro. exam.
	"	5909	"	5/13/20	11/16/20	9 mos.	"	"
	"	6042	"	5/13/20	2/9/21.....		"	"
Group II (north wing)	Grand Electus..	6040	Moluccas	10/11/18	2/6/21	4 mos.	Incerta	Autopsy
	Sun Bittern.....	6025	Cent. & So. Am.	7/21/19	12/2/21	6 mos.	"	"
	Mexican Guan..(Alive)		Mexico	4/28/20.....		10 mos.	"	Micro. exam.

Remarks:—The table above brings out several points. First, there is not, either in Group I or Group II a common geographical source. It appears as though the infestation had been acquired at the dealer's or here in the Garden.

Second, most of the birds arrived in the spring of 1920.

Third, the birds died within from four to ten months of their arrival. If we accept the idea that the infestation occurred here it means that the parasite kills rather quickly.

The present outbreak began in September, 1920, and concerns two very different groups of birds. The first came to light at autopsy on a Lineated Barbet, *i. e.*, not in the parrot family which we had been so carefully watching. Birds in the neighboring cages were at once examined with the result that three toucans were quarantined.* All of these occupied the extreme south wing

* In subsequent examination five months after the first test the Lineated Barbet's cagemate was detected and isolated. This gives some indication as to the time the worm takes to develop.

of the bird house, far from the major parrot collection and it will be noted, involved none of the parrot family. All have since died at the laboratory and found extensively infested.

The second focus was at the other extreme of the bird house and was first brought to light at autopsy on a Sun Bittern in January, 1921. Examination of its neighbors (guans) disclosed one infested bird which was isolated. We have traced the "contacts" which were associated with these diseased birds and examined them with negative results.

In review then, we had two different foci of the disease in widely different birds, and far from the original site of 1906-1912. This time the only parrot affected was a Grand Eclectus. This outbreak has at present none of the proportions of the old one, involving a total of only seven birds.

Before speculating as to the source of this new enzootic attention must be called to several additional points. I have closely examined the worms from one of these last toucans and the male is beyond doubt a spiroptera. It is very close to but not a species identical with *S. incerta*. On the other hand, a male worm from the Eclectus was identical with *S. incerta*. We must be dealing, therefore, in this last outbreak, with two different sources. I cannot conceive of a difference in hosts determining as much mutation as is indicated in the two males I studied. Referring back now to the old enzootic, I find that toucans, pigeons and several other scattered families were affected, but I do not find any records that the toucan or pigeon spiroptera were examined microscopically, as would be necessary to distinguish between the two species; so that there also, two different sources were possible and likely.

I believe therefore that we should suspect the toucans as one, and the parrots as the other, portal of entry of the disease. Be that as it may, we have examined all birds within a reasonable distance of the bad spots, and until eventualities decree otherwise recommend that an

extensive examination of the rest of the bird house be omitted.

Therapeutic Work. In 1912 I experimented with thymol and sodium cacodylate in an attempt to cure some of the quarantined and useless parrots. This time, having three toucans, I decided to try another arsenical preparation with the thymol, namely arsphenamine. Preliminary tests as to dosage on pigeons showed that they could tolerate enormous amounts, *i. e.*, up to 0.0375 gm. intravenously. This is, weight for weight, about six times the human dosage.

A corresponding dose of arsphenamine was then administered to the one surviving toucan (two had died during the preliminary pigeon work) together with thymol by mouth. The bird was a poor specimen and died in about 20 minutes. Autopsy showed the spiroptera deeply imbedded in the proventricular mucosa. All were translucent from the effects of the glycerine in which the thymol had been administered and were motionless. That is, the glycerine, which must have been saturated with thymol, had penetrated the mucosa sufficiently to saturate the worms. In about 20 minutes more the worms were pulled out and placed in warm salt solution over night. Next morning they were actively moving. Without further speculation as to what might have happened under other circumstances (longer exposure to thymol, etc.,) suffice it to say that again we are constrained to remark on the difficulty of animal medication.

Observations by Dr. E. A. Schumann upon Interesting Conditions found in the Female Genital Tract:

No. 5727. Brazilian Ocelot (*Felis chihigonazon*). Cystic Ovaries. The left ovary has been converted into a cystic mass 2 x 1 inch. The cyst is thin walled monolocular and is filled with a clear fluid. The right ovary is the seat of a small very thin walled cyst one-half inch in diameter also containing clear fluid.

No. 5836. King Parrakeet (*Aprosmictus cyanopygius*). Sarcoma of ovary. On opening the abdomen there is

found a marked visceral displacement owing to the presence of a mass apparently an ovarian growth. It is gray, roughly egg shaped, slightly nodular, firm, resilient, and seems to be cystic at one place. Section shows a small cyst with grayish fluid at the lower pole. The rest of tumor is gray-brown mottled and streaked. Near its insertion is a yellow-brown necrotic area about 1 x 1.5 cm. It is uniform in consistency and structure except for cyst and necrosis. No metastases found.

