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A New List of the Chromosome Numbers in Vertebrata (March 1937)¹⁾

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At the request of Prof. Punnett, the editor of the *Journal of Genetics*, A Revised Check-List of the Chromosome Numbers in Vertebrata was published by us in that *Journal*, Vol. 26, in the year 1932²⁾. In that list were tabulated 180 species of Vertebrata, taxonomically different, in which the chromosome numbers had been reported more or less fully up to the beginning of the year 1932.

During the five years that have elapsed since the publication of our paper, a large number of cytological papers has been published. In several of these papers the investigations of previous authors on the chromosome numbers of the known species have either been revised or confirmed, while, a large number of other papers deal with cytologically new species and have recorded their chromosomal constitution. Thus, as far as we are aware, some 120 new species have been reported up to the end of March 1937. In these species their respective chromosome numbers as well as the nature of their sex chromosomes have been recorded. The literature pertaining to these investigations is of course voluminous, as much of the work previously done had to be repeated in order to settle the questions at issue regarding the chromosome numbers, etc.

Obviously, as the chief purpose of the tabulations of this kind is to keep the research workers informed of the additions to the knowledge that have taken place as well as to help the beginning students in undertaking new investigations, we deem it necessary to revise and issue such up-to-date lists from time to time. The

1) Contribution No. 119 from the Zoological Institute, Faculty of Science, Hokkaido Imperial University, Sapporo.

2) The original list was published in the *Zoological Magazine*, (Japan), Vol. 43, 1931.

following table has been compiled with a view to indicating briefly the remarkable increase that has taken place during recent years in our knowledge of the chromosome numbers of various species of Vertebrata.

Names of Classes	Nos. of Species, till 1932	Nos. of Species known at present	Nos. of References consulted
Cyclostomata	2	2	4
Pisces	18	39	40
Amphibia	41	68	140
Reptilia	51	77	46
Aves	11	27	46
Mammalia	57	92	245
Total	180	305	521

The following alterations and improvements have been incorporated in the existing list.

(1). Species investigated appear under different classes, grouped into families.

(2). The Arabic numerals in the first column refer to the number of species investigated.

(3). In naming the species, scientific names have been used first, the common or vernacular names used by the original authors being retained, but put into parentheses.

(4). Even scientific names have been altered where necessary, precedence being given to those proposed recently by more thorough taxonomical investigations, the old names being retained in parentheses.

(5). In the column of the diploid number, the number within parentheses denotes the diploid number of chromosomes presumed by the author, the presumption being based on the haploid number actually observed.

(6). All the three kinds of germ cells, namely, primary and secondary cytes and tids have been put together in a single column showing the haploid number (n). Abbreviations used for these cells and put in this column will be found in the list of abbreviations.

(7). The column indicating the fixatives employed by the authors in their investigations and the one showing references to

literature, both of which appeared in our previous list, have been omitted. A bibliography of papers giving their titles in full is incorporated with this new list.

Abbreviations used in the List

chrom.	= chromosome
diff. chrom.	= differential chromosome
div.	= division
hetero.	= heterogametic
J ₁	= the largest J-shaped chromosome
J (in <i>Homo</i>)	= Japanese
M	= macrochromosome
m	= microchromosome
M (in <i>Homo</i>)	= Manchurian
N (in <i>Homo</i>)	= Negro
oog	= oogonium
parth.	= parthenogenetic
path.	= pathological
postred.	= postreduction
prered.	= prereduction
prob.	= probably
R	= long rod-shaped chromosome
R ₁	= the longest rod-shaped chromosome
R ₂	= the second longest rod-shaped chromosome
r	= rod-shaped chromosome of medium size
sex-chrom.	= sex-chromosome
som	= somatic cell
spg	= spermatogonium
S	= chromosome of spherule-shape
tid	= spermatid
V	= large V-shaped chromosome
V ₁	= the largest V-shaped chromosome
V ₂	= the second largest V-shaped chromosome
v	= V-shaped chromosome of medium size
W (in <i>Homo</i>)	= White
X	= X-chromosome
Y	= Y-chromosome
W	= W-chromosome
Z	= Z-chromosome
♂ (I)	= primary spermatocyte
♂ (II)	= secondary spermatocyte
♀ (I)	= primary oocyte
♀ (II)	= secondary oocyte

I. CYCLOSTOMATA

No.	Species	Diploid number	Haploid number	Remarks	Author
1	<i>Bdellostoma burgeri</i>	48? spg	—	—	SCHREINER, '08
2	<i>Myxine glutinosa</i>	ca. 50 som	—	—	RETZIUS, '90
	—	ca. 52 spg ca. 52 som	26 ♂ (I, II)		SCHREINER, '04a, '04b

II. PISCES

A. Dipnoi

	Lepidosirenidae				
1	<i>Lepidosiren paradoxa</i>	36? som	—	—	MURRY, '06
	—	38 som	19 ♂ (I)		AGAR, '11, '12

B. Elasmobranchii

	Catulidae				
2	<i>Pristiurus melano-</i> <i>stomus</i>	—	30-50 ♀ (I)	—	KASTSCHENKO, '90
	(<i>Pristiurus</i> sp.)	ca. 36 spg 30-36 oog 30-36 som	ca. 18 ♀ (I, II)	—	RÜCKERT, '92
	(<i>Pristiurus</i> sp.)	24 spg	12 ♂ (I, II)	—	MOORE, '95; FARMER & MOORE, '04
3	<i>Scyllium canicula</i>	—	30-50 ♀ (I)	—	KASTSCHENKO, '90
	—	24 spg	12 ♂ (I, II)	—	MOORE, '94, '95; FARMER & MOORE, '04
	—	—	20-24 ♂ (I) 14-16 ♂ (II)	—	RAWITZ, '99
	—	—	17-19 ♀ (I)	—	CERRUTI, '08
	Squalidae				
4	<i>Spinax niger</i>	60-70 spg	—	—	SCHREINER, '07
5	<i>Squalus suckleyi</i>	62 spg	31 ♂ (I, II)	Sex-chrom. unknown	MAKINO, '37b
	Rajidae				
6	<i>Raja macrorhynchus</i>	24 spg	12 ♂ (I, II)	—	MOORE, '95; FARMER & MOORE, '04
7	<i>Raja maculata</i>	24 spg	12 ♂ (I, II)	—	MOORE, '95; FARMER & MOORE, '04

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
8	<i>Raja meerdervoortii</i> Torpedidae	104 spg	52 ♂ (I, II)	Sex-chrom. unknown	MAKINO, '37b
9	<i>Torpedo ocellata</i> (<i>Torpedo</i> sp.)	— 24 spg	30-50 ♀ (I) 12 ♂ (I, II)	— —	KASTSCHENKO, '90 MOORE, '95; FARMER & MOORE, '04

C. Teleostomi

	Salmonidae				
10	<i>Salmo fario</i> — (= <i>Trutta fario</i>) — ('Forelle')	— 24 som Prob. 12 som	12 ♀ (I, II) 12 ♀ (I, II) —	— — Sperm treated with radium	BÖHM, '91 BEHRENS, '98 OPPERMANN, '13
	—	84 som	—	—	PROKOFIEVA, '34
11	<i>Salmo (Trutta) lacustris</i>	—	24 ♀ (I, II)	—	BLANC, '94
12	<i>Salmo salar</i>	60 som	—	—	PROKOFIEVA, '34
13	<i>Salmo irideus</i> <i>Salmo salar</i> × <i>Salvelinus fontinalis</i>	12? spg 70 som	— —	— —	MRSIC, '23 PROKOFIEVA, '34
14	<i>Coregonus lavaretus baeri</i> <i>Coreg. l. baeri</i> × <i>Salv. font.</i>	80 som 80 som	— —	— —	PROKOFIEVA, '34 PROKOFIEVA, '34
15	<i>Oncorhynchus keta</i>	74	—	Primordial germ cells, sex undetermined	MAKINO, '33, '37a
	Anguillidae				
16	<i>Anguilla vulgaris</i>	36? spg, 36? oog	—	—	RODOLICO, '33
	Cyprinidae				
17	<i>Cyprinus carpio</i>	104 spg	52 ♂ (I, II)	—	MAKINO, '34b
18	<i>Carassius carassius</i>	94 spg	47 ♂ (I, II)	Goldfish and 'Funa'	MAKINO, '34b, '35
	Cobitidae				
19	<i>Misgurnus anguillicaudatus</i>	52 spg	26 ♂ (I, II)	Sex-chrom. unknown	MAKINO, '37a
	Esocidae				
20	<i>Umbra limi</i>	22 spg, 20? som	11 ♂ (I, II)	Prob. X-X ♂ ; X = V ₁	FOLEY, '26
	Cyprinodontidae				
21	<i>Oryzias latipes</i>	—	22-24 ♂ (I)	—	GOODRICH, '27

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Oryzias (Aplocheilus) latipes</i>	48 spg	24 ♂ (I, II)	Sex-chrom. unknown	IRIKI, '32a, '32b, '32c
22	<i>Lebistes reticulatus</i>	46 spg 46 oog	23 ♂ (I, II) 23 ♀ (I)	Prob. X-Y ♂	WINGE, '22, '23
	—	(46) spg	23 ♂ (I, II)	X-Y ♂	VAUPEL, '29
	—	46 spg	23 ♂ (I, II)	Sex-chrom. unknown	IRIKI, '32a, '32b
23	<i>Xiphophorus hellerii</i>	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
24	<i>Xiphophorus montezumae</i>	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
	(<i>Xiphophorus</i> sp.)	(48) spg	24 ♂ (I)	Prob. X-X ♂	RALSTON, '34a, '34b
	<i>Xiphophorus</i> × <i>Platypoecilus</i>	(48) spg	24 ♂ (I)	—	RALSTON, '34a, '34b
	<i>Xiphophorus</i> hell. × <i>Platypoecilus</i> mac.	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
25	<i>Platypoecilus couchiana</i>	(48) spg	24 ♂ (I)	Prob. X-X ♂	RALSTON, '34a, '34b
	—	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
26	<i>Platypoecilus maculatus</i>	(48) spg	24 ♂ (I)	Prob. X-X ♂	RALSTON, '34a, '34b
	—	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
27	<i>Platypoecilus xiphidium</i>	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
28	<i>Platypoecilus variatus</i>	(50) spg	25 ♂ (I)	—	FRIEDMAN & GORDON, '34
	<i>Platypoecilus couch.</i> × <i>P. maculatus</i>	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
	<i>Platypoecilus xiph.</i> × <i>P. maculatus</i>	(48) spg	24 ♂ (I)	—	FRIEDMAN & GORDON, '34
	<i>Platypoecilus variat.</i> × <i>P. maculatus</i>	—	24, 25 ♂ (I)	—	FRIEDMAN & GORDON, '34
29	<i>Fundulus heteroclitus</i>	36 som	—	—	MOENKHAUS, '04
	—	45 som	—	—	PINNEY, '18
30	<i>Gambusia holbrooki</i>	36 spg	18 ♂ (I, II)	Doubtful sex-chrom.	GEISER, '24
	Gasterosteidae				
31	<i>Pungitius tymensis</i>	42 spg	21 ♂ (I, II)	Sex-chrom. unknown	MAKINO, '34a, '34b
32	<i>Pungitius pungitius</i>	(42) spg	21 ♂ (I, II)	Sex-chrom. unknown	MAKINO, '34a, '34b
	Atherinidae				
33	<i>Menidia notata</i>	36 som	—	—	MOENKHAUS, '04

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	Osphromenidae				
34	<i>Betta splendens</i>	42 spg	21 ♂ (I, II)	Prob. X-X ♂ ; X = R ₁	BENNINGTON, '36
	Percidae				
35	<i>Perca fluviatilis</i> ('Perch ')	27 spg	—	—	TURNER, '19
	Labridae				
36	<i>Ctenolabrus</i> <i>adspersus</i>	38-48 som	—	—	PINNEY, '18
	Hexagrammidae				
37	<i>Hexagrammos octo-</i> <i>grammus</i>	(48) spg	24 ♂ (I, II)	—	MAKINO, '37a
	Cottidae				
38	<i>Cottus bairdii</i>	36-38 spg	18 ♂ (I)	—	HANN, '27
	Pholidae				
39	<i>Pholis pictus</i>	46 spg	—	—	MAKINO, '37a

III. AMPHIBIA

a. Apoda

	Coecilliidae				
1	<i>Ichthyophis gluti-</i> <i>nosus</i>	42 spg, 42 ♂ som	21 ♂ (I, II)	—	SESHACHAR, '36, '37

b. Urodela

	Proteidae				
2	<i>Proteus anguineus</i>	18 spg	9 ♂ (I, II)	—	STIEVE, '18, '20
3	<i>Necturus maculosus</i>	—	12 ♂ (I)	X or XY attached to an autosome in 1st div. ?	KING, '12
	Amphiumidae				
4	<i>Amphiuma (means)</i>	(24) spg	12 ♂ (I, II)	—	MCGREGOR, '99
	Cryptobranchidae				
5	<i>Cryptobranchus</i> <i>alleghehiensis</i>	ca. 56 som	—	—	SMITH, '29
	—	62 spg	31 ♂ (I, II)	—	MAKINO, '34b, '35b
6	<i>Megalobatrachus</i> <i>japonicus</i>	56-58 som	—	—	SUZUKI, '26

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Megalobatrachus japonicus</i>	64 spg	32 ♂ (I, II)	Sex-chrom. unknown	IRIKI, '31, '32e
	Salamandridae				
7	<i>Triton alpestris</i>	—	12 ♀ (I, II)	—	CARNOY & LEBRUN, '99; LEBRUN, '01
	—	24 spg	12 ♂ (I, II) 12 ♀ (I, II)	—	JANSSENS, '00, '01, '02, '04
	—	18-24 spg	—	—	CHAMPY, '13
8	<i>Triton cristatus</i>	—	12 ♀ (I, II)	—	CARNOY & LEBRUN, '99
	—	24 spg	12 ♂ (I, II) 12 ♀ (I, II)	—	JANSSENS, '00, '01, '02, '04
	—	24 som	—	12 chroms. in regenerating blood cells	JOLLY, '04
	—	18-24 spg	—	—	CHAMPY, '13
	—	24 spg	12 ♂ (I, II)	—	MEEK, '13
	—	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
9	<i>Triton palmatus</i>	18-24 spg	—	—	CHAMPY, '13
	—	12-16 som	—	—	RETZIUS, '81
	—	7-24 som	—	Number variable in merogonic fragments	FANKHAUSER, '34
10	<i>Triton punctatus</i>	24 spg	12 ♂ (I, II)	—	JANSSENS, '00, '01, '02, '04
11	<i>Triton taeniatus</i>	—	12-14 ♀ (I)	—	BORN, '94
	—	—	12 ♀ (I, II)	—	CARNOY & LEBRUN, '99
	—	24 som	—	—	PROKOFIEVA, '35
12	<i>Triton vulgaris</i>	18-24 spg	—	—	CHAMPY, '13
	—	12 som, parth	—	Sperm exposed to radium	HERTWIG, '13
	—	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
13	<i>Triton (Molge) pyrrhogastra</i>	24 spg	—	—	MUCKERMANN, '13
	(<i>Triton</i> sp.)	24 som	—	—	RABL, '85
	(<i>Triton</i> sp.)	24 spg	12 ♂ (I)	—	MOORE & EMBLETON, '05; MOORE & ARNOLD, '05
14	<i>Geotriton (=Spelerpes) fuscus</i>	24 spg	12 ♂ (I, II)	—	TERNI, '10, '14
15	<i>Plethodon cinereus</i>	24 spg	12 ♂ (I)	—	MONTGOMERY, '03
16	<i>Anaides (=Autodax) lugubris</i>	28(23-30) spg	14 ♂ (I)	—	SNOOK & LONG, '14
17	<i>Salamandra atra</i>	16? spg	—	—	CHAMPY, '13

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
18	<i>Salamandra maculosa</i>	24 som	12 ♂ (I, II)	—	FLEMMING, '82, '87
	—	24 som	—	Ca. 16 chroms. in testis epithelium and egg follicle	RABL, '85, '89
	—	24 spg, 24 oog 24 som	12 ♂ (I, II)	—	VOM RATH, '93, '94
	—	24 spg, 24 oog 24 som	12 ♂ (I, II)	—	MEVES, '95, '97, '11
	—	24 spg	12 ♂ (I, II) 12 ♀ (I, II)	—	JANSSENS, '00, '01, '02, '04
	—	24 spg	12 ♂ (I, II)	—	SCHREINER, '07
	—	4-43 som (a) 19-27 som (b)	—	(a) Blood cells (b) Larval peritoneus	DELLA VALLE, '09, '11
	—	24 spg, 24 som	—	—	DEHORNE, '10, '11
	—	16? spg	—	—	CHAMPY, '13
	—	24 spg, 24 som	—	—	MUCKERMANN, '13
	— ('Salamander')	24 som	—	—	VON ERLANGER, '96
19	<i>Salamandrina perspicillata</i>	(24) spg	12 ♂ (I)	Sex-chrom. unknown	GALGANO, '33b
20	<i>Triturus (Diemyctilus) torosus</i>	—	10-12 ♀ (I, II)	—	LEBRUN, '02a, '02b
21	<i>Triturus (Diemyctilus) pyrrhogaster</i>	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	IRIKI, '31, '32a, '32d
	—	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	SATO, '32
22	<i>Triturus ensicauda</i>	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	SATO, '34b
23	<i>Batrachoseps attenuatus</i>	24 spg	12 ♂ (I, II)	—	EISEN, '00
	—	24 som	12 ♂ (I, II)	—	JANSSENS & DUMEZ, '03; JANSSENS, '05
24	<i>Desmognathus fuscus</i>	(24) spg	12 ♂ (I, II)	—	KINGSBURY, '99, '02
	—	24 spg	12 ♂ (I)	—	MONTGOMERY, '03
25	<i>Amblystoma tigrinum</i> ('Siredon')	12 som	—	—	KÖLLIKER, '89
	— ('Axolotl')	ca. 16 som	4-10 ♀ (I), 8 ♀ (II)	—	FICK, '93
	— ('Axolotl')	ca. 30 som	14-16 ♀ (I, II)	—	JENKINSON, '04
	— ('Siredon')	24 som	—	—	MUCKERMANN, '13
	—	24 som	—	—	MACK, '14
	—	28 som	—	—	PARMENTER, '19

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Amblystoma tigrinum</i>	28 spg	14 ♂ (I)	Sex-chrom. unknown	GALGANO, '33b
	—	28 spg	14 ♂ (I)	X-O ♂; X associated with an autosome?	CARRICK, '34
	—	24, 28 som	—	—	PROKOFIEVA, '35
26	<i>Pleurodeles waltlii</i>	(24) spg	12 ♂ (I)	Sex-chrom. unknown	GALGANO, '33b
Hynobiidae					
27	<i>Hynobius lichenatus</i>	58 spg	—	—	MAKINO, '32c
28	<i>Hynobius retardatus</i>	40 spg	20 ♂ (I, II) 20 ♀ (I, II)	Sex-chrom. unknown	MAKINO, '32c, '33, '34c
29	<i>Hynobius tokyoensis</i>	56 spg	—	—	MAKINO, '32c
30	<i>Hynobius nigrescens</i>	56 spg	—	—	MAKINO, '32c
31	<i>Hynobius leechii</i>	56 spg	28 ♂ (I, II)	—	MAKINO, '34a, '34b
32	<i>Hynobius nebulosus</i>	56 spg	—	—	MAKINO, '34a, '34b
	—	56 spg	28 ♂ (II)	—	SATO, '35, '36a
33	<i>Hynobius dunni</i>	56 spg	—	—	MAKINO, '35a
	—	56 spg	—	—	SATO, '35, '36a
34	<i>Hynobius kimurai</i>	56 spg	—	20 V's+36 r's	MAKINO, '35a
	—	60 spg	—	16 V's+44 r's	SATO, '35, '36a
35	<i>Hynobius stejnegeri</i>	56 spg	—	—	MAKINO, unpublished
36	<i>Hynobius tsuensis</i>	56 spg	—	—	SATO, '35, '36a
37	<i>Pachypalaminus bouleengeri</i>	56 spg	—	—	SATO, '34a, '35, '36a
38	<i>Salamandrella keyserlingii</i>	62 spg	—	—	MAKINO, '32c

c. Anura³⁾

39	Discoglossidae <i>Alytes obstetricans</i>	32 spg	16 ♂ (I)	—	JANSSENS & WILLEMS, '09
40	<i>Bombinator igneus</i>	—	6-7 ♀ (II)	—	LEBRUN, '01
41	<i>Bombinator pachypus</i>	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b

3) Anurans possess in general a large bivalent chromosome in the primary spermatocyte which can be differentiated from others by its shape. It is presumed by Iriki and Minouchi (Nos. 45, 56b, 61 and 64) as the bivalent resulting from the conjugation of two X-chromosomes without any positive proof.

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
42	<i>Bombina orientalis</i>	24 spg	12 ♂ (I, II)	—	SATO, '35
	Bufonidae				
43	<i>Bufo americanus</i>	(22) spg	11 ♂ (I, II)	X-Y ♂	WITSCHI, '33
44	<i>Bufo arenarum</i>	22 spg	11 ♂ (I, II)	Sex-chrom. unknown	SÆTZ, ROJAS & ROBERTIS, '34a, '34b, '36a, '36b
45	<i>Bufo bufo japonicus</i>	22 spg	11 ♂ (I, II)	X-X ♂; One diff. chrom. in ♂ (I) = X-bivalent	IRIKI, '29; MINOUCHI & IRIKI, '31
46	<i>Bufo calamita</i>	—	12 ♀ (I)	—	BATAILLON, '10
	—	22 spg	11 ♂ (I, II)	—	STOHLER, '27a, '27b, '28
47	<i>Bufo canorus</i>	(22) spg	11 ♂ (I, II)	X-Y ♂	WITSCHI, '33
48	<i>Bufo fowleri</i>	(22) spg	11 ♂ (I, II)	X-Y ♂	WITSCHI, '33
49	<i>Bufo lentiginosus</i>	24 spg 24 oog	12 ♂ (I, II) 12 ♀ (I, II)	—	KING, '01, '02, '05, '07, '08
	—	(22) spg	11 ♂ (I, II)	X-Y ♂	WITSCHI, '33
50	<i>Bufo quercicus</i>	(22) spg	11 ♂ (I, II)	X-Y ♂	WITSCHI, '33
51	<i>Bufo radderi</i>	22 spg	11 ♂ (I, II)	—	SATO, '36b
52	<i>Bufo sachalinensis</i>	22 spg	11 ♂ (I, II)	—	MAKINO, '30, '32b
53	<i>Bufo viridis</i>	22 spg, 22 oog	11 ♂ (I, II)	—	STOHLER, '26, '27a, '27b, '28
	—	22 spg	11 ♂ (I)	—	BECCARI, '26a, '26b
	—	22 spg	11 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
54	<i>Bufo vulgaris</i>	—	8-10 ♀ (I), 8 ♀ (II)	—	CARNOY & LEBRUN, '00; LEBRUN, '01
	—	18-24 oog	—	—	DELLA VALLE, '07
	—	—	8-9 ♀ (I)	—	BATAILLON, '10
	—	22 spg, 22 oog	11 ♂ (I, II)	—	STOHLER, '27a, '27b, '28
	—	22 spg	11 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
	—	22 spg, 24 som	—	—	POSKA-TEISS, '33
	Pelobatidae				
55	<i>Pelodytes punctatus</i>	—	6 ♀ (I)	—	BATAILLON, '10
	Hylidae				
56a	<i>Hyla arborea</i>	24 spg	12 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
56b	<i>Hyla arborea japonica</i>	24 spg	12 ♂ (I, II)	X-X ♂; One diff. chrom. in ♂ (I) = X-bivalent	IRIKI, '30, '32c, '32f
	Engystomidae				
57	<i>Cacopoides tornieri</i>	28 spg	14 ♂ (I, II)	—	SATO, '36b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	Ranidae				
58	<i>Rana catesbiana</i>	26 oog	—	—	SWINGLE, '17
	—	23 spg	14 ♂ (I)	Larval testes	SWINGLE, '21
59	<i>Rana esculenta</i>	24 som	—	—	SCHOTTLÄNDER, '88
	—	24 som	—	—	VOM RATH, '95
	—	16 spg	—	—	CHAMPY, '13
	—	ca. 25 spg	13 ♂ (I) 12, 13 ♂ (II)	X-O ♂	LEVY, '15
	—	12-28 som	—	<i>R. escul.</i> ♀ × <i>Bufo viridis</i> ♂	HERTWIG, G. u. P., '20
	—	30-38 som	—	Pseudohybrid egg fertilized with normal sperms	HERTWIG, G. u. P., '20
	—	13-39 som	—	Tadpoles developed gyno- and andro- genetically	DALCQ, '30, '32
	—	26 spg	13 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '31a, '31b, '31c, '33a, '33b, '34, '35
60	<i>Rana limnocharies</i>	26 spg	13 ♂ (I, II)	—	SATO, '33, '34c
61	<i>Rana nigromaculata</i>	26 spg	13 ♂ (I, II)	X-X ♂; One diff. chrom. in ♂ (I) = X-bivalent	IRIKI, '28, '32b
62	<i>Rana palustris</i>	13, 26, 39 som	—	Parth. tadpoles	PARMENTER, '32, '33
63	<i>Rana pipiens</i>	25 spg, 26 oog	13 ♂ (I) 12, 13 ♂ (II)	X-O ♂	SWINGLE, '17
	— ('Leopard frog')	20 spg	—	Parth. tadpole	LOEB, '18
	—	26 spg, 26 oog	13 ♂ (I)	Parth. tadpoles	PARMENTER, '20, '25
	—	13, 26, 39 som	—	Parth. tadpoles	PARMENTER, '26, '32, '33
64	<i>Rana rugosa</i>	26 spg	13 ♂ (I, II)	X-X ♂; One diff. chrom. in ♂ (I) = X-bivalent	IRIKI, '28, '32b
65	<i>Rana tigrina</i>	26 spg	13 ♂ (I)	—	ASANA, unpublished
66	<i>Rana temporaria</i>	—	8 ♂ (I)	—	BERTACCHNI, '96
	—	—	8-10 ♀ (I) 10 ♀ (II)	—	CARNOY & LEBRUN, '00; LEBRUN, '01
	— (<i>R. fusca</i>)	24 spg	12 ♂ (I, II)	—	VOM RATH, '95
	— (<i>R. fusca</i>)	12 som	12 ♀ (I)	Parth. eggs	BATAILLON, '10
	— (<i>R. fusca</i>)	20 + som	—	Parth. tadpoles	BRACHET, '11
	—	8-24 som	—	Parth. tadpoles	LEVY, '13, '20
	— (<i>R. fusca</i>)	13-27 som	—	Parth. tadpoles	HOVASSE, '20, '22a, '22b
	—	26 spg	13 ♂ (I, II)	X-Y ♂; Sex- chrom. postred.	WITSCHI, '22, '24
	—	26 spg	13 ♂ (I, II)	—	MAKINO, '33b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Rana temporaria</i>	26 spg	13 ♂ (I, II)	Sex-chrom. unknown	GALGANO, '33b
	—	26 som	—	—	PROKOFIEVA, '35
	('Frosch')	16 som	—	Leucocytes	DEKHUYZEN, '91
	('Grenouille')	24 som	—	Parth. tadpoles	DEHORNE, '10
	(<i>Rana</i> sp.)	26 spg	13 ♂ (I)	Parth. frog	GOLDSCHMIDT, '20
67	<i>Polypedates buergeri</i>	26 spg	13 ♂ (I, II)	—	SATO, '34c
68	<i>Rhacophorus schlegelii</i>	26 spg	13 ♂ (I, II)	—	MAKINO, '32a

IV. REPTILIA⁴⁾

a. Chelonia

Testudinidae					
1	<i>Chrysemys cinerea</i>	—	25 ♂ (I)	—	GLASCOCK, '14
2	<i>Chrysemys marginata</i>	—	17 ♂ (I)	X-O ♂	JORDAN, '14
3	<i>Cistudo carolina</i>	—	16 ♂ (I)	X-O ♂	JORDAN, '14
4	<i>Clemmys japonica</i>	52 spg	26 ♂ (I)	X-X ♂*	NAKAMURA, '35
5	<i>Emys orbicularis</i> (<i>E. europaea</i>)	50 spg	25 ♂ (I)	X-X ♂*	MATTHEY, '30b, '31b
6	<i>Testudo graeca</i>	54-60 spg	—	—	MATTHEY, '31b
Pelomedusidae					
7	<i>Sternotherus odoratus</i>	50 spg	25 ♂ (I, II)	No heteropycnetic elements in auxocyte	RISLEY, '36
Trionychidae					
8	<i>Amyda japonica</i>	64 spg 63 oog	32 ♂ (I, II) 31+X ♀ (I)	X-X ♂, X-O ♀ ; X-r, identified in ♀ cells	OGUMA, '36, '37

b. Rhynchocephalia

9	<i>Sphenodon punctatum</i>	36 spg	18 ♂ (I, II)	—	KEENAN, '32
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4) Male homogamety in cases with an asterisk is not established directly by actual observation of sex-chromosomes, but is presumed to exist on the fact that all the chromosomes in the diploid complex (2n) seem to form homologous pairs.

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
c. Lacertilia					
Geckonidae					
10	<i>Gekko japonicus</i>	38 spg	19 ♂ (I, II)	X-X ♂*	NAKAMURA, '31a, '32
	—	—	20? ♂ (I)	XX-O ♂	SU-HSUEN, '33
11	<i>Gymn. dactylus milliusi</i>	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '32c, '32e, '33b
12	<i>Hemidactylus bowringii</i>	46 spg	23 ♂ (I, II)	X-X ♂*	NAKAMURA, '31a, '32
13	<i>Tarentola mauritanica</i>	42 spg	21 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b
Eublepharidae					
14	<i>Eublepharis variegatus</i>	32 spg	16 ♂ (I, II)	X-X ♂*	MATTHEY, '32c, '32e, '33b
Agamidae					
15	<i>Agama stellio</i>	36 spg	18 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b
16	<i>Japarula swinhonis</i>	46 spg	23 ♂ (I, II)	X-X ♂*	NAKAMURA, '31a, '35b
17	<i>Uromastix hardwickii</i>	36 spg	18 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b
Iguanidae					
18	<i>Anolis carolinensis</i>	34 spg	17 ♂ (I) 16, 17 ♂ (II)	XX-O ♂	PAINTER, '21
	—	36 spg	18 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b
19	<i>Crotaphytus collaris</i>	36-38 spg	18? ♂ (I)	XX-O ♂	PAINTER, '21
20	<i>Holbrookia texana</i>	34? spg	18-19 ♂ (I)	X-O ♂	PAINTER, '21
21	<i>Sceloporus spinosus</i>	22 spg	11 ♂ (I)	XX-O ♂	PAINTER, '21
22	<i>Sceloporus undulatus consobrinus</i>	30? spg	14-17 ♂ (I)	XX-O ♂	PAINTER, '21
23	<i>Uta ornata</i>	30? spg	14-15 ♂ (I)	XX-O ♂	PAINTER, '21
Anguidae					
24	<i>Anguis fragilis</i>	—	12 ♀ (I)	—	LOYEZ, '05
	—	36? som	18? ♀ (I)	—	TRINCI, '08
	—	ca. 43 spg	22 ♂ (I)	Prob. X-O ♂	DALCQ, '20a, '20b, '21
	—	43 spg	22 ♂ (I, II)	X-X ♂*; 1 r associated with 1 R resulting in spg with odd number	MATTHEY, '29c, '31a, '31b
25	<i>Gerrhonotus kingi</i>	45 spg	—	X-X ♂*; 1 V separated into 2R's resulting in spg with odd number	MATTHEY, '29c, '31a, '31b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
26	<i>Gerrhonotus scinci-cauda</i> (= <i>G. caeruleus</i>)	44 or 45 spg	22 ♂ (I)	X-X ♂*; 1 V separated into 2R's resulting in spg with odd number	MATTHEY, '29c, '31a, '31b, '32b, '33b
27	<i>Ophisaurus ventralis</i>	30 spg	15 ♂ (I)	X-X ♂*	MATTHEY, '29c, '31a, '31b
28	<i>Pseudopus apus</i>	44 spg	22 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31a, '31b
Zonuridae					
29	<i>Zonurus cataphractus</i>	46 spg	23 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31a, '31b
Helodermatidae					
30	<i>Heloderma suspectum</i>	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '31a, '31b
Varanidae					
31	<i>Varanus gouldi</i>	40 spg	20 ♂ (I, II)	X-X ♂*	MATTHEY, '31a, '31b
Xantusiidae					
32	<i>Xantusia henschawi</i>	42 spg	21 ♂ (I)	X-X ♂*	MATTHEY, '31a, '31b
Tejiidae					
33	<i>Ameiva surinamensis</i>	50 spg	25 ♂ (I)	X-X ♂*	MATTHEY, '33a, '33b
34	<i>Cnemidophorus gularis</i>	—	20 ? ♂ (I)	XX-O ♂	PAINTER, '21
35	<i>Cnemidophorus sexlineatus</i>	46 spg	23 ♂ (I, II)	X-X ♂*	MATTHEY, '32d, '32e, '33b
36	<i>Tupinambis teguixin</i>	36 spg	18 ♂ (I, II)	X-X ♂*; Giant spgs containing 72 and 144 chroms.	MATTHEY, '32d, '33a, '33b
Lacertidae					
37	<i>Lacerta agilis</i>	20-28 spg	10-15 ♂ (I)	—	TELLYESNIEZKY, '97
—	—	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '29a, '31b
38	<i>Lacerta muralis</i>	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '29a, '31b
39	<i>Lacerta stirpium</i>	24 oog	8-12 ♀ (I)	—	LOYEZ, '05
40	<i>Lacerta viridis</i>	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '29a, '31b
41	<i>Lacerta vivipara</i>	38 spg	—	X-X ♂*	MATTHEY, '31b
—	—	36 spg	18 ♂ (I, II)	X-X ♂, X-O ♀; X = r	OGUMA, '34a, '34b
—	—	35 oog, ♀ som (36) spg	18 ♂ (I)	Early accounts corrected	MATTHEY, '34
42	<i>Takydromus tachydromoides</i>	38 spg	19 ♂ (I, II)	X-X ♂*	NAKAMURA, '28b; '35a
43	<i>Takydromus formosanus</i>	38 spg	19 ♂ (I, II)	X-X ♂*	NAKAMURA, '31a, '35a
44	<i>Takydromus septentrionalis</i>	38 spg	19 ♂ (I, II)	X-X ♂*	NAKAMURA, '31a, '35a
45	<i>Tropidosaurus algirus</i>	38 spg	19 ♂ (I, II)	X-X ♂*	MATTHEY, '31b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	Geckosauridae				
46	<i>Gerrhosaurus flavigularis</i>	36 spg	18 ♂ (I, II)	X-X ♂*	MATTHEY, '32c, '33b
	Scincidae				
47	<i>Eumeces latiscutatus</i>	26 spg	13 ♂ (I, II)	2 heteropycnotic elements in auxocytes represent 2X's	NAKAMURA, '31a, '31b
48	<i>Chalcides tridactylus</i>	(28) spg	14 ♂ (I)	X-X ♂*	MATTHEY, '29c, '31b
49	<i>Cryptobrephalus nigropunctatus</i>	28 spg	14 ♂ (I, II)	—	OGUMA, unpublished
50	<i>Scincus officinalis</i>	32 spg	16 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b
	Aniellidae				
51	<i>Aniella pulchra</i>	24 spg	—	X-X ♂*	MATTHEY, '31a, '31b
	Amphisbaenidae				
52	<i>Rhineura floridana</i>	46 spg	23 ♂ (I, II)	X-X ♂*	MATTHEY, '32c, '33b
53	<i>Trogonophis wiegmanni</i>	36 spg	18 ♂ (I, II)	X-X ♂*	MATTHEY, '31c, '32a
	Chamaeleontidae				
54	<i>Chamaeleon vulgaris</i>	24 spg	12 ♂ (I, II)	X-X ♂*	MATTHEY, '29c, '31b