No. 5994. Common Opossum (*Didelphys virginiana*). There is subinvolution and total prolapse of left uterine cornu which has taken with it one inch of rectum. The cause of the prolapse could not be found.

No. 6071. Jaguar (*Felis onca*). Fibro adenoma of uterus. The body of the uterus is firm and cordlike. mucosa is blackish gray and uneven. There is gray fluid in the cavity. The right cornu has a bulge at about its middle which is a firm gray tumor 3 cm. long attached by short wide pedicle. Tumor is resilient and contains three small cysts containing clear fluid. Microscopic section shows a fibro-adenoma of a very cellular type. In the dilated acini one can see large vacuolated cells often resembling amœbæ. They are probably degenerated epithelia. In no area is the epithelial lining of the glands distorted or reduplicated.

TUMORS.

No. 5501. Common Raccoon ♀ (*Procyon lotor*). Simple adenoma of pancreas.

No. 5540. Undulated Grass Parrakeet ♀ (*Melopsittacus undulatus*). Adenoma of kidney.

No. 5696. Coypu Rat (*Myocastor coypus*). Sarcoma of right thyroid.

No. 5800. Java Sparrow ♀ (*Muniazory ivora*). Carcinoma of liver.

No. 5810. Scaly Ground Dove ♀ (*Scardapella squamosa*). Spindle cell sarcoma of left kidney with metastases to left tibia.

No. 5836. King Parrakeet ♀ (*Aprosmictus cyano-pygus*). Sarcoma of ovary.

No. 5840. Brown Cebus ♀ (*Cebus fatuellus*). Hypernephroma of right adrenal.

No. 5890. Undulated Grass Parrakeet ♀ (*Melopsittacus undulatus*). Alveolar round cell sarcoma of liver, spleen and kidney region.

No. 6041. Common Rhea ♀ (*Rhea americana*). Cystic papillary adenoma of duodenum.

No. 6071. Jaguar ♀ (*Felis onca*). Fibro adenoma of bile ducts. Fibro adenoma of uterus. Multiple cystic lymphangioma of omentum.

Respectfully submitted,

HERBERT FOX,

Pathologist.