d. Ophidia

	Colubridae (Ser. Aglypha)				
55	<i>Coronella austriaca</i>	36 spg	18 ♂ (I)	X-X ♂*	MATTHEY, '31b
56	<i>Dinodon rufozonatum</i>	46 spg	23 ♂ (I, II)	X-X ♂*	NAKAMURA, '35c
57	<i>Elaphe quadrivirgata</i>	36 spg	18 ♂ (I, II)	X-X ♂*	NAKAMURA, '27, '29, '35c
58	<i>Elaphe climacophora</i>	36 spg	18 ♂ (I)	X-X ♂*	NAKAMURA, '29, '35c
59	<i>Holarchus formosanus</i>	36 spg	18 ♂ (I)	X-X ♂*	NAKAMURA, '35c
60	<i>Macropistodon rudis carinatus</i>	46 spg	23 ♂ (I)	X-X ♂*	NAKAMURA, '35c
61	<i>Natrix tigrina</i>	40 spg	20 ♂ (I, II)	2 heteropycnotic elements in auxocytes represent 2X's	NAKAMURA, '27, '28a
62	<i>Thamnophis butleri</i>	37 spg	18 ♂ (I)	XX-Y ♂	THATNER, '22
63	<i>Tropidonotus natrix</i>	36 spg	18 ♂ (I)	X-X ♂*	MATTHEY, '31b
64	<i>Tropidonotus viperinus</i>	36 spg	—	X-X ♂*	MATTHEY, '31b
65	<i>Zamenis gemonensis</i>	36 spg	—	X-X ♂*	MATTHEY, '31b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
66	<i>Zoacys nigrorginatus oshimai</i>	36 spg	—	X-X ♂*	NAKAMURA, '35c
67	<i>Coelopeltis lacertina</i>	42 spg	21 ♂ (I)	X-X ♂*	MATTHEY, '31b
68	<i>Tarbophis fallax</i>	36 spg	18 ♂ (·)	X-X ♂*	MATTHEY, '31b
(Ser. Proteroglypha)					
69	<i>Bungarus multicinctus</i>	36 spg	18 ♂ (I, II)	X-X ♂*	NAKAMURA, '35c
70	<i>Naja naja atra</i>	38 spg	19 ♂ (I, II)	X-X ♂*; 4n observed in auxocyte ♂	NAKAMURA, '35c
71	<i>Laticauda semifasciata</i>	38 spg	19 ♂ (I, II)	X-X ♂*	NAKAMURA, '35c
Viperidae					
72	<i>Agkistrodon acutus</i>	36 spg	18 ♂ (I)	X-X ♂*	NAKAMURA, '35c
73	<i>Agkistrodon halys blomhoffii</i>	36 spg	18 ♂ (I, II)	X-X ♂*	NAKAMURA, '27, '35c
74	<i>Trimeresurus mucrosquamatus</i>	36 spg	18 ♂ (I, II)	X-X ♂*	NAKAMURA, '35c
75	<i>Trimeresurus gramineus stejnegeri</i>	36 spg	18 ♂ (I, II)	X-X ♂*	NAKAMURA, '35c
76	<i>Vipera aspis</i>	42 spg	21 ♂ (I)	X-X ♂*; earlier accounts corrected in '31 and '33	MATTHEY, '28, '29b, '31b, '33b
77	<i>Vipera berus</i>	36 spg	18 ♂ (I, II)	—	OGUMA, unpublished

V. AVES

A. Ratitae

a. Struthioness

1	Dromiceidae <i>Dromiceius novae-hollandiae</i> ('Emu')	40-76 som	—	Number inconstant and variable in embryonal soma	SHIWAGO & PESCH-KOWSKAJA, '36
2	Rheidae <i>Rhea americana</i> ('Nandu')	42-68 som	—	Number inconstant and variable in embryonal soma	SHIWAGO & PESCH-KOWSKAJA, '36

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
B. Carinatae					
b. Passeres					
3	Turdidae <i>Turdus merula</i>	60-85 spg, oog, ♀, ♂ som	—	X-X♂, X-O♀; X = v (4th largest)	UNGER, '36
4	Fringillidae <i>Linota cannabina</i>	64-85 oog, ♂ som	—	X-X♂, X-O♀; X = v (5th largest)	UNGER, '36
c. Psittaci					
5	Psittacidae <i>Melopsittacus undulatus</i>	50-60 som	—	♀ hetero. ; X = V ₁	CREW & LAMY, '35
	—	42 spg 42 ♀, ♂ som	21 ♂ (I)	X-X♂, X-Y♀; X = R ₂ , Y = r	JENTSCH, '35
d. Anseres					
6	Anatidae <i>Anas boschas</i>	ca. 16 spg 48-49 ♀, ♂ som	8 ♂ (I, II) —	— X-X♂, X-O♀; X = R ₁	SCHÖNEBERG, '13 ALICHANIAN, '36
7	<i>Anas platyrhynchos domestica</i> ('Indian runner duck')	76 ♂ som 77 ♀ som	38 ♂ (I)	Z-Z♂, W _w -Z♀; W = J ₁ , Z = V ₁	WERNER, '25, '27
	— ('Khaki campbell')	34-62 ♀, ♂ som	—	X-X♂, X-O♀; X = R ₁	SOKOLOWSKAJA, '35
	— ('Aylesbury')	48-69 ♀, ♂ som	—	X-X♂, X-O♀; X = V ₁	CREW & KOLLER, '36
8	<i>Aythya ferina</i>	ca. 16 spg	8 ♂ (I, II)	—	SCHÖNEBERG, '13
9	<i>Cairina moschata</i>	ca. 16 spg 34-62 ♀, ♂ som	8 ♂ (I, II) —	— X-X♂, X-O♀; X = R ₁	SCHÖNEBERG, '13 SOKOLOWSKAJA, '35

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Cairina moschata</i> (' Muscovy ')	-72 ♀, ♂ som	—	X-X♂, X-O♀; X = V ₁	CREW & KOLLER, '36
	<i>Cairina mos.</i> × <i>Anas platyrhynchos</i>	34-62 ♀, ♂ som	—	X-X♂, X-O♀; Similar in reciprocal cross	SOKOLOWSKAJA, '35
	—	54-70 ♀, ♂ som	—	X-X♂, X-O♀; X = V ₁ ; Abnormal divs. in ♂(I)	CREW & KOLLER, '36
10	<i>Lampronessa sponso</i>	ca. 16 spg	8♂ (I, II)	—	SCHÖNEBERG, '13
11	<i>Mareca penelope</i>	ca. 16 spg	8♂ (I, II)	—	SCHÖNEBERG, '13

e. Steganopodes

12	Phalacrocoracidae <i>Phalacrocorax carbo hanedae</i>	70 spg	35♂ (I)	—	OGUMA, '37
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f. Tubinares

13	Procellariidae <i>Oceanodroma leucorhoa leucorhoa</i>	74 spg	37♂ (I)	—	OGUMA, '37
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g. Columbæ

14	Columbidae <i>Columba livia domestica</i>	16 spg	8♂ (I), 4♂ (II)	—	GUYER, '02
	—	16 som	8♀ (I, II)	—	HARPER, '04
	—	ca. 16 spg	8♂ (I), 4♂ (II)	—	SMITH, '12
	—	62 spg, ♂ som 61♀ som	31♂ (I, II)	X-X♂, X-O♀; X = V ₁	OGUMA, '27
	— (' Pigeon ')	50+ ♀, ♂ som	—	X-X♂, X-O♀; X = the largest chrom.	HANCE, '32
15	<i>Streptopelia risoria</i> (<i>Turtur risorius</i>)	16 spg	8♂ (I), 4♂ (II)	—	GUYER, '02
	— (' Dove ')	50+ ♀, ♂ som	—	X-X♂, X-O♀; X = the largest chrom.	HANCE, '32

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
h. Lari					
Laridae					
16	<i>Sternula albifrons sinensis</i>	66 spg	33 ♂ (I)	—	OGUMA, '37
17	<i>Larus argentatus vegae</i>	66 spg	33 ♂ (I)	—	OGUMA, '37
i. Alcae					
Alcidae					
18	<i>Brachyramphus marmoratus perdia</i>	50 spg	25 ♂ (I)	—	OGUMA, '37
19	<i>Lunda cirrhata</i>	50 spg	25 ♂ (I)	—	OGUMA, '37
j. Galli					
Phasianidae					
20	<i>Gallus gallus domesticus</i>	—	6? ♀ (I)	—	LOYEZ, '06
—	('Huhn')	—	12-16 ♀ (I)	—	SONNENBRODT, '08
—	—	12 parth. som	—	—	LECAILLON, '10
—	—	17-19 spg	9 ♂ (I), 4, 5 ♂ (II)	X-O ♂	GUYER, '09
—	—	18 spg, ♂ som	9 ♂ (I), 4, 5 ♂ (II)	X-X ♂, X-O ♀	GUYER, '16
—	('Gold campine fowl')	18-20 spg	8-10 ♂ (I)	—	CUTLER, '18
—	('Chicken')	ca. 32 spg	—	Miss STEVENS' figure	BORING, '23
—	('Chicken')	30-34 ♀, ♂ som	—	♀ hetero.; X = prob. V ₁	HANCE, '23, '24, '25
—	—	35-36 spg	—	X-X ♂, X-O ♀; X = V ₁	HANCE, '26c
—	—	35-36 ♀, ♂ som	—	♀ hetero.	HANCE, '26a, '26b
—	—	60-70 som (prophase)	—	—	—
—	—	35-40 som (metaphase)	—	—	—
—	('Chicken')	32 ♀, ♂ som	—	X-X ♂, X-Y ♀; X = R ₁ , Y = s	SHIWAGO, '24

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Gallus gallus domesticus</i> (' Huhn ')	32 spg 30-44 ♀, ♂ som	—	X-X ♂; number variable in racial hybrids	AKKERINGA, '27
	—	—	—	2V's in ♂, 1V in ♀, prob. sex-chroms.	GOLDSMITH, '28
	— (' Haushuhn ')	74 spg, ♂ som 73 oog, ♀ som	37 ♂ (I, II)	X-X ♂, X-O ♀; X = v	SUZUKI, '30
	— (' Huhn ')	36-38 som	—	Tissue culture	KEMP, '30
	— (' Huhn ')	29-39 som	—	Tissue culture	SAGUCHI, '30
	— (' Chicken ')	66±2 ♂ som 65±2 ♀ som	33 ♂ (I)	X-X ♂, X-O ♀; X = V ₁	WHITE, '32
	— (' Haushuhn ')	60-70 ♀, ♂ som (prophase) 30-45 ♀, ♂ som (metaphase)	—	X-X ♂, X-O ♀; X = V ₁	POPOFF, '33
	—	32-71 spg, oog, ♀, ♂ som	—	X-X ♂, X-O ♀; X=v (5th largest chrom.); m-chroms. variable, M-chroms. constant in number (7 pairs)	SOKOLOW & TROFIMOW, '33; SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b
	—	44-61 spg, oog, ♀, ♂ som	—	X-X ♂, X-O ♀; X=v (5th largest chrom.); m-chroms. variable in number	UNGER, '36
21	<i>Phasianus colchicus</i>	40-63 spg, oog ♀, ♂ som	—	X-X ♂, X-O ♀; X=v (4th largest chrom.); M-chroms. constant in number (8 pairs)	TROFIMOW & TINIAKOW, '33; SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b
22	<i>Phasianus torquatus</i>	52-61 spg, oog	—	X-X ♂, X-O ♀; X=v (4th largest chrom.); m-chroms. variable in number	UNGER, '36
	(' Pheasant ')	20-22 spg	10-11 ♂ (I), 8 ♂ (II)	—	CUTLER, '18
	<i>Phasianus</i> × <i>Gallus</i>	18-20 spg	—	—	CUTLER, '18
23	<i>Meleagris gallopavo</i> (' Truthennen ')	46 ♂ som 46 ♀ som	—	X-X ♂, X-Y ♀; X = V ₁ , Y = s	SHIWAGO, '29
	— (' Domestic turkey ')	76 ♂ som 77 ♀ som	38 ♂ (I)	Z-Z ♂, W _w -Z ♀; W = J ₁ , Z = V ₁	WERNER, '31
	—	—	—	X-X ♂, X-O ♀; X=v (4th largest chrom.); m-chroms. variable, M-chroms. constant in number (8 pairs)	SOKOLOW, TINIAKOW & TROFIMOW, '34, '36a, '36b
24	<i>Numida meleagris domestica</i> (' Domestic guinea ')	17 spg	9 ♂ (I), 8, 9 ♂ (II)	X-O ♂	GUYER, '09

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Numida meleagris domestica</i>	—	—	X-X ♂, X-O ♀; X-v (6th largest chrom.); m-chroms. variable, M-chroms. constant in number (8 pairs)	SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b
25	<i>Nycthemerus argentatus</i>	—	—	X-X ♂, X-O ♀; X-v (4th largest chrom.); m-chroms. variable, M-chroms. constant in number (8 pairs)	SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b
26	<i>Pavo cristatus</i>	—	—	X-X ♂, X-O ♀; X-v (5th largest chrom.); m-chroms. variable, M-chroms. constant in number (10 pairs)	TINIAKOW, '34; SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b
	Tetraonidae				
27	<i>Lyrurus tetrix</i> (<i>Tetrao tetrix</i>)	—	—	X-X ♂, X-O ♀; X-v (5th largest chrom.); m-chroms. variable, M-chroms. constant in number (10 pairs)	SOKOLOW, TINIAKOW & TROFIMOW, '36a, '36b

VI. MAMMALIA

A. Prototheria

a. Monotremata

1	<i>Echidna aculeata</i>	—	8-12 ♂ (I)	—	BENDA, '06
2	<i>Ornithorhynchus anatinus</i>	—	8-12 ♂ (I)	—	BENDA, '06

B. Eutheria⁵⁾—Didelphia

b. Marsupialia

3	Didelphyidae <i>Didelphys aurita</i>	—	12? ♀ (I, II)	—	HILL, '18
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5) This is the only group of Vertebrata in which the behaviour of sex-chromosomes is known with certainty during meiosis. They are separated prereductively generally, but postreductively in some instances (Nos. 67b, 69, 70a and 70b). Further, in some species, they separate in both these ways as shown in Nos. 51, 68, 71 and 57 by Koller and Darlington. For the sake of convenience, notes have been written in the column of remarks, against the last two cases only. The formula of sex-chromosomes without remarks, therefore, denotes the normal cases where prereduction occurs.

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
4	<i>Didelphys paraguayensis</i>	22 spg	—	X-Y ♂	SAEZ, '30, '31
5	<i>Didelphys virginiana</i>	17 spg, ♂ som	9 ♂ (I), 4, 5 ♂ (II)	X-O ♂	JORDAN, '11
	—	—	11 ♀ (I)	—	HARTMAN, '19
	—	22 spg, ♂ som 22 ♀ som	11 ♂ (I, II)	X-Y ♂	PAINTER, '21, '22a, '24a
	—	22 ♀, ♂ som	—	X-Y ♂, X-X ♀; 8n observed in spleen cells	HOY & GEORGE, '29
	Dasyuridae				
6	<i>Dasyurus maculatus</i>	14 spg	—	X-Y ♂	GREENWOOD, '23
	—	14 spg	7 ♂ (I, II)	X-Y ♂	KOLLER, '36a, '36b
7	<i>Sarcophilus ursinus</i>	14 spg, ♀ som	—	X-Y ♂, X-X ♀	GREENWOOD, '23
	—	14 spg	7 ♂ (I, II)	X-Y ♂	KOLLER, '36a, '36b
	Peramelidae				
8	<i>Perameles</i> sp.	—	8 ♂ (I)	—	BENDA, '06
9	<i>Isoodon obesulus</i>	14 spg	7 ♂ (I)	X-Y ♂	DRUMMOND, '33
	Phalangeridae				
10	<i>Petauroides volans</i>	22 spg	—	X-Y ♂	AGAR, '23
11	<i>Petaurus breviceps</i>	22 spg	—	X-Y ♂	DRUMMOND, '33
12	<i>Phascolarctus cinereus</i>	16 spg, ♀ som	8 ♂ (I, II)	X-Y ♂, X-X ♀	GREENWOOD, '23
	—	16 spg	8 ♂ (II)	X-Y ♂	KOLLER, '36b
13	<i>Phalangista</i> sp.	—	8 ♂ (I)	—	BENDA, '06
14	<i>Pseudochirus peregrinus</i>	20 spg, ♀ som	10 ♂ (I, II)	X-Y ♂, X-X ♀	ALTMANN & ELLERY, '25
	—	20 spg	10 ♂ (I)	X-Y ♂	KOLLER, '36b
15	<i>Trichosurus vulpecula</i>	20 spg, ♀ som	10 ♂ (I, II)	X-Y ♂, X-X ♀	ALTMANN & ELLERY, '25
	—	20 spg	10 ♂ (I, II)	X-Y ♂	KOLLER, '36b
	Macropodidae				
16	<i>Bettongia lesueuri</i>	22 spg	11 ♂ (I)	X-Y ♂	DRUMMOND, '33
17	<i>Bettongia penicillata</i>	28 spg	—	X-Y ♂	DRUMMOND, '33
18	<i>Macropus ualabatus</i>	12 spg, ♀ som	6 ♂ (I, II)	X-Y ♂; X-X ♀; X associated with an autosome in spg	AGAR, '23
19	<i>Macropus giganteus</i>	22 spg	11 ♂ (I)	X-Y ♂	BINDER, '27
20	<i>Macropus parryi</i>	16 spg	8 ♂ (I, II)	X-Y ♂	MATHEY, '34a, '36a
21	<i>Potorous tridactyla</i>	12 spg, ♀ som	6 ♂ (I, II)	X-Y ♂, X-X ♀	ALTMANN & ELLERY, '25
22	<i>Setonix brachyurus</i>	22 spg	—	X-Y ♂; 4n observed in spg	DRUMMOND, '33

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
23	<i>Phascolomyidae</i> <i>Phascolomys mitchelli</i>	(14) spg	7♂ (I)	X-Y♂	ALTMANN & ELLERY, '25

C. Eutheria—Monodelphia

c. Chiroptera

24	<i>Rhinolophidae</i> <i>Rhinolophus hipposideros</i>	—	16♀ (I, II)	—	ATHIAS, '12
25	<i>Vespertilionidae</i> <i>Vesperugo noctula</i>	—	9-10♀ (I, II)	—	VAN der STRICHT, '10
26	<i>Vesperugo serotinus</i>	—	15-22♀ (I) 18-24♀ (II)	—	ATHIAS, '12
	('Bat')	24+ spg	—	X-O♂	JORDAN, '12
	('Bat')	40? spg	—	♂ hetero.?	HANCE, '17a
27	<i>Molossidae</i> <i>Nyctinomus mexicanus</i>	48 som	—	Prob. X-Y♂	PAINTER, '25a, '25b

d. Insectivora

28	<i>Erinaceidae</i> <i>Erinaceus europaeus</i> ('European hedgehog ')	48 spg	—	X-Y♂	PAINTER, '25a, '25b
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e. Edentata—Xenarthra

29	<i>Dasypodidae</i> <i>Tatusia novemcinctum</i> ('9-banded armadillo ')	31? spg, 32 oog	14-19♀ (I)	Prob. X-O♂	NEWMAN & PATTERSON, '10; NEWMAN, '12
30	<i>Tatusia novemcinctum</i> ('Armadillo ')	60♀, ♂ som	—	Prob. X-Y♂	PAINTER, '25a, '25b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
f. Rodentia					
a) Duplicidentata					
Leporidae					
31	<i>Lepus cuniculus</i> (' Kaninchen ')	24? som	—	—	FLEMMING, '98
	— (' Lapin ')	41-43 oog 36-46(42) som	—	—	WINIWARTER, '99, '00
	— (' Rabbit ')	28-36 spg	14-18 ♂ (I)	—	BARRETT, '07
	— (' Rabbit ')	22 spg	11-12 ♂ (I) 11 ♂ (II)	X-Y ♂	BACHHUBER, '16
	— (' Rabbit ')	44-54 spg	20+ ♂ (I)	X-O ♂	MASUI, '23
	— (' Rabbit ')	44 spg 44 ♀, ♂ som	22 ♂ (I)	X-Y ♂, X-X ♀; Chrom. number constant in amnion	PAINTER, '25a, '25b, '25c, '26a, '26b
	—	(44) spg	22 ♂ (I)	X-Y ♂	MINOUCHI & OHTA, '32
	—	44 spg	22 ♂ (I, II)	X-Y ♂	TATEISHI, '36
32	<i>Lepus formosus</i>	48 spg	24 ♂ (I, II)	X-Y ♂	TATEISHI, '36
b) Simplicidentata					
Sciuridae					
33a	<i>Sciurus carolinensis</i> <i>carolinensis</i>	48 spg	—	X-Y ♂	CROSS, '31b
33b	<i>Sciurus carolinensis</i> <i>leucotus</i>	28 spg	14 ♂ (I)	X-Y ♂	KOLLER, '36b
34a	<i>Sciurus niger rufi-</i> <i>venter</i>	62 spg	—	X-Y ♂	CROSS, '31b
34b	<i>Sciurus niger limitis</i> (' Ecoreuil ')	62 spg 24 som	— ca. 16 ♂ (I)	X-Y ♂ —	CROSS, '31b VAN MOLLE, '06, '07
35	<i>Glaucomys volans</i> <i>volans</i>	52 spg	—	X-Y ♂	CROSS, '31b
36	<i>Citellus columbianus</i> <i>columbianus</i>	32 spg, oog	—	X-Y ♂	WODSEDALEK, '29
37	<i>Citellus tridecem-</i> <i>lineatus arenicola</i>	50-54 spg	—	—	CROSS, '31b
Geomyidae					
38	<i>Geomys breviceps</i> <i>breviceps</i>	84? spg	—	X-Y ♂	CROSS, '31b
Heteromyidae					
39	<i>Dipodomys merriami</i> <i>merriami</i>	86? spg	—	X-Y ♂	CROSS, '31b

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
40	<i>Perognathus fallax fallax</i> Myoxidae	44 spg	—	X-Y ♂	CROSS, '31b
41	<i>Dyromys nitedula intermedius</i>	48 spg	24 ♂ (I)	X-Y ♂	MATTHEY & RENAUD, '36
42	<i>Eliomys quercinus</i>	—	16 ♀ (I, II)	—	ATHIAS, '09, '12
43	<i>Glis glis glis</i>	62 spg	31 ♂ (I)	X-Y ♂; sex-chrom. prob. postred.	MATTHEY & RENAUD, '36
44	<i>Muscardinus avelanarius</i> Muridae-Cricetinae	48 spg	24 ♂ (I)	X-Y ♂	MATTHEY & RENAUD, '36
45	<i>Peromyscus eremicus eremicus</i>	ca. 60 spg	—	—	CROSS, '31a
46	<i>Peromyscus boylei attwateri</i>	48 spg	—	X-Y ♂	CROSS, '31b
47	<i>Peromyscus californicus insignis</i>	48 spg	—	X-Y ♂	CROSS, '31a, '31b
48a	<i>Peromyscus maniculatus gambeli</i>	48 spg	—	X-Y ♂	CROSS, '31a, '31b
48b	<i>Peromyscus maniculatus hollesteri</i>	52 spg	—	X-Y ♂	CROSS, '31b
49	<i>Neotoma floridanus attwateri</i>	52 spg	—	X-Y ♂	CROSS, '31b
50	<i>Sigmodon hispidus texianus</i> Muridae-Microtinae	54 spg	—	X-Y ♂	CROSS, '31b
51	<i>Arvicola scherman exitus (Arvicola scherman terrestris)</i>	36 spg	18 ♂ (I)	X-Y ♂; sex-chrom. prered. or postred. in ratio 50:100	MATTHEY & RENAUD, '35
52	<i>Evotomys (Clethrionomys) bedfordiae</i>	55 spg	28 ♂ (I) 27, 28 ♂ (II)	X-O ♂	OGUMA, '35a, '35b
53	<i>Evotomys glareolus</i>	56 spg	28 ♂ (I, II)	X-Y ♂	MATTHEY & RENAUD, '35
54	<i>Microtus incertus</i>	—	28-34 ♀ (I, II)	—	ATHIAS, '12
55	<i>Microtus townsendii</i>	50 spg	—	X-Y ♂	CROSS, '31b
56	<i>Microtus montebelli</i> Muridae-Murinae	31 spg	16 ♂ (I)	X-O ♂	OGUMA, '37b
57	<i>Rattus norvegicus ('Rat')</i>	32 spg	16 ♂ (I)	—	MOORE, '93, '94; MOORE & ARNOLD, '05; MOORE & WALKER, '06
--	('Ratte')	—	12 ♂ (I)	—	LENHOSSEK, '98

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Rattus norvegicus</i> (' Rat ')	20-30 spg	ca. 12 ♂ (I)	—	REGAUD, '01a, '01b, '09
	— (' Weiss Ratte ')	—	10-20 ♀ (I) 8-16 ♀ (II)	—	SOBOTTA & BURCKARD, '10
	— (<i>Mus decumans</i> ' albino ')	24 som	12 ♂ (I, II)	—	DUESBERG, '08a, '08b
	— (<i>Mus decumans</i> ' albino ')	24+ spg	16 ♂ (I, II)	—	VAN HOOF, '11
	— (' Albino ')	40 ♀	—	In pachytene of ♀ (I)	PRATT & LONG, '17
	— (' Albino ')	37 spg, ♂ som	19 ♂ (I)	X-O ♂	ALLEN, '18, '19
	— (<i>Mus decumans</i> ' albino ')	40 spg	—	—	RAUH, '25
	— (' Albino ')	42 spg	21 ♂ (I, II)	X-Y ♂	PINCUS, '27
	— (' Albino ')	42 spg	21 ♂ (I)	X-Y ♂	PAINTER, '26a, '28a
	— (' Albino ' × ' Wild ') (mixed rat strain)	62 spg	21 ♂ (I) 21, 31 ♂ (II)	Mating experiments between two strains with chrom. number 42 (normal) and 62	SWEZY, '28, '29a, '29b
		42 spg	21 ♂ (I) 21, 31 ♂ (II)		
		42 som			
		62 som			
		42 ♀ som	21 ♀ (I)		
		62 ♀ som	31 ♀ (I)		
	— (' Wild ')	62 spg	21 ♂ (I) 21, 31 ♂ (II)	—	SWEZY, '26, '28
		42 spg	21 ♂ (I) 21, 31 ♂ (II)		
	— (' Albino ')	42 spg	21 ♂ (I, II)	—	SWEZY, '26, '28
	— (' Albino ')	42 spg	21 ♂ (I, II)	X-Y ♂	MINOUCHI, '28a, '28b
	— (' Albino ')	42 spg	21 ♂ (I)	X-Y ♂	BRYDEN, '32, '33a, '35
	— (' Albino ')	42 spg	21 ♂ (I)	X-Y ♂; Sex- chrom. prered. in 90% and postred. in 10%	KOLLER & DARLINGTON, '34
	— (' Wild ')	42 spg	21 ♂ (I, II)	X-Y ♂; X with segmentary structure	OGUMA, '35a, '35b
	— (' Wild ')	42 spg	21 ♂ (I)	X-Y ♂	TATEISHI, '35
	— (<i>Epimys</i> <i>norvegicus</i>)	(42) spg	21 ♂ (I)	X-Y ♂	MATTHEY, '36a
	— (' Wanderratte ')	16 spg	8 ♂ (I, II)	—	VON EBNER, '99
58a	<i>Rattus rattus</i> (' Albino ')	—	8 ♀ (I, II)	—	MELISSINOS, '07
	— (' Albino ')	24+ spg	16 ♂ (I, II)	—	VAN HOOF, '11

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Rattus rattus</i>	40 spg	20 ♂ (I, II)	X-Y ♂	PINCUS, '27
	— ('Wild')	42 spg	21 ♂ (I)	X-Y ♂; X with segmentary structure	OGUMA, '28, '35a, '35b
58b	<i>Rattus rattus alexandrinus</i>	40 spg	—	X-Y ♂	CROSS, '31b
58c	<i>Rattus rattus rufescens</i>	42 spg	21 ♂ (I)	X-Y ♂	TATEISHI, '35
59	<i>Rattus losea</i>	42 spg	21 ♂ (I, II)	X-Y ♂	TATEISHI, '33, '35
60	<i>Rattus coxinga</i>	42 spg	21 ♂ (I)	X-Y ♂	TATEISHI, '35
		46 spg	23 ♂ (I)		
61	<i>Rattus culturatus</i>	46 spg	23 ♂ (I)	X-Y ♂	TATEISHI, '35
62	<i>Bandicota nemoribaga</i>	44 spg	22 ♂ (I)	X-Y ♂	TATEISHI, '35
63	<i>Mus musculus</i>	20? som	20 ♀ (I, II)	—	TAFANI, '89
	— ('Maus')	—	16 ♂ (I)	—	HERMANN, '89
	— ('Grau Maus')	24? oog	—	—	HOLL, '93a, '93b
	— ('Weiss, grau, Tanz')	30 som	16 ♀ (I, II)	—	SOBOTTA, '95, '07
	— ('Souris blanche')	10-12 spg	12-16 ♂ (I, II)	—	LUKIANOW, '98
	— ('Mouse')	24 spg	—	—	MOORE & ARNOLD, '05
	—	—	12 ♀ (I, II)	—	GERLOCH, '06
	—	—	12 ♀ (I, II)	—	LAMS & DÖRME, '07
	— ('Albino')	—	8 ♀ (I, II)	—	MELISSINOS, '07
	— ('White mouse')	—	12-24 ♀ (I) 12 ♀ (II)	—	COE & KIRKHAM, '07; KIRKHAM, '07, '08
	— ('White, black, hybrid')	—	20 ♀ (I, II)	—	LONG, '08; LONG & MARK, '11
	— ('White mouse')	—	12-24 ♀ (I) 12-30 ♀ (II)	—	KINGERY, '14, '17
	— ('House mouse')	—	20 ♂ (I, II)	X postred.	YOCUM, '17
	— ('Domestic, wild')	40 spg	20 ♂ (I, II)	X-Y ♂	COX, '26
	— ('Weiss Maus')	24 oog	12 ♀ (I)	—	ZDENKO, '26
	—	40 spg	20 ♂ (I)	X-Y ♂	PAINTER, '28a, '28b
	— ('Maus')	32-36 (prob. 40) som	—	'Karzinomzelle'	GOLDSCHMIDT & FISCHER, '29
	— ('Maus')	21-44(40) som	—	Tissue culture; number inconstant	KEMP, '30
	—	21-175(36-40) som	—	'Teerkarzinome'	WINGE, '30
	—	ca. 36 oog	18 ♀ (I)	—	SCHACHOW, '30

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Mus musculus</i> (' Albino ')	40 spg	20 ♂ (I, II)	X-Y ♂	CUTRIGHT, '32
	— (' Albino ')	40 ♀, ♂ som	—	X-Y ♂, X-X ♀	CREW & KOLLER, '32
	—	40 spg	—	—	BUTARIN, '35c
	—	40 spg	20 ♂ (I)	X-Y ♂	TATEISHI, '35
	—	40 spg	20 ♂ (I, II)	X-Y ♂; X and Y similar in form and size	MATTHEY, '36a
64	<i>Mus formosanus</i>	40 spg	20 ♂ (I)	X-Y ♂	TATEISHI, '35
65	<i>Mus molossinus</i>	40 spg	20 ♂ (I, II)	X-Y ♂	OGUMA, '35a, '35b
66	<i>Mus wagneri</i>	40 spg	20 ♂ (I, II)	X-Y ♂	MASUI, '23
	—	40 spg	20 ♂ (I, II)	X-Y ♂; GATES' non-disjunction (v-o) mouse	PAINTER, '27
	— (' Albino ')	40 spg	20 ♂ (I, II)	X-Y ♂	MINOUCHI, '28d
67a	<i>Apodemus agrarius</i>	(48) spg	24 ♂ (I, II)	X-Y ♂; Sex-chrom. postred.	MATTHEY, '36b
67b	<i>Apodemus agrarius ningpoensis</i>	50 spg	25 ♂ (I, II)	X-Y ♂; Sex-chrom. postred.	TATEISHI, '34, '35
68	<i>Apodemus flavicollis</i>	(48) spg	24 ♂ (I, II)	X-Y ♂; Sex-chrom. prerred. or postred.	MATTHEY, '36b
69	<i>Apodemus semotus</i>	48 spg	24 ♂ (I)	X-Y ♂; Sex-chrom. postred.	TATEISHI, '34, '35
70a	<i>Apodemus speciosus speciosus</i>	46 spg	23 ♂ (I)	X-Y ♂; Sex-chrom. postred.	TATEISHI, '34, '35
70b	<i>Apodemus speciosus ainu</i>	47 spg	24 ♂ (I, II) 23, 24 (tid)	X-O ♂; Sex-chrom. postred.	OGUMA, '34a, '34b, '37b
71	<i>Apodemus sylvaticus</i> (<i>Mus sylvaticus</i>)	—	—	Prob. X-O ♂	FEDERLEY, '19
	—	(48) spg	24 ♂ (I, II)	X-Y ♂; Sex-chrom. prerred. or postred.	MATTHEY, '36a, '36b
	—	48 spg	24 ♂ (I, II)	X-Y ♂; Sex-chrom. prerred. or postred.	RAYNAUD, '36
	Caviidae				
72	<i>Cavia cobaya</i> (' Meerschweinchen ')	16 spg	8 ♂ (II)	—	VON BARDELEBEN, '92
	— (' Meerschweinchen ')	24± som	—	—	FLEMMING, '98
	— (' Guinea-pig ')	32 spg	16 ♂ (I, II)	—	MOORE & WALKER, '06
	— (' Guinea-pig ')	56? spg	28 ♂ (I)	X-Y ♂	STEVENS, '11a, '11b
	—	16 som	8 ♀ (I, II)	—	LAMS, '13
	—	38 spg	19 ♂ (I, II)	X-Y ♂	HARMAN & ROOT, '26