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 MORGAN, ZILLAH
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 MOWLDS, THOMAS D.
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 MUCKLE, COL. M. RICHARDS
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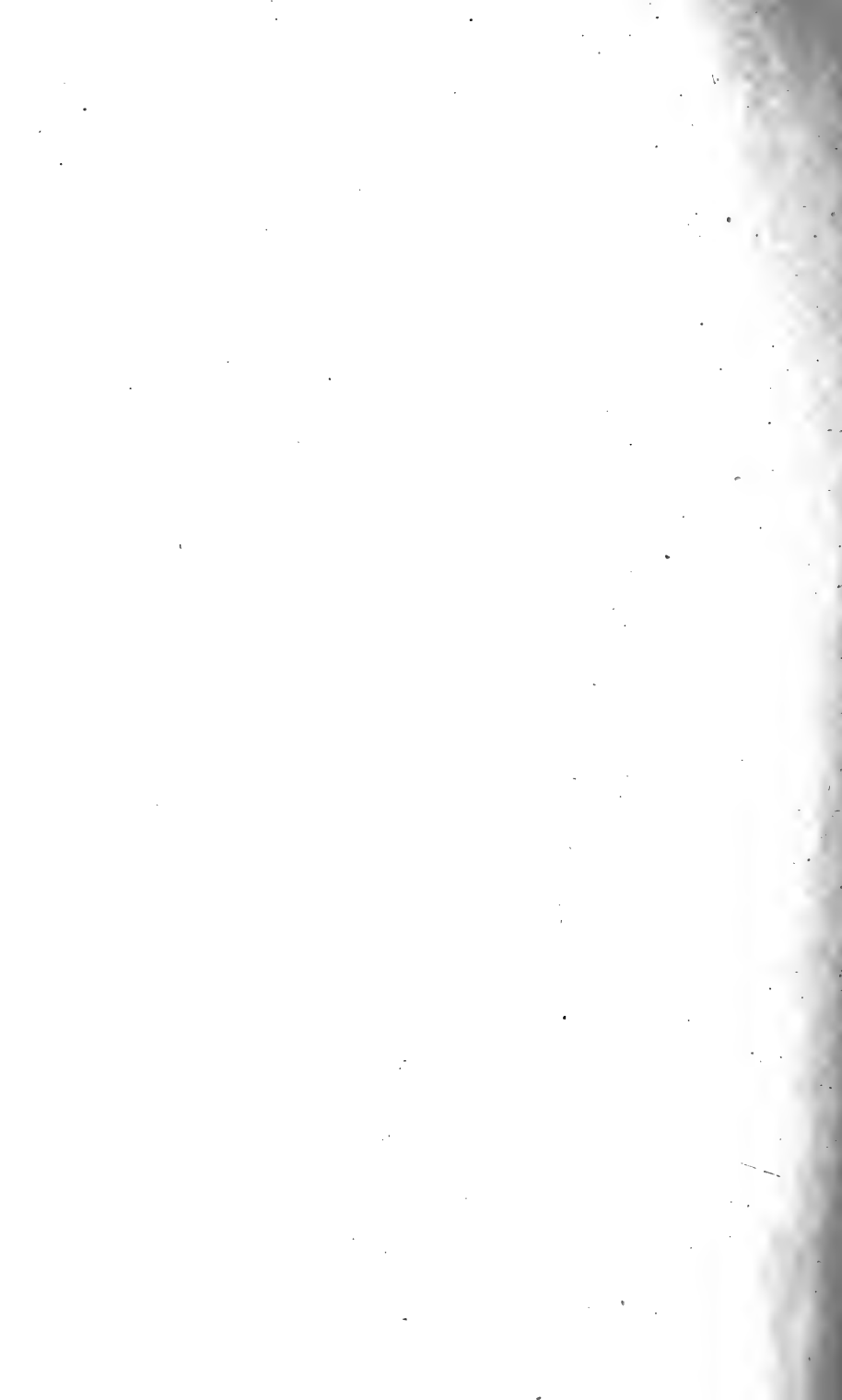