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Cavia cobaya</i>	60-64 spg	—	X-Y ♂	PAINTER, '26a
	—	65 spg	33 ♂ (I)	X-O ♂	MOLS, '28
	— ('Guinea-pig')	44, 55, 66 som	32, 33 ♂ (II)		
	—	62±2 spg	31 ♂ (I)	X-Y ♂	LEAGUE, '28
	—	—	30+ ♂ (II)		
73	<i>Cavia porcellus</i>	—	24-23 ♀ (I)	—	ATHIAS, '12
	—	—	ca. 24 ♀ (II)		

g. Carnivora

	a) Fissipedia				
	Canidae				
74	<i>Canis familiaris</i>	64? som	—	—	VOM RATH, '94
	—	21 spg	11 ♂ (I)	X-O ♂	MALONE, '18
	—	22 ♀ som	10, 11 ♂ (II)		
	— ('Dog')	50+ spg	—	Prob. X-Y ♂	PAINTER, '25b
	—	78 spg, oog	39 ♂ (I, II)	X-Y ♂, X-X ♀	MINOUCHI, '28a, '28c
75	<i>Nyctereutes viverrinus</i>	42 spg	21 ♂ (I, II)	X-Y ♂	MINOUCHI, '28f, '29
76	<i>Vulpes fulvus</i>	42 spg	21 ♂ (I)	X-Y ♂	WODESDALEK, '31
	Felidae				
77	<i>Felis domestica</i>	35 spg	18 ♂ (I)	X-O ♂	WINIWARTER & SAINMONT, '09; WINIWARTER, '14, '19, '22, '34
	('Variété belge')	36 oog, ♀ som	17, 18 ♂ (II)		
	— ('Variété japonaise')	38 spg	19 ♂ (I, II)	X-Y ♂	WINIWARTER, '34
	— ('Chat')	—	12 ♀ (I)	—	VAN der STRICHT, '11
	—	—	14-17 ♀ (I, II)	—	LONGLEY, '11
	— ('Hauskatze')	38 oog	—	—	GUTHERZ, '18, '20
	—	38 spg, oog	19 ♂ (I, II)	X-Y ♂, X-X ♀	MINOUCHI, '28e, '28f; MINOUCHI & OHTA, '32b, '34a
	—	38 spg, oog	19 ♂ (I)	Prob. X-Y ♂; Sex-chrom. unable to identify	MATTHEY, '34b, '36a
	Viverridae				
78	<i>Mungos ichneumon</i>	—	ca. 24 ♂ (I)	Prob. X-O ♂	JORDAN, '14
	('Mongoose')				
	b) Pinnipedia				
	Otarridae				
79	<i>Callorhinus alascanus</i>	30 spg	15 ♂ (I, II)	X-Y ♂	STARKS, '28

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
h. Ungulata					
a) Artiodactyla					
Suidae					
80	<i>Sus scrofa</i> ('Pig')	18 spg, ♂ som 20 ♀ som	10 ♂ (I) 8, 10 ♂ (II)	XX-O ♂	WODESDALEK, '13a, '13b
	—	40 spg, 40-74 som	20 ♂ (I)	Variation of chrom. number in soma due to fragmentation	HANCE, '17b, '18
	— ('Schwein')	38 spg	19 ♂ (I)	Prob. X-Y ♂	KRALLINGER, '31
	— ('Pig')	38 spg	19 ♂ (I)	X-Y ♂	BRYDEN, '33b
81	<i>Pecari tajacu</i>	30 spg	15 ♂ (I, II)	Sex-chrom. unable to identify	KRALLINGER, '36
Bovidae					
82	<i>Bos taurus</i> ('Stier')	16 spg	—	—	VON BARDELEBEN, '92
	— ('Taureau')	20-25 spg	12 ♂ (I, II)	—	SCHOENFELD, '02
	— ('Taureau')	20-24 spg	12 ♂ (I)	—	VAN HOOFF, '13
	—	33 spg	17 ♂ (I) 16, 17 ♂ (II)	X-O ♂	MASUI, '19
	— ('Cattle')	37 spg, ♂ som 38 oog, ♀ som	19 ♂ (I) 18, 19 ♂ (II) ca. 19 ♀ (I)	X-O ♂, X-X ♀	WODESDALEK, '20
	— ('Rind')	60 spg	30 ♂ (I, II)	X-Y ♂	KRALLINGER, '27, '28, '31
83	<i>Poephagus grunniens</i> ('Yak')	62±2 spg	31±1 ♂ (I)	Prob. X-Y ♂	ZUITIN, '35
84	<i>Capra hircus</i>	60 spg	30 ♂ (I, II)	X-Y ♂	SOKOLOV, '30
	— ('Ziege')	60 ♂ som	—	X-Y ♂	SHIWAGO, '30, '31
	— ('Ziege')	60 spg	30 ♂ (I)	X-Y ♂	KRALLINGER, '31
85	<i>Ovis aries</i> ('Sheep')	33 spg, 34 oog	17 ♂ (I), 17 ♀ (I)	X-O ♂, X-X ♀	WODESDALEK, '22
	— ('Schaf, Hammel')	48-53 (prob. 54) ♂ som	—	X-Y ♂	SHIWAGO, '30, '31
	— ('Schaf')	60 spg	30 ♂ (I) prob. 30 ♂ (II)	X-Y ♂	KRALLINGER, '31
	— (Interracial hybrid)	60 spg	30 ♂ (I)	—	NOVIKOV, '35
86	<i>Ovis pollii karelini</i>	60 spg	30 ♂ (II)	—	BUTARIN, '35a, '35b
87	<i>Ovis steato pyga</i>	(60) spg	30 ♂ (I)	—	BUTARIN, '35a, '35b
	<i>Ov. pol. kar.</i> × <i>Ov. st. py.</i>	60 spg	30 ♂ (I)	—	BUTARIN, '35a

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
88	b) Perissodactyla				
	Equidae				
	<i>Equus caballus</i> ('Pferd ')	—	10-16 ♂ (I)	—	KIRILLOW, '12
	— ('Horse ')	37 spg	19 ♂ (I) 9, 10 ♂ (II)	X-O ♂	WODESDALEK, '14
	—	33-38 spg	19 ♂ (I) 18, 19 ♂ (II)	X-O ♂	MASUI, '19
	— ('Horse ')	57-60 spg	30 ♂ (I)	X-Y ♂	PAINTEK, '24c, '25b
89	—	60 spg	—	X-Y ♂	RANQUINI, '34
	'Mule' (<i>Eq. cab.</i> × <i>Eq. asinus</i>)	51 spg	34-49 ♂ (I)	Abnormal mitoses	WODESDALEK, '16
	<i>Equus asinus</i>	60 spg	30 ♂ (I)	—	MELADZE, '37

i. Primates

90	a) Simiae-Platyrrhina				
	Cebidae				
	<i>Cebus</i> sp. ('Brown Cebus ')	54 spg	27 ♂ (I)	X-Y ♂	PAINTEK, '22b, '24b
91	b) Simiae-Catarrhina				
	Cercopithecidae				
	<i>Rhesus macacus</i>	48 spg 48 ♀, ♂ som	24 ♂ (I)	X-Y ♂	PAINTEK, '24b
92	Hominidae				
	<i>Homo sapiens</i>				
	(a) Somatic cells				
	— ('Mensch ')	22-28 (prob. 24) som	—	Cornea	FLEMMING, '82, '98
	— ('Mensch ')	18-40 som	—	Normal tissue	HANSEMANN, '91
	— ('Man ')	33-38 som	—	Embryonal tissue	WIEMAN, '13
	— ('Mensch ')	30-50(47-48) som	—	Amnion	GROSSER, '21, '27
	— ('Mensch ')	32-48 som	—	Amnion, pleura ; chrom. number variable in soma	RAPPEPORT, '22
	— ('Homme ')	20+ som	—	—	MOLAS, '26
— ('Mensch ')	24 & 48 som	—	Chorion, decidual tissue ; 48 chroms. due to splitting	SCHACHOW, '26	
— ('Human ')	24± som	—	Embryonal tissue	ADAMSTONE, '29	

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Homo sapiens</i> (' Mensch ')	30-64 som	—	Pleura, peritoneum: chrom. number in- constant in soma	KARPLUS, '29
	— (' Mensch ')	47-50 (prob. 48) ♀, ♂ som	—	Tissus culture: chrom. number constant in normal soma, inconstant in path. cells	KEMP, '28, '29, '30
	— (' Mensch ')	30-85(45-50) som	—	Tissue culture: chrom. number variable in soma	CAFFIER, '32
	— (' Human ')	52 som	—	Blood cell	CHRUSTSCHOFF & BERLIN, '35
	— (' Mensch ')	32-73 som	—	Embryonal soma; variable number due to abnormal mitoses, fragmen- tation, elimination and non-disjunc- tion	ANDRES & SHIW (JIV), '35, '36
	(b) Pathologic cells				
	— (' Human ')	40-50 (prob. 48) ♀ som	—	Tumor and can- cer	BELLING, '27
	— (' Homme ')	50-55 som	—	EVANS' prepa- ration	WINIWARTER & OGUMA, '30
	— (' Human ')	23-140 som	—	Cancer	PICON, '30
	— (' Mensch ')	24-136 (Primärtumor) 31-583 (Metastase)	—	—	ANDRES, '32
	— (' Mensch ')	96-98 spg	48 ♂ (I, II)	4n germ cells in normal testis	ANDRES, '33
	(c) Germ cells				
	— (' Mensch ' W)	8 spg	8 ♂ (I), 4 ♂ (II)	—	VON BARDELEBEN, '92, '97, '98
	— (' Man ' W)	—	15-19(18) ♂ (I)	—	WILCOX, '00
	— (' Mensch ' W)	32?	—	—	FICK, '05
	— (' Man ' W)	32 spg	16 ♂ (I)	—	MOORE & ARNOLD, '05; MOORE & WALKER, '06
	— (' Homme ' W)	ca. 24 spg	12 ♂ (I)	—	DUESBERG, '06
	— (' Man ' W)	22 spg	12 ♂ (I) 5, 7 ♂ (II)	XX-O ♂	GUYER, '10, '14
	— (' Homme ' W)	24 spg, som	ca. 12 ♂ (I) ca. 18 ♂ (II)	—	BRANCA '10a, '10b, '12, '21
	— (' Mensch ' W)	—	ca. 12 ♂ (I)	No sex-chrom.	GUTHERZ, '12, '22a
	— (' Man ' W, N)	—	12 ♂ (I) 10, 11 or 12 ♂ (II)	XX-O; Sex- chrom. prered. or postred.	MONTGOMERY, '11, '12
	— (' Man ' W)	24 spg	12 ♂ (I, II)	X-Y ♂	WIEMAN, '17

(Continued)

No.	Species	Diploid number	Haploid number	Remarks	Author
	<i>Homo sapiens</i> (' Man ' W)	—	12♂ (I)	Double X ?	JORDAN, '14
	— (' Mensch ' W)	24 spg	12♂ (I)	—	FRIEDENTHAL, '21
	— (' Homme ' W)	47 spg 48 oog	24♂ (I) 23, 24♂ (II)	X-O♂, X-X♀	WINIWARTER, '12, '21a, '21b, '23
	— (' Man ' J)	47 spg	24♂ (I)	X-O♂	OGUMA & KIHARA, '22, '23
	— (' Man ' W, N)	48 spg	24♂ (I, II)	X-Y♂	PAINTER, '23a, '23b, '24d
	— (' Homme ' W)	47 spg	24♂ (I) 23, 24♂ (II)	X-O♂	WINIWARTER & OGUMA, '25, '26
	— (' Human ' W, N)	48 spg 48 ♀, ♂ som	24♂ (I, II)	X-Y♂	EVANS & SWEZY, '28, '29
	— (' Man ' J)	48 spg	24♂ (I, II)	X-Y♂	MINOUCHI & OHTA, '32a, '34b
	— (' Mensch ' W)	48 spg	24♂ (I, II)	X-Y♂	SHIWAGO & ANDRES, '32a, '32b
	— (' Man ' W)	—	—	X-Y in ♂ (I)	GATENBY & BEAMS, '35
	— (' Man ' W)	—	24♂ (I)	X-Y♂	KING & BEAMS, '36
	— (' Man ' J)	—	24♂ (I)	X-Y♂	IRIKI, '36
	— (' Mensch ' W)	—	—	Various soma and germ cells; first 10 pairs of autosomes identified	ANDRES & NAVASCHIN, '36
	— (' Human ' J, M)	47 spg	24♂ (I)	X-O♂; Sex-chrom. with tripartite segmentary structure	OGUMA, '30, '36, '37
	— (' Human ' W)	48 oog	—	X-X♀	SWEZY & EVANS, '30
	— (' Human ' W)	—	16-18 (prob. 24) ♀ (I)	—	HOADLEY & SIMONS, '28
	— (' Human ' W)	—	Prob. 24 ♀ (I)	—	ALLEN, PRATT & NEWELL, '30
	— (' Mensch ' W)	48 oog	—	X-X♀; Abnormal mitoses in oog. div.	ANDRES & VÖGEL, '36

Bibliography

The papers have been arranged primarily according to the classes of animals studied. Under each class appears a list of papers arranged according to the alphabetical order of the names of the authors. The year of publication follows the name of the author. If two papers were published by the same author in the same year, the small letter of alphabet, such as (Makino, S. 1934b; 'b' denoting the second paper of the author in 1934), indicates the order of appearance of the papers. For the sake of economy of space the titles of journals most often referred to have been abbreviated as shown below.

The list of abbreviations of the titles of journals.

A. A.,	Anatomischer Anzeiger.
A. A. M.,	Archives d'Anatomie microscopique.
A. B.,	Archives de Biologie.
A. Hf.,	Anatomische Hefte.
A. I. A. E.,	Archivio Italiano di Anatomia e di Embriologia (Firenze).
A. J. A.,	American Journal of Anatomy.
A. M. A.,	Archiv für mikroskopische Anatomie.
A. N.,	American Naturalist.
A. R.,	Anatomical Record.
A. Zf.,	Archiv für Zellforschung.
A. Z. E. G.,	Archives de Zoologie expérimentale et générale.
B. B.,	Biological Bulletin.
B. B. Fr. Bel.,	Bulletin Biologique de la France et de la Belgique.
B. Z.,	Biologisches Zentralblatt.
C. R. A. S.,	Comptes Rendus de l'Académie des Sciences (Paris).
C. R. S. B.,	Comptes Rendus des Séances de la Société de Biologie (Paris).
Cyt.,	Cytologia (Tokyo).
Genet.,	Genetics.
Jap. J. G.,	Japanese Journal of Genetics.
Jap. J. Z.,	Japanese Journal of Zoology.
J. E. Z.,	Journal of Experimental Zoology.
J. F. S. Hokkaido I. U.,	Journal of the Faculty of Science, Hokkaido Imperial University.
J. G.,	Journal of Genetics.
J. G. P.,	Journal of General Physiology.
J. M.,	Journal of Morphology.
J. S. Hiroshima U.,	Journal of Science of the Hiroshima University.

L. C.,	La Cellule.
M. C. S. Kyoto I. U.,	Memoirs of the College of Science, Kyoto Imperial University.
M. Z. Italiano,	Monitore Zoologico Italiano (Firenze).
P. I. A. (Tokyo),	Proceedings of the Imperial Academy (Tokyo).
P. R. S. London,	Proceedings of the Royal Society (London).
Q. J. M. S.,	Quarterly Journal of Microscopical Science.
R. Suisse Z.,	Revue Suisse de Zoologie.
Sci.,	Science, New York.
S. R. Tokyo B. D.,	Science Reports of the Tokyo Bunrika Daigaku.
Z. A.,	Zoologischer Anzeiger.
Z. A. E.,	Zeitschrift für Anatomie und Entwicklungsgeschichte.
Z. B. (Moskaw),	Zeitschrift für Biologie (Moskaw).
Z. I. A. V.,	Zeitschrift für induktive Abstammungs- und Vererbungslehre.
Z. M. (Japan),	Zoological Magazine (Dobutsugaku Zasshi) (Japan).
Z. M. A. F.,	Zeitschrift für mikros.-anatomische Forschung.
Z. W. Z.,	Zeitschrift für wissenschaftliche Zoologie.
Z. Z. M. A.,	Zeitschrift für Zellforschung und mikroskopische Anatomie.

I. CYCLOSTOMATA

- RETZIUS, G. 1890. Ueber Zellenteilung bei *Myxine glutinosa*. Biol. Fören i. Stockholm förhandl., II, Nr. 8, S. 80.
- SCHREINER, A. und K. E. 1904 a. Die Reifungsteilungen bei den Wirbeltieren. Ein Beitrag zur Frage nach der Chromatinreduktion. A. A., 24, S. 561.
- 1904 b. Ueber die Entwicklung der männlichen Geschlechtszellen von *Myxine glutinosa* (L.). I. Vermehrungsperiode, Reifungsperiode und Reifungsteilungen. A. B., 21, S. 183.
- 1908. Zur Spermienbildung der Myxinoiden. (Ueber die Entwicklung der männlichen Geschlechtszellen von *Myxine glutinosa* (L.). III). A. Z., 1, S. 152.

II. PISCES

- AGAR, W. E. 1911. The spermatogenesis of *Lepidosiren paradoxa*. Q. J. M. S., 57, p. 1.
- 1912. Transverse segmentation and internal differentiation of chromosomes. Q. J. M. S., 58, p. 285.
- BEHRENS, G. 1898. Reifung und Befruchtung der Forelleneies. A. Hf., 10, S. 227.
- BENNINGTON, N. L. 1936. Germ cell origin and spermatogenesis in the Siamese fighting fish, *Betta splendens*. J. M., 60, p. 103.
- BLANC, H. 1894. Etude sur la fécondation de l'oeuf de la truite. Ber. Naturf. Gesel. Freiburg, 8, p. 163.
- BÖHM, A. A. 1891. Ueber die Befruchtung des Forelleneies. Sitzber. Gesel. Morph. Physiol. München, 7, S. 63.