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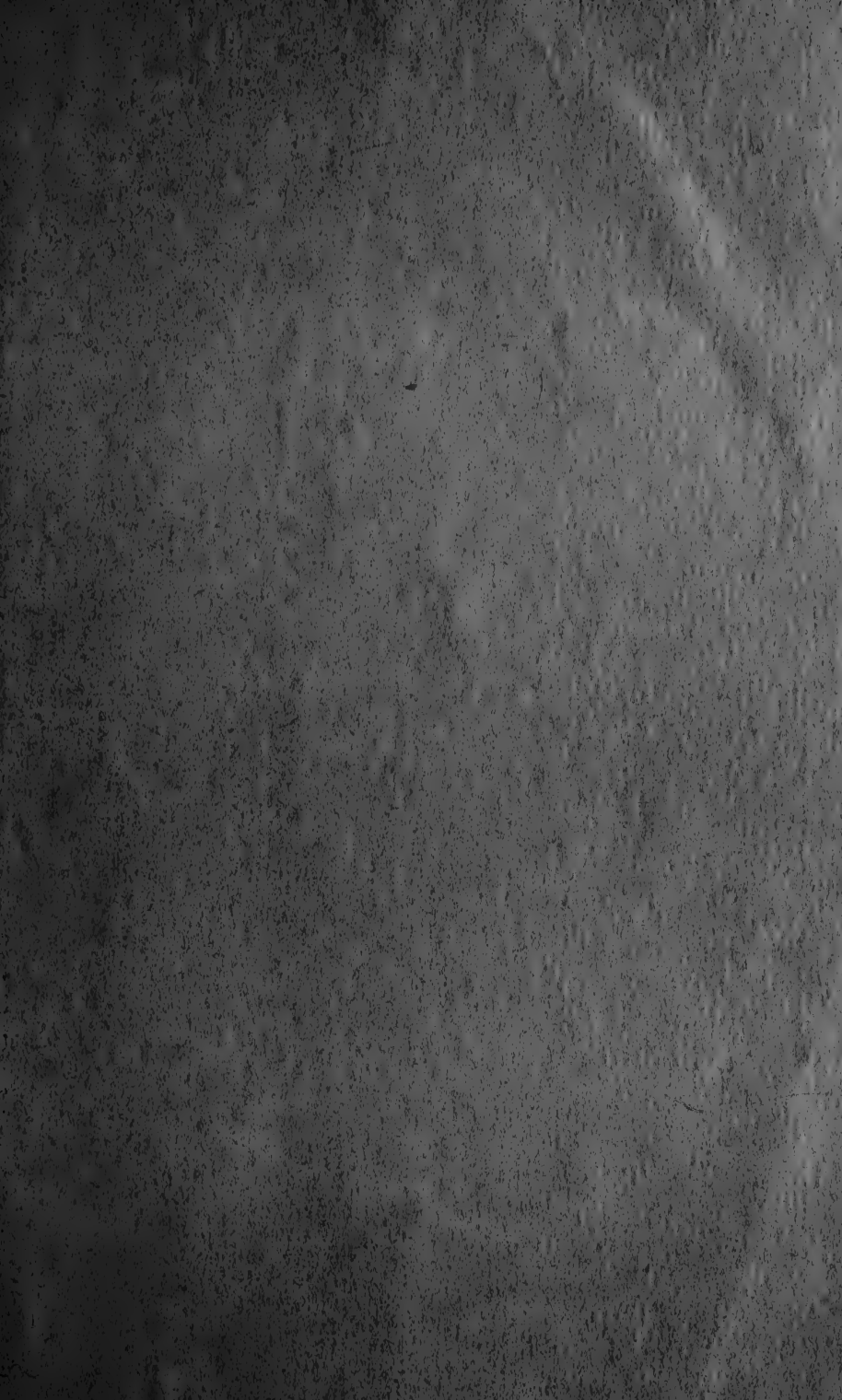
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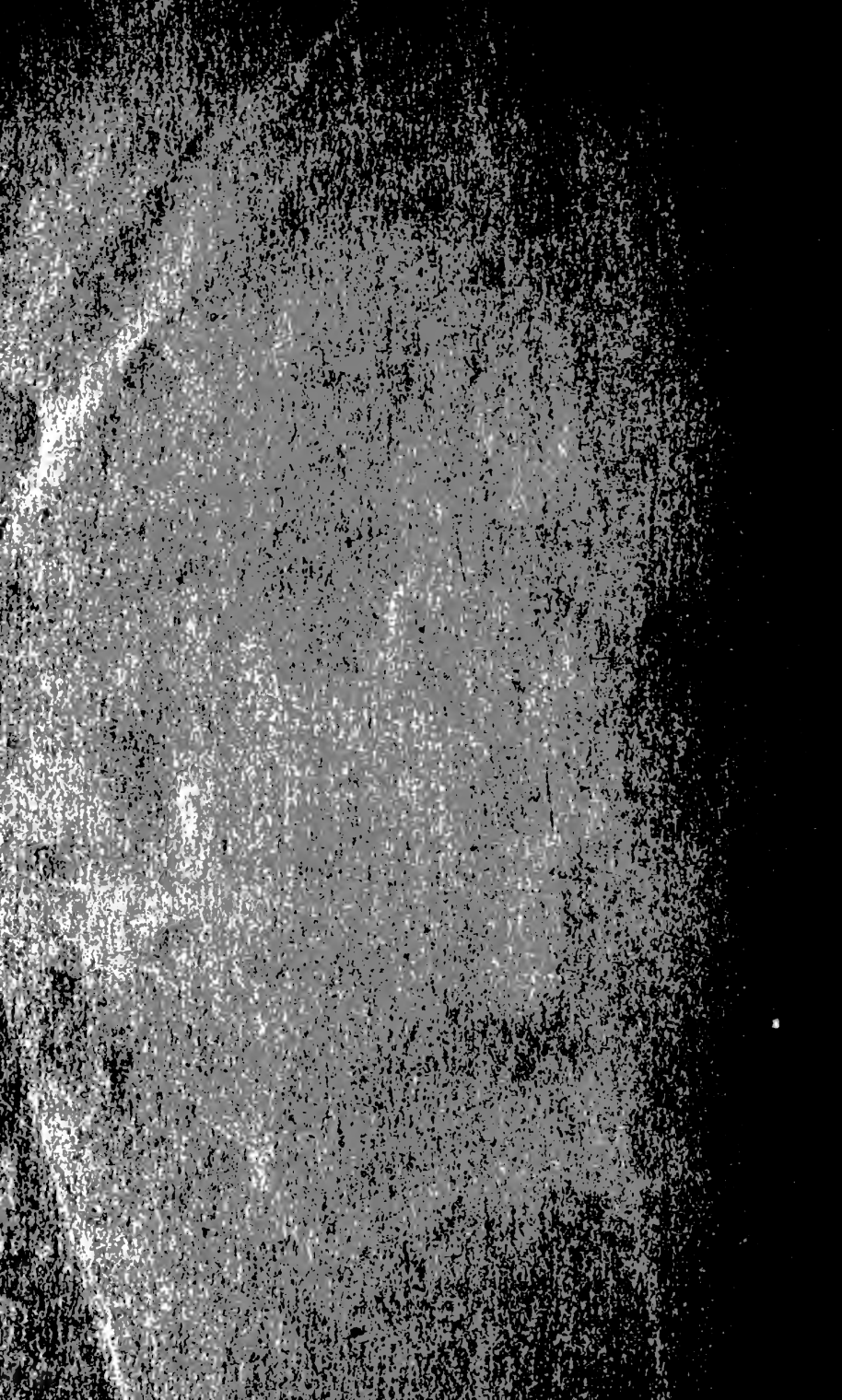
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