- CERRUTI, A. 1908. Sull' evoluzoine dell' novo ovarico nei Selaci. Atti Accad. Sci. (fis. e math.), Napoli, Ila, 13, p. 1.
- FARMER, J. B. and J. E. S. MOORE. 1904. On the meiotic phase in animals and plants. Q. J. M. S., 48, p. 489.
- FOLEY, J. O. 1926. The spermatogenesis of *Umbra limi* with special reference to the behavior of the spermatogonial chromosomes and the first maturation division. B. B., 50, p. 117.
- FRIEDMAN, B. and M. GORDON 1934. Chromosome numbers in Xiphophorin fishes. A. N., 68, p. 446.
- GEISER, S. W. 1924. Sex ratios and spermatogenesis in the topminnow, *Gambusia holbrooki* Grd, B. B., 47, p. 175.
- GOODRICH, H. B. 1927. A study of the development of mendelian characters in *Oryzias latipes*. J. E. Z., 49, p. 261.
- HANN, H. 1927. The history of the germ cells of *Cottus bairdii* Grd. J. M., 43, p. 427.
- IRIKI, Sh. 1932a. On the chromosomes of some species of Amphibia and Pisces. (兩棲類及魚類數種の染色体に就いて). 動. 雜.: Z. M., (Japan), 44, p. 519.
- 1932b. Preliminary notes on the chromosomes of Pisces. I. *Aplocheilus latipes* and *Lebistes reticulatus*. P. I. A., (Tokyo), 8, p. 262.
- 1932c. Studies on the chromosomes of Pisces. On the chromosomes of *Aplocheilus latipes*. S. R. Tokyo B. D., Sec. B, 1, p. 127.
- KASTSCHENKO, W. 1890. Ueber den Reifungsprozess des Selachieries. Z. W. Z., 50, p. 428.
- MAKINO, S. 1933. The chromosome number of *Oncorhynchus keta* (Walbaum). (サケの染色体数). 植. 動.: Bot. & Zool., 1, p. 1837.
- 1934a. The chromosomes of the sticklebacks, *Pungitius tymensis* (Nikolsky) and *Pungitius pungitius* (Linnaeus). Cyt., 5, p. 155.
- 1934b. Notes on the chromosomes of some fresh-water Teleosts. (二三淡水魚の染色体(富魚. 鯉. 金魚). 遺傳雜.: Jap. J. G., 9, p. 100.
- 1935. A close relationship between the 'Funa' and the goldfish as seen in the morphology of the chromosomes (染色体の形態から見た鰯と和金の近縁關係), 科學: Kagaku, Tokyo, 5, p. 56.
- 1937a. Notes on the chromosomes of some teleost fishes. Z. M. (Japan), 49, p. 75.
- 1937b. The chromosomes of two Elasmobranch fishes. Cyt., FUJII Jubilee Volume, p. 867.
- MOENKHAUS, W. J. 1904. The development of the hybrids between *Fundulus heteroclitus* and *Menida notata* with special reference to the behavior of the maternal and paternal chromatin. A. J. A., 3, p. 29.
- MOORE, J. E. S. 1894. On the germinal blastema and the nature of the so-called reduction division in the cartilaginous fishes. A. A., 9, S. 547.
- 1895. On the structural changes in the reproductive cells during the spermatogenesis of Elasmobranchs. Q. J. M. S., 38, p. 275.
- MRSIC, W. 1923. Die Stätfbefruchtung und der Einfluss auf die Entwicklung und Geschlechtsbildung, experimentell nachgeprüft an der Regenbogenforelle. A. M. A., 98.

- MURRAY, J. A. 1906. Zahl und Grössenhältnisse der Chromosomen bei *Lepidosiren paradoxa* Fitz. A. A., 29, p. 203.
- OPPERMANN, K. 1913. Die Entwicklung von Forelleneier nach Befruchtung mit radiumbestrahlten Samenfäden. A. M. A., 83, S. 2.
- PINNEY, E. 1918. A study of the relation of the behaviour of the chromatin to development and heredity in teleost hydrids. J. M., 31, p. 225.
- PROKOFIEVA, A. 1934. On the chromosome morphology of certain Pisces. Cyt., 5, p. 498.
- RALSTON, E. M. 1934a. The chromosomes of *Xiphophorus*, *Platypoecilus* and their hybrids during maturation stages. Sci., 78, p. 124.
- 1934b. A study of the chromosomes of *Xiphophorus*, *Platypoecilus* and of *Xiphophorus-Platypoecilus* hybrids during spermatogenesis. J. M., 56, p. 423.
- RAWITZ, B. 1899. Untersuchungen über Zellteilung. II. Die Teilung der Hodenzellen und die Spermatogenese bei *Scyllium canicula* L. A. M. A., 53, S. 19.
- RODOLICO, A. 1933. Differenziamento dei sessi ed ovo-spermatogenesi nell'anguilla. (Ricerche istologiche e sperimentali). Pubbl. Staz. Zool. Napoli, 8, p. 180.
- RÜCKERT, J. 1892. Zur Entwicklungsgeschichte des Ovarialeies bei Selachiern. A. A., 7, S. 107.
- SCHREINER, A. und K. E. 1907. Neue Studien über die Chromatinreifung der Geschlechtszellen. II. Die Reifung der männlichen Geschlechtszellen von *Salamandra maculosa*, *Spinax niger* und *Myrine glutinosa*. A. B., 22, S. 419.
- TURNER, C. E. 1919. The seasonal cycle in the spermary of the perch. J. M., 32, p. 681.
- VAUPEL, J. 1929. The spermatogenesis of *Lebistes reticulatus*. J. M., 47, p. 555.
- WINGE, Ö. 1922. A peculiar mode of inheritance and its cytological explanation. J. G., 12, p. 137.
- 1923. Crossing-over between the X- and Y-chromosomes in *Lebistes*. J. G., 13, p. 201.

III. AMPHIBIA

- BATAILLON, E. 1910. Le problème de la fécondation circonscrit par l'imprégnation sans amphimixie et la parthénogénèse traumatique. A. Z. E. G., Ser. V, 6, p. 101.
- BECCARI, N. 1926a. Le nombre des chromosomes dans les cellules génitales de *Bufo viridis*. C. R. Assoc. Anat. Liège, 21, p. 63.
- 1926b. Le nombre des chromosomes dans les cellules génitales de *Bufo viridis*. Ann. Anat. Path. Mém.-Chir., 3.
- BERTACCHINI, P. 1896. La espermatogenesi nel gruppo degli anfi anuri. Inter. Monats. Anat. Physiol., 13, p. 409.
- BORN, G. 1894. Die Struktur des Keimbläschens in Ovarialei von *Triton taeniatus*. A. M. A., 43, S. 1.
- BRACHET, A. 1911. Etudes sur les localisations germinales et leur potentialité réelle dans l'oeuf parthenogénétique de *Rana fusca*. A. B., 26, p. 337.

- CARNOY, J. B. et H. LEBRUN 1898. La vésicule germinative et les globules polaires chez les Urodèles. II. Axolotl et Tritons. *L. C.*, 14, p. 109.
- 1899. La vésicule germinative et les globules polaires chez les Urodèles. Le globule polaires des Urodèles. *L. C.*, 16, p. 299.
- 1900. La vésicule germinative et les globules polaires chez les Batraciens. *L. C.*, 17, p. 199.
- CARRICK, R. 1934. The spermatogenesis of the Axolotl (*Amblystoma tigrinum*). *Trans. Roy. Soc. Edinburgh*, 58, p. 63.
- CHAMPY, C. 1913. Recherches sur la spermatogénèse des Batraciens et les éléments accessoires du testicule. *A. Z. E. G.*, 52, p. 13.
- DALCQ, A. 1930. La formule chromosomiale chez la grenouille. *Ann. et Bull. Soc. Roy. Sci. Méd. Nat. Bruxelles*, p. 15-22.
- 1932. Contribution à l'analyse des fonctions nucléaires dans l'ontogénèse de la grenouille. IV. Modification de la formule chromosomiale. *A. B.*, 43, p. 343.
- DEHORNE, A. 1910. Le nombre des chromosomes chez les Batraciens et chez les larves parthenogénétiques de grenouille. *C. R. A. S.*, 150, p. 1451.
- 1911. Recherches sur la division de la cellule. I. Le duplicisme constant du chromosome somatique chez *Salamandra maculosa* Laur. et chez *Allium cepa* L. *A. Zf.*, 6, S. 613.
- DEKHUYZEN, M. C. 1891. Ueber Mitosen in frei im Bindegewebe gelegenen Leukocyten. *A. A.*, 6, S. 220.
- EISEN, G. 1900. The spermatogenesis of *Batrachoseps*. *J. M.*, 17, p. 3.
- ERLANGER, R. von 1896. Ueber den feineren Bau der Epithelzellen des Kiemenplättchen der Salamanderlarve und ihre Theilung. *Z. A.*, 19, S. 401.
- FANKHAUSER, G. 1934. Cytological studies on egg fragments of the salamander *Triton*. V. Chromosome number and chromosome individuality in the cleavage mitoses of merogonic fragments. *J. E. Z.*, 68, p. 1.
- FICK, R. 1893. Ueber die Reifung und Befruchtung des Axolotleies. *Z. W. Z.*, 56, S. 529.
- FLEMMING, W. 1882. Beiträge zur Kenntniss der Zelle und ihre Lebenserscheinungen. *A. M. A.*, 20, S. 1.
- 1887. Neue Beiträge zur Kenntniss der Zelle. *A. M. A.*, 29, S. 389.
- GALGANO, M. 1931a. Il numero e la forma dei cromosomi nel processo spermatogenetico di *Rana esculenta* L. *M. Z. Italiano*, 41, p. 224.
- 1931b. Il problema dell'esistenza del cromosoma del sesso in *Rana esculenta* L. *M. Z. Italiano*, 42, p. 89.
- 1931c. Osservazioni e considerazioni intorno ai processi spermatogenetici normale ed aberranti di *Rana esculenta* L. *M. Z. Italiano*, 42, p. 297.
- 1933a. Studi intorno al compartamento della cromatina nella spermatogenesi di *Rana esculenta* L. I. Il numero e la forma dei cromosomi nel processo normale. *A. I. A. E.*, 31, p. 1.
- 1933b. Evoluzione degli spermatoцити di I ordine e cromosomi pseudosessuali in alcune specie di anfiбi. *A. I. A. E.*, 32, p. 171.
- 1934. L'influenza della temperatura sulla spermatogenesi della *Rana esculenta* L. *M. Z. Italiano*, Sup., 45, p. 82.

- GALGANO, M. 1935. Studi intorno al comportamento della cromatina nella spermatogenesi di *Rana esculenta* L. *A. I. A. E.*, 34, p. 487.
- GOLDSCHMIDT, R. 1920. Kleine Beobachtungen und Ideen zur Zellenlehre. II. Die Spermatogenese eines parthenogenetischen Frosches nebst Bemerkungen zur Frage, welches Geschlecht bei den Amphibien das heterozygotische ist. *A. Zf.*, 15, S. 283.
- HERTWIG, O. 1913. Versuche an Tritoneiern über Einwirkung bestrahlter Samenfasern auf die tierische Entwicklung. *A. M. A.*, 82, S. 1.
- HERTWIG, G. und P. 1920. Triploide Froschlarven. *A. M. A.*, 94, S. 34.
- HOVASSE, R. 1920. Le nombre des chromosomes chez les tetrads parthénogénétique de grenouille. *C. R. A. S.*, 170, p. 1211.
- 1922a. La regulation du nombre des chromosomes chez les embryons parthénogénétiques de grenouille rousse. Son mécanisme. *C. R. A. S.*, 174, p. 72.
- 1922b. Contribution à l'étude des chromosomes. Variation du nombre et régulation en parthénogénèse. *B. B. Fr. Bel.*, 56, p. 141.
- IRIKI, SH. 1928. The chromosomes of Amphibia. (兩棲類の染色體). *動. 雜.: Z. M. (Japan)*, 40, p. 491.
- 1929. On the chromosomes of *Bufo bufo japonicus*. (ヒキガヘルの染色體に就て). *動. 雜.: Z. M. (Japan)*, 41, p. 397.
- 1930. Studies on Amphibian chromosomes. 1. On the chromosomes of *Hyla arborea japonica* Guenther. *M. C. S. Kyoto I. U.*, Ser B., 5, p. 1.
- 1931. Studies on Amphibian chromosomes. 3. Preliminary notes on the chromosomes of urodeles. *P. I. A.*, (Tokyo), 7, p. 201.
- 1932a. On the chromosomes of some species of Amphibia and Pisces. (兩棲類及魚類數種の染色體に就いて). *動. 雜.: Z. M. (Japan)*, 44, p. 519.
- 1932b. Studies on Amphibian chromosomes. 4. On the chromosomes of *Rana rugosa* and *Rana nigromaculata*. *S. R. Tokyo B. D.*, Sec. B, 1, p. 61.
- 1932c. Studies on Amphibian chromosomes. 5. Explanation of the sex-chromosome type of *Hyla arborea japonica* from the standpoint of spiral structure. *S. R. Tokyo B. D.*, Sec. B, 1, p. 73.
- 1932d. Studies on Amphibian chromosomes. 6. On the chromosomes of *Diemyctylus pyrrhogaster*. *S. R. Tokyo B. D.*, Sec. B, 1, p. 81.
- 1932e. Studies on Amphibian chromosomes. 7. On the chromosomes of *Megalobatrachus japonicus*. *S. R. Tokyo B. D.*, Sec. B, 1, p. 91.
- 1932f. Studies on Amphibian chromosomes. 8. On the fixation of the chromosomes of *Hyla arborea japonica* and some other animals. *S. R. Tokyo B. D.*, Sec. B, 1, p. 105.
- JANSSENS, F. A. 1900. Rapprochement entre les cinèses polliniques et les cinèses sexuelles dans le testicule des Tritons. *A. A.*, 17, p. 520.
- 1901. La spermatogénèse chez les Tritons. *L. C.*, 19, p. 5.
- 1902. Die Spermatogenese bei den Tritonen nebst einigen Bemerkungen über die Analogie zwischen chemischer und physikalischer Tätigkeit in der Zelle. *A. A.*, 21, S. 129.
- 1904. Das chromatische Element während der Entwicklung des Oocyts des *Triton*. *A. A.*, 24, S. 648.

- JANSSENS, F. A. 1905. Spermatogénèse dans les Batraciens. III. Evolution des auxocytes males du *Batrachoseps attenuatus*. L. C., 22, p. 377.
- JANSSENS, F. A. et R. DUMEZ 1903. L'élément nucléinien pendant les cinèses de maturation des spermatoocytes chez *Batrachoseps attenuatus* et *Plethodon cinereus*. L. C., 20, p. 419.
- JANSSENS, F. A. et J. WILLEMS 1909. La spermatogénèse dans l'*Alytes obstetricans*. L. C., 25, p. 151.
- JENKINSON, J. W. 1904. The maturation and fertilization of the egg of the Axolotl. Q. J. M. S., 48, p. 407.
- JOLLY, J. 1904. Recherches expérimentales sur la division indirecte des globules rouges. A. A. M., 6, p. 455.
- KING, H. D. 1901. The maturation and fertilization of the egg of *Bufo lentiginosus*. J. M., 17, p. 293.
- 1902. Preliminary note on the formation of the first polar spindle in the egg of *Bufo lentiginosus*. A. A., 21, p. 414.
- 1905. The formation of the first polar spindle in the eggs of *Bufo lentiginosus*. B. B., 9, p. 73.
- 1907. The spermatogenesis of *Bufo lentiginosus*. A. J. A., 7, p. 345.
- 1908. The oogenesis of *Bufo lentiginosus*. J. M., 19, p. 369.
- 1912. Dimorphism in the spermatozoa of *Necturus maculosus*. A. R., 6, p. 405.
- KINGSBURY, B. F. 1899. The reducing divisions in the spermatogenesis of *Desmognathus fusca*. Zool. Bull., 2, p. 203.
- 1902. The spermatogenesis of *Desmognathus fusca*. A. J. A., 1, p. 99.
- KÖLLIKER, A. v. 1889. Gewebelehre des Menschen.
- LEBRUN, H. 1901. La vésicule germinative et les globules polaires chez les Anoures. Les cinèses sexuelles des Anoures. L. C., 19, p. 315.
- 1902a. Maturation of the egg of *Diemyctilus torosus*. B. B., 3, p. 1.
- 1902b. La vésicule germinative et les globules polaires chez les Batraciens. Les cinèses sexuelles chez *Diemyctilus torosus*. L. C., 20, p. 5.
- LEVY, F. 1913. Ueber künstliche Entwicklungserregung bei Amphibien. A. M. A., 82, S. 65.
- 1915. Studien zur Zeugungslehre. IV. Ueber die Chromatinverhältnisse in der Spermatogenese von *Rana esculenta*. A. M. A., 86, S. 85.
- 1920. Die Kernverhältnisse bei parthenogenetischen Fröschen. Sitzungsber. Preuss. Akad. Wiss., S. 417.
- LOEB, J. 1918. Further experiments on the sex of parthenogenetic frogs. Proc. Nat. Acad. Sci. Washington, 4, p. 60.
- MCGREGOR, J. H. 1899. The spermatogenesis of *Amphiuma*. J. M., 15, Suppl., p. 56.
- MACK, J. B. 1914. A study of the dimensions of the chromosomes of the somatic cells of *Amblystoma*. Kansas Univ. Sci. Bull., 9, p. 119.
- MAKINO, S. 1930. On the chromosomes of *Bufo sachalinensis* (Nikolski) (カラフトヒキガヘルの染色体に就いて). 動. 雑.: Z. M. (Japan), 42, p. 239.
- 1932a. Notes on the chromosomes of *Rhacophorus schlegelii schlegelii* (Guenther). P. I. A., (Tokyo), 8, p. 20.
- 1932b. Notes on the chromosomes of *Rana temporaria* L. and *Bufo sachalinensis* (Nikolski). P. I. A. (Tokyo), 8, p. 23.

- MAKINO, S. 1932c. The chromosome number in some salamanders from northern Japan. *J. F. S. Hokkaido I. U.*, Ser. VI, 2, p. 97.
- 1933. On the chromosomes of *Hynobius retardatus*. A comparison of chromosomes in the male and female germ cells (エゾサンセウウヲの染色體に就て. 特に雌雄兩性に於ける染色體形態上の比較). 遺傳雜.: *Jap. J. G.*, 8, p. 231.
- 1934a. The chromosomes of *Hynobius leechii* and *H. nebulosus*. *Trans. Sapporo Nat. Hist. Soc.*, 13, p. 351.
- 1934b. Supplementary studies on the chromosomes of urodeles. (有尾類染色體研究補遺). 動. 雜.: *Z. M. (Japan)*, 46, p. 94.
- 1934c. A cytological study on the maturation and fertilization of the egg of *Hynobius retardatus* (an urodelan Amphibian). *J. F. S. Hokkaido I. U.*, Ser. VI, 3, p. 117.
- 1935a. The chromosomes of *Hynobius dunni* and *H. kimurai*. 遺傳雜.: *Jap. J. G.*, 10, p. 243.
- 1935b. The chromosomes of *Cryptobranchus allegheniensis*. *J. M.*, 58, p. 573.
- MEEK, C. F. U. 1913. A metrical analysis of chromosome complex, showing correlation of evolutionary development and chromatin thread-width throughout the animal kingdom. *Phil. Trans. Roy. Soc. London*, 23 B, p. 1.
- MEVES, FR. 1895. Ueber eigentümliche mitotische Prozesse in jungen Ovocyten von *Salamandra maculosa*. *A. A.*, 10, S. 635.
- 1897. Ueber die Entwicklung der männlicher Geschlechtszellen von *Salamandra maculosa*. *A. M. A.*, 48, S. 1.
- 1911. Chromosomenlängen bei *Salamandra*, nebst Bemerkungen zur Individualitätstheorie der Chromosomen. *A. M. A.*, 77, S. 273.
- MINOUCHI, O. and SH. IRIKI 1931. Studies on Amphibian chromosomes. 2. On the chromosomes of *Bufo bufo japonicus schlegelii*. *M. C. S. Kyoto I. U.*, Ser. B, 6, p. 39.
- MONTGOMERY, T. H. 1903. The heterotypic maturation mitosis in Amphibia and its general significances. *B. B.*, 4, p. 259.
- MOORE, J. E. S. and A. L. Embleton 1905. On the synapsis in Amphibia. *P. R. S. London*, 77, p. 555.
- MOORE, J. E. S. and G. ARNOLD 1905. On the existence of permanent forms among the chromosomes of the first meiotic division in certain animals. *P. R. S. London*, 77, p. 563.
- MUCKERMANN, H. 1913. Zur Anordnung, Trennung und Polwanderung der Chromosomen in der Metaphase und Anaphase der somatischen Karyokinese bei Urodelen. *L. C.*, 23, S. 231.
- PARMENTER, C. L. 1919. Chromosome number and pair in somatic mitosis of *Ambystoma tigrinum*. *J. M.*, 33, p. 169.
- 1920. The chromosomes of parthenogenetic frogs. *J. G. P.*, 2, p. 205.
- 1925. The chromosomes of parthenogenetic frogs and tadpoles. *J. G. P.*, 8, p. 1.
- 1926. The chromosomes of parthenogenetically developed young tadpoles and early cleavages of *Rana pipiens*. *A. R.*, 34, p. 150.
- 1932. Chromosome numbers and their origin in parthenogenetically developed larvae and frogs of *Rana pipiens* and *palustris*. *A. R.*, 54, p. 83.

- PARMENTER, C. L. 1933. Haploid, diploid, triploid, and tetraploid chromosome numbers, and their origin in parthenogenetically developed larvae and frogs of *Rana pipiens* and *Rana palustris*. *J. E. Z.*, 66, p. 409.
- POSKA-TEISS, L. 1933. Spermatogonien von *Bufo vulgaris* Laur. und ihr Vergleich mit larvalen somatischen Zellen derselben Tieres. *Z. Z. M. A.*, 17, S. 347.
- PROKOFIEVA, A. 1935. On the chromosome morphology of certain Amphibia. *Cyt.*, 6, p. 148.
- RABL, C. 1885. Ueber Zelltheilung. *Morph. Jahrb.*, 10, S. 214.
- 1889. Ueber Zelltheilung. *A. A.*, 14, p. 21.
- RATH, O. vom 1893. Beiträge zur Kenntnis der Spermatogenese von *Salamandra maculosa*. *Z. W. Z.*, 57, S. 97.
- 1894. Ueber die Konstanz der Chromosomenzahl bei Tieren. *B. Z.*, 14, S. 449.
- 1895. Neue Beiträge zur Frage der Chromatinreduktion in der Samen- und Eireife. *A. M. A.*, 46, S. 168.
- RETZIUS, G. 1881. Studien über die Zellenteilung. *Biol. Unters. Jahrg.* 1881, S. 109.
- SAEZ, F. A., ROJAS, P. et E. DE ROBERTIS 1934a. Formule chromosomique du crapaud *Bufo arenarum* (Hensel). *C. R. S. B.*, 117, p. 1242.
- 1934b. La formula cromosomica del sapo *Bufo arenarum* (Hensel). *Rev. Soc. Argentina Biol.*, 10, p. 340.
- 1936a. Investigaciones sobre las células exuales de las anfibios anuros el proceso meiotico en *Bufo arenarum* (Hensel). *Inst. Museo Univ. Nacional Plata*, 2, p. 95.
- 1936b. Untersuchungen über die Geschlechtszellen der Amphibien (Anuren). Der meiotische Prozess bei *Bufo arenarum*. *Z. Z. M. A.*, 24, S. 727.
- SATO, I. 1932. Chromosome behaviour in the spermatogenesis of urodele amphibia, *Diemyctylus (Triturus) pyrrhogaster* (Boie). *J. S. Hiroshima U.*, Ser. B, 2, p. 33.
- 1933. Preliminary notes on the chromosomes of *Rana limnocharis* Wiegmann. *P. I. A. (Tokyo)*, 9, p. 422.
- 1934a. Studies on *Hynobius* from Shikoku. I. (四國山椒魚の研究). *動. 雜.: Z. M. (Japan)*, 46, p. 464.
- 1934b. On the chromosomes of *Triturus ensicauda*. *J. S. Hiroshima U.*, Ser. B, 3, p. 99.
- 1934c. On the chromosomes of *Rana limnocharis* and *Polypedates buergeri*. (ヌマガヘル及びカジカガヘルの染色體に就て). *動. 雜.: Z. M. (Japan)*, 46, p. 98.
- 1935. On the chromosomes of some species of Amphibia. (兩棲類數種の染色體に就て). *動. 雜.: Z. M. (Japan)*, 47, p. 178.
- 1936a. On the chromosomes in some hynobiid salamanders from southern Japan. *J. S. Hiroshima U.*, Ser. B, 4, p. 143.
- 1936b. Notes on the chromosomes of *Cacopoides tornieri* (Vogt) and *Bufo radderi* Strauch. *Z. M. (Japan)*, 48, p. 958.
- SCHREINER, A. und K. E. 1907. Neue Studien über die Chromatinreifung der Geschlechtszellen. II. Die Reifung der männlichen Geschlechtszellen von *Salamandra maculosa* (Laur.), *Spinax niger* (Bonap.) und *Myxine glutinosa* (L.). *A. B.*, 22, S. 419.

- SCHOTTLÄNDER, J. 1888. Ueber Kern- und Zellteilungsvorgänge in dem Endothel der entzündeten Hornhaut. *A. M. A.*, 31, S. 426.
- SESHACHAR, B. R. 1936. The spermatogenesis of *Ichthyophis glutinosus* (Linn.). Pt. 1. The spermatogonia and their division. *Z. Z. M. A.*, 24, S. 662.
- 1937. The chromosomes of *Ichthyophis glutinosus* (Linn.). *Cyt.*, 8 (in press).
- SMITH, B. G. 1929. The history of the chromosomal vesicles in the segmenting egg of *Cryptobranchus alleghehiensis*. *J. M.*, 47, p. 89.
- SNOOK, H. J. and J. A. LONG 1914. Parasynaptic stages in the testis of *Anaides lungubris* (Hallowell). Univ. Calif. Pub., 11, p. 511.
- STIEVE, H. 1918. Die Spermatogenese des Grottenolmes. *A. A.*, 51, S. 321.
- 1920. Die Entwicklung der Keimzellen des Grottenolmes (*Proteus anguineus*). 1. Die Spermatogenese. *A. M. A.*, 23, Abt. II, S. 141.
- STOHLER, R. 1926. Die Chromosomen des Hodens und des Bidderschen Organs von *Bufo viridis* Laur. *B. Z.*, 46, S. 349.
- 1927a. Die Chromosomen der mitteleuropäischen Kröten (*Bufo viridis* Laur., *B. calamita* Laur. und *B. vulgaris* Laur.) *B. Z.*, 47, S. 695.
- 1927b. Die Chromosomen der einheimischen Bufonen. Verhandl. Schweiz. Naturf. Ges., 108.
- 1928. Cytologische Untersuchungen an der Keimdrüsen mitteleuropäischen Kröten (*Bufo viridis* Laur., *B. calamita* Laur., *B. vulgaris* Laur.). *Z. Z. M. A.*, 7, S. 400.
- SUZUKI, K. 1926. On the somatic chromosomes of *Megalobatrachus japonicus*. (ハシザキの體細胞染色體に就いて). 動. 雜.: *Z. M.* (Japan), 33, p. 340.
- SWINGLE, W. W. 1917. The accessory chromosome in a frog possessing marked hermaphroditic tendencies. *B. B.*, 33, p. 70.
- 1921. The germ cells of anurans. 1. The male sexual cycle of *Rana catesbeiana* larvae. *J. E. Z.*, 32, p. 235.
- TERNI, T. 1911. La spermatogenesi del *Geotriton fuscus*. *A. I. A. E.*, 10, p. 1.
- 1914. Condriosomi, idiozoma e formazioni periidiozomiche nella spermatogenesi degli anfibi. *A. Zf.*, 12, p. 1.
- DELLA VALLE, P. 1907. Osservazioni di tetradi in cellule somatiche. Contributo a la conoscenza della tetradie. Atti R. Acad. Sci. Napoli, Ser 2a, No. 13, Vol. 13, p. 1.
- 1909. L'organizzazione della cromatina studiata mediante il numero dei cromosomi. *Arch. Zool. Ital.*, 4, p. 1.
- 1911. La continuita delle forme di divisione nucleare ed il valore morfologico dei cromosomi. *Arch. Zool. Ital.*, 5, p. 119.
- WITSCHI, E. 1922. Chromosomen und Geschlecht bei *Rana temporaria*. *Z. I. A. V.*, 27, S. 253.
- 1924. Die Entwicklung der Keimzellen der *Rana temporaria* L. I. Urkeimzellen und Spermatogenese. *Z. Z. M. A.*, 1, S. 523.
- 1933. Contributions to the cytology of Amphibian germ cells. I. Chromosomes in the spermatocyte divisions of five north American species of toads. *Cyt.*, 4, p. 174.

IV. REPTILIA

- DALCQ, A. 1920a. Note sur la spermatogénèse de l'Orvet. Etude des cellules séminales atypiques. *C. R. S. B.*, 83, p. 820.
- 1920b. Note sur la spermatogénèse de l'Orvet (aspect nucléaires de la lignée typique: existence d'un hétérochromosome). *C. R. S. B.*, 83, p. 995.
- 1921. Etude de la spermatogénèse chez l'Orvet (*Anguis fragilis* Linn.). *A. B.*, 31, p. 347.
- GLASCOCK, H. R. 1914. The spermatogenesis of the turtle, *Chrysemys cinerea*. Thesis, Univ. Wisconsin (1914).
- JORDAN, H. E. 1914. Spermatogenesis in *Chrysemys marginata* and *Cistudo carolina*. *Sci.*, 39, p. 433.
- KEENAN, R. D. 1932. The chromosomes of *Sphenodon punctatum*. *Journ. Anat.*, 67, p. 1.
- LOYEZ, M. 1905. Recherches sur les oeufs méloblastiques à vitellus nutritif abondant. *A. A. M.*, 8, p. 69.
- MATHEY, R. 1928. Les chromosomes de la Vipère (*Vipera aspis*). *C. R. Soc. Phys. Genève*, 45.
- 1929a. La spermatogénèse du Lezard (*Lacerta muralis* L.). *Z. Z. M. A.*, 8, p. 671.
- 1929b. Les chromosomes de la Vipère male (*Vipera aspis* L.). *B. Z.*, 49, p. 35.
- 1929c. Chromosomes de Sauriens, Geckonidae, Agamidae, Iguamidae, Zonuridae, Anguidae, Lacertidae, Scincidae, Chamaeleontidae. *C. R. Soc. Phys. Genève*, 46, p. 135.
- 1930a. Chromosomes de Reptiles. *C. R. S. B.*, 103.
- 1930b. Chromosomes de Tortues. *Bull. Soc. Vaud. Sci. Nat.*, 57.
- 1931a. Chromosomes de Sauriens: Helodermatidae, Varanidae, Xantusiidae, Aniellidae, Anguidae. *Bull. Soc. Vaud. Sci. Nat.*, 57, p. 267.
- 1931b. Chromosomes de Reptiles, Sauriens, Ophidiens, Chéloniens. L'évolution de la formule chromosomiale chez les Sauriens. *R. Suisse Z.*, 38, p. 117.
- 1931c. Les chromosomes des Amphisbénien acrodontes (*Trogonophis wiegmanni* Kaup.). *Bull. Soc. Vaud. Sci. Nat.*, 57, p. 313.
- 1932a. Les chromosomes de l'Amphisbénien acrodonte: *Trogonophis wiegmanni* Kaup. *A. Z. E. G.*, 74, p. 193.
- 1932b. Chromosomes de Sauriens: la cinèse hétérotypique et la réduction chromatique chez *Gerrhonotus scincicauda* Gray (= *G. caeruleus* Wiegmann.). *C. R. S. B.*, 110, p. 158.
- 1932c. Chromosomes de Sauriens: Geckonidae, Enblepharidae, Gerrhosauridae, Amphisbaenidae Pleurodotes. *C. R. S. B.*, 110, p. 273.
- 1932d. Chromosomes de Sauriens (Tejidae). *C. R. S. B.*, 110, p. 668.
- 1932e. Nouvelle contribution à l'étude des chromosomes chez les Sauriens. *Bull. Soc. Vaud. Sci. Nat.*, 57, p. 587.
- 1933. La formule chromosomiale de *Tupinambis teguixin* L. et d'*Ameiva surinamensis* Laur. *C. R. S. B.*, 112, p. 115.

- MATTHEY, R. 1933b. Nouvelle contribution à l'étude des chromosomes chez les Sauriens. *R. Suisse Z.*, 40, p. 281.
- 1934. La formule chromosomiale du *Lacerta vivipara* Jacquin. *C. R. S. B.*, 117, p. 315.
- NAKAMURA, K. 1927. Preliminary notes on Reptilian chromosomes. I. The chromosomes of some snakes. *P. I. A.* (Tokyo), 3, p. 296.
- 1928a. On the chromosomes of a snake, *Natrix tigrina*. (Studies on Reptilian chromosomes. I). *M. C. S. Kyoto I. U.*, Ser. B, 4, p. 1.
- 1928b. Preliminary notes on Reptilian chromosomes. II. The chromosomes of a lizard, *Tachydromus tachydromoides*. *P. I. A.* (Tokyo), 4, p. 491.
- 1929. The chromosomes of *Elaphe climacophora* and *E. quadrivirgata*. (青大将と縞蛇の染色體及び其の比較). *動. 雜.: Z. M.* (Japan), 41, p. 398.
- 1931a. Preliminary notes on Reptilian chromosomes. III. The chromosomes of some lizards. *P. I. A.* (Tokyo), 7, p. 26.
- 1931b. Studies on Reptilian chromosomes. II. On the chromosomes of *Eumeces latiscutatus* (Hallowell), a lizard. *Cyt.*, 2, p. 385.
- 1932. Studies on Reptilian chromosomes. III. Chromosomes of some geckos. *Cyt.*, 3, p. 156.
- 1935a. Studies on Reptilian chromosomes. IV. Chromosomes of *Tachydromus* spp. (lizards). *M. C. S. Kyoto I. U.*, Ser. B, 10, p. 341.
- 1935b. Studies on Reptilian chromosomes. V. Chromosomes of *Japarula swinhonis* (a lizard). *M. C. S. Kyoto I. U.*, Ser. B, 10, p. 355.
- 1935c. Studies on Reptilian chromosomes. VI. Chromosomes of some snakes. *M. C. S. Kyoto I. U.*, Ser. B, 10, p. 361.
- 1935d. Studies on Reptilian chromosomes. VII. Chromosomes of a turtle, *Clemmys japonica* (Temm. et Schl.). *M. C. S. Kyoto I. U.*, Ser. B, 10, p. 403.
- OGUMA, K. 1934a. The cytological evidence proving female heterogamety in the reptile. (爬蟲類の雌性ヘテロガメターに就いての細胞學的一實證). *動. 雜.: Z. M.* (Japan), 46, p. 96.
- 1934b. Studies on the Sauropsid chromosomes. II. The cytological evidence proving female heterogamety in the lizard (*Lacerta vivipara*). *A. B.*, 45, p. 27.
- 1936. Sexual difference of chromosomes in the soft-shelled turtle. A preliminary note. (スツボンに見る染色體の性別). *遺傳雜.: Jap. J. G.*, 12, p. 59.
- 1937. Studies on Sauropsid chromosomes. III. The chromosomes of the soft-shelled turtle, *Amyda japonica* (Temminck et Schleg.), as additional proof of female heterogamety in the Reptilia. *J. G.*, 34 (in press).
- PAINTER, T. S. 1921. Studies in Reptilian spermatogenesis. 1. The spermatogenesis of lizards. *J. E. Z.*, 34, p. 281.
- RISLEY, P. L. 1936. The chromosomes of the male mask turtle, *Sternotherus odoratus* L. *Cyt.*, 7, p. 232.
- SU-HSUEN WU 1933. Spermatogenesis in *Gekko japonicus*. *J. M.*, 54, p. 593.
- TELLYESNICZKY, K. 1897. Ueber den Bau des Eidechsenhodens. *Math. u. Naturw. Ber. Hungarn*, 13, p. 303.

- THATCHER, L. E. 1922. Spermatogenesis of the garter snake. *Sci.*, 56, p. 372.
TRINCI, G. 1908. L'evoluzione dell' elemento cromatico nell' oogenesi dei Sauri durante il primo periodo postgoniale. *Mem. R. Acad. Sci. Bologna, Ser. VI*, 5, p. 167.

V. AVES

- AKKERINGA, L. T. 192. Die Chromosomen bei einigen Hühnerrassen. *Z. M. A. F.*, 8, S. 325.
ALICHANIAN, S. 1936. The karyotype *Anas boscas* (Russ. w. Engl. sum.). *Zool. Journ. (Moskaw)*, 15, p. 74.
BORING, A. M. 1932. Chromosomes of domestic chicken. Miss STEVENS' figure. *Sci.*, 58, p. 73.
CREW, F. A. E. and R. LAMY 1935. Autosomal colour mosaics in the budgerigar. *J. G.*, 30, p. 233.
CREW, F. A. E. and P. CH. KOLLER 1936. Genetical and cytological studies of the intergeneric hybrid of *Cairina moschata* and *Anas platyrhyncha platyrhyncha*. *Proc. Roy. Soc. Edinburgh*, Vol. 56, p. 210.
CUTLER, D. W. 1918. On the sterility of hybrids between the pheasant and the gold campine fowl. *J. G.*, 7, p. 155.
GUYER, F. M. 1902. Spermatogenesis of normal and hybrid pigeons. *Bull. Univ. Cincinnati*, No. 21, Ser. II, Vol. II, p. 1.
— 1909a. The spermatogenesis of the domestic guinea (*Numidia meleagris dom.*). *A. A.*, 34, p. 502.
— 1909b. The spermatogenesis of the domestic chicken (*Gallus gallus dom.*). *A. A.*, 34, p. 573.
— 1916. Studies on the chromosomes of the common fowl as seen in testes and in embryos. *B. B.*, 31, p. 221.
GOLDSMITH, B. J. 1923. The history of the germ cells in the domestic fowl. *J. M.*, 46, p. 275.
HANCE, R. T. 1923. Chick chromosomes and sex-determination. *A. R.*, 26, p. 348.
— 1924. The somatic chromosomes of the chick and their possible relations. *Sci.*, 59, p. 424.
— 1925. The fixation of Avian chromosomes. *A. R.*, 31, p. 87.
— 1926a. A comparison of mitosis in chick tissue cultures and in sectioned embryos. *B. B.*, 50, p. 155.
— 1926b. The chromosomes of the chick soma. *B. B.*, 51, p. 443.
— 1926c. Sex and the chromosomes in the domestic fowl (*Gallus domesticus*). *J. M.*, 43, p. 119.
— 1932. The chromosomes of pigeons and doves. *A. R.*, 54, p. 87.
HARPER, E. H. 1904. The fertilization and early development of the pigeon's egg. *A. J. A.*, 3, p. 349.
JENTSCH, S. 1935. Die Chromosomen des Wellensittichs (*Melopsittacus undulatus* Sh.), untersucht in somatischen Geweben und in der Spermatogenese, nebst einigen Bemerkungen über Kernfragmentation in Amnion. *Z. Z. M. A.*, 23, S. 607.

- KEMP, T. 1930. Ueber die somatische Mitosen bei Menschen und warmblütigen Tieren unter normalen und pathologischen Verhältnissen. *Z. Z. M. A.*, 11, S. 429.
- LÉCAILLON, A. 1910. La parthenogénèse chez les Oiseaux. *A. A. M.*, 12, p. 511.
- LOYEZ, M. 1906. Recherches sur le développement ovarien des oeufs méroblastiques à vitellus nutritif abondant. *A. A. M.*, 8, p. 239.
- OGUMA, K. 1927. Studies on the Sauropsid chromosomes. I. The sexual difference of chromosomes in the pigeon. *J. Coll. Agr. Hokkaido Imp. Univ.*, 16, p. 203.
- 1937. Studies on Sauropsid chromosomes. IV. Chromosome numbers of seabirds new to cytology. *J. F. S. Hokkaido I. U.*, Ser. VI, 5, p. 267.
- POPOFF, W. W. 1933. Ueber die Zahl der Chromosomen und über die Heterochromosomen des Haushuhnes. *Z. Z. M. A.*, 17, S. 341.
- SAGUCHI, S. 1930. Ueber das Verhalten des Nukleolus bei der Mitose in Kulturgewebe, nebst Bemerkungen über die Chromosomenzahl beim Huhn. *Zyt. Studien*, Ht. III. Kanazawa, 1930.
- SCHÖNEBERG, K. 1913. Die Samenbildung bei den Enten. *A. M. A.*, 83, S. 324.
- SHIWAGO, P. J. 1924. The chromosome complex in the somatic cells of male and female of the domestic chicken. *Sci.*, 60, p. 45.
- 1929. Ueber den Chromosomenkomplex der Truthennen. *Z. Z. M. A.*, 9, S. 106.
- SHIWAGO, P. J. und L. S. PESCHKOWSKAJA 1936. Zum Problem des Verhaltens des Karyotyps in der Ontogenese. I. Karyologische Studien am embryonalen Vogelsoma. *Genetica*, 18, S. 74.
- SMITH, G. 1912. Studies in the experimental analysis of sex. 9. On the spermatogenesis and the formation of giant spermatozoa in hybrid pigeons. *Q. J. M. S.*, 58, p. 159.
- SOKOLOV, N. N. und J. E. TROFIMOW 1933. Individualität der Chromosomen und Geschlechtsbestimmung beim Haushuhn (*Gallus domesticus*). *Z. I. A. V.*, 65, S. 327.
- SOKOLOV, N. N., TINIAKOW, G. G. and J. E. TROFIMOW 1934. On the chromosomes of the domestic turkey. (Russ. w. Engl. sum.). *Z. B. (Moskaw)*, 3, p. 648.
- 1936a. Ueber die Morphologie der Chromosomen in der Ordnung der Hühner. (Russ. m. deutsch. Zus.). *Z. B. (Moskaw)*, 5, S. 98.
- 1936b. On the morphology of the chromosomes in Gallinaceae. *Cyt.*, 7, p. 467.
- SOKOLOWSKAJA, J. J. 1935. Vergleichende Untersuchung der Karyotypen von *Cairina moschata*, *Anas platyrhyncha* und der durch Kreuzung dieser Arten erhaltenen Bastarde. (Russ. m. deutsch. Zus.). *Z. B. (Moskaw)*, 4, S. 893.
- SONNENBRODT, H. 1908. Die Wachstumsperiode der Oocyte des Huhn. *A. M. A.*, 72, S. 415.
- SUZUKI, K. 1930. On the chromosomes of the domestic fowl. (家鶏の染色體に就いて). *動. 雑.: Z. M. (Japan)*, 42, p. 358.
- TINIAKOW, G. G. 1934. Peacock and hen hybrids, and a comparative analysis of the karyotype of their parents. (Russ. w. Engl. sum.). *Z. B. (Moskaw)*, 3, p. 41.

- TROFIMOW, J. E. and G. G. TINIAKOW 1933. The karyotype of the pheasant (*Phasianus colchicus*) and its comparison with the karyotype of the domestic fowl (*Gallus domesticus*). (Russ. w. Engl. sum.). Z. B. (Moskaw), 2, p. 33.
- UNGER, H. 1936. Beitrag zur Chromosomenforschung der Vögel. Z. Z. M. A., 25, S. 476.
- WERNER, O. S. 1925. The chromosomes in the cells of the embryonic membrane in the Indian runner duck. A. R., 31, p. 308.
- 1927. The chromosomes of the Indian runner duck. B. B., 52, p. 330.
- 1931. The chromosomes of the domestic turkey. B. B., 61, p. 157.
- WHITE, M. J. D. 1932. The chromosomes of the domestic chicken. J. G., 26, p. 345.

VI. MAMMALIA

- ADAMSTONE, E. B. 1929. Preliminary report of the chromosomes in man as determined in an 8.5 mm human embryo. A. R., 44, p. 232.
- AGAR, W. E. 1923. The male meiotic phase in two genera of marsupials (*Macropus* and *Petauroides*). Q. J. M. S., 67, p. 183.
- ALLEN, E. 1918. Studies on cell division in the albino rat (*Mus norvegicus albinus*). III. Spermatogenesis: the origin of the first spermatocytes and the organization of chromosomes, including accessory. J. M., 31, p. 133.
- 1919. A technique which preserve the normal cytological condition in both germinal and interstitial tissue in the testis of the albino rat (*Mus norvegicus albinus*). A. R., 16, p. 25.
- ALLEN, E., J. P. PRATT, Q. U. NEWELL and L. T. BLAND 1930. Human ova from large follicles including a search for maturation divisions and observations on atresia. A. J. A., 46, p. 1.
- ALTMANN, S. C. and E. W. ELLERY 1925. The chromosomes of four species of marsupials. Q. J. M. S., 69, p. 463.
- ANDRES, A. H. 1932. Zellstudien an Menschenkrebs. Der chromosomale Bestand im Primärtumor und in der Metastase. Z. Z. M. A., 16, S. 88.
- 1933. Die Riesenzellen in der Spermatogenese des Menschen. Z. Z. M. A., 18, S. 411.
- ANDRES, A. H. und B. V. SHIW 1935. Der Chromosomenbestand im embryonalen Soma des Menschen. (Russ. m. deutsch. Zus.). Z. B. (Moskaw), 4, S. 489.
- ANDRES, A. H. and B. V. JIV 1936. Somatic chromosome complex of the human embryo. Cyt., 7, p. 371.
- ANDRES, A. H. und M. S. NAVASCHIN 1936. Ein Beitrag zur morphologischen Analyse der Chromosomen des Menschen. Z. Z. M. A., 24, S. 411.
- ANDRES, A. H. und I. I. VÖGEL 1936. Karyologische Studien der Menschenovogenese. I. Embryonale Ovogenese. Z. Z. M. A., 24, S. 552.
- ATHIAS, M. 1909. Les phénomènes de division de l'ovule dans les follicules de De Graaf en voie d'atrésie chez le Lérot (*Elomys quercinus* (L.)). A. A., 34, p. 1.

- ATHIAS, M. 1912. Sur les divisions de maturation de l'oeuf des mammifères. Arch. Inst. Bacter. Cam. Pest. Lisbonne, 3, p. 287.
- BACHHUBER, L. T. 1916. The behaviour of the accessory chromosome and of the chromatoid body in the spermatogenesis of the rabbit. B. B., 30, p. 294.
- BARDELEBEN, K. von 1892. Ueber Spermatogenese bei Säugetieren, besonders beim Menschen. Verh. Anat. Gesell. Wien, 6, S. 202.
- 1896. Ueber Spermatogenese bei Monotremen und Beuteltieren. Verh. Anat. Gesell., 10, S. 38.
- 1897. Beiträge zur Histologie des Hodens und zur Spermatogenese beim Menschen. Arch. Anat. Physiol. (Abt. Anat.), Suppl., p. 193.
- 1898. Weitere Beiträge zur Spermatogenese beim Menschen. Jen. Zeits. Naturw., 24, S. 475.
- BARRETT, J. O. W. 1907. On mitosis in proliferating epithelium. P. R. S. London, B 79, p. 372.
- BELLING, J. 1927. The number of chromosomes in the cells of cancerous and other human tumors. Journ. Am. Med. Assoc., 88, p. 396.
- BENDA, C. 1906. Die Spermatogenese der Monotremen. Semon Zool. Forsch. Australialia u. Malay Archipel. Livraison, 27, S. 415.
- BINDER, S. 1927. Spermatogenese von *Macropus giganteus* mit Berücksichtigung einiger allgemeiner Fragen der Säugerspermatogenese. Z. Z. M. A., 5, S. 293.
- BRANCA, A. 1910a. Caractères des deux mitoses de maturation chez l'homme. C. R. Assoc. Anat., 12, p. 5.
- 1910b. Les mitoses spermatocytaires chez l'homme. Bibl. Anat., 21, p. 233.
- 1912. Sur le caractère individuel du testicule humain. C. R. Assoc. Anat., 13, p. 283.
- 1924. Les canalicules testiculaires et la spermatogénèse de l'homme. (Etudes cytologiques). A. Z. E. G., 62, p. 53.
- BRYDEN, WM. 1932. Cytogenetic studies on the rat. Somatic chromosome complex, meiosis and chiasma frequency. J. G., 23, p. 395.
- 1933a. A comparison of the chromosomes of the rat and the mouse. J. G., 27, p. 421.
- 1933b. The chromosomes of the pig. Cyt., 5, p. 149.
- 1935. Some observations upon the mitotic and meiotic divisions in the Wister rat. I. The effect of changes in temperature. Cyt., 6, p. 300.
- BUTARIN, N. S. 1935a. The chromosome complex of arkhar (*Ovis pollii karelini* Sev.), kurdinchny ram (*O. steato pyga*) and their F₁-hybrid. (Russ. w. Engl. sum.). C. R. Acad. Sci. U. S. S. R., 4, VI-VII, S. 287.
- 1935b. Chromosomenkomplex des Arkhares (*Ovis pollii karelini* Sev.) und Fellstersschafes. (Russ. m. deutsch. Zus.). Verlag. Akad. Wissensch. U. S. S. R., S. 77.
- 1935c. The morphology of chromosomes in the mouse (*Mus musculus* L.) (Russ. w. Engl. res.). Bull. Instit. Genet. (Moskaw), 10, p. 180.
- CAFFIER, P. 1932. Chromosomenstudien am menschlichen embryonalen Gewebe. Ein Beitrag zum Problem des Wachstums von Embryo und Tumor. Zeits. Geburtsch. Gynäk., 101.

- CHRUSTSCHOFF, G. K. and E. A. BERLIN 1935. Cytological investigations on cultures of normal human blood. *J. G.*, 31, p. 243.
- COE, W. R. 1908. The maturation of the egg of the rat. *Sci.*, 27, p. 444.
- COE, W. R. and W. B. KIRKHAM 1907. The maturation of the mouse egg. *Sci.*, 25, p. 778.
- COX, E. K. 1926. The chromosomes of the house mouse. *J. M.*, 43, p. 45.
- CREW, F. A. E. and P. CH. KOLLER 1932. The sex incidence of chiasma frequency and genetical crossing-over in the mouse. *J. G.*, 26, p. 351.
- CROSS, J. C. 1931a. Some chromosome numbers from the genus *Peromyscus*. *A. R.*, 51, p. 70.
- 1931b. A comparative study of the chromosomes of rodents. *J. M.*, 52, p. 373.
- CUTRIGHT, P. R. 1932. The spermatogenesis of the mouse (*Mus musculus* var. *albula*). *J. M.*, 54, p. 197.
- DRUMMOND, F. H. 1933. The male meiotic phase in five species of marsupials. *Q. J. M. S.*, 76, p. 1.
- DUESBERG, J. 1906. Sur le nombre des chromosomes chez l'homme. *A. A.*, 28, p. 475.
- 1908a. Les divisions des spermatocytes chez le rat. *A. Zf.*, 1, p. 399.
- 1908b. La spermatogénèse chez le rat (*Mus decumanus* Pall. var. *albinos*). *A. Zf.*, 2, p. 137.
- EVANS, H. M. and O. SWEZY 1928. A sex differences in chromosome lengths in the mammals. *Genet.*, 13, p. 532.
- 1929. The chromosomes in man: sex and somatic. *Mem. Univ. California*, 9, p. 1.
- EBNER, V. von 1899. Ueber die Teilung der Spermatocyten bei den Säugetieren. *Sitz. Ber. Akad. Wiss. Wien*, 108, S. 429.
- FEDERLEY, H. 1919. Beiträge zur Kenntnis der Säugetiergametogenese. I. Die Spermatogenese von *Mus sylvaticus* L. *Act. Soc. Sci. Fenn.*, 48, S. 1.
- FICK, R. 1905. Betrachtungen über die Chromosomen, ihre Individualität, Reduktion und Vererbung. *Arch. Anat. Physiol. (Abt. Anat.)*, Suppl., 1905, S. 179.
- FLEMMING, W. 1882. Beiträge zur Kenntnis der Zelle und ihre Lebenserscheinungen. III. *A. M. A.*, 20, S. 1.
- 1898. Ueber die Chromosomenzahl beim Menschen. *A. A.*, 14, S. 171.
- FRIEDENTHAL, H. 1921. Ueber die Bildung der menschlichen Geschlechtszellen und die Vorgeschichte der menschlichen Leibensentwicklung. *Arch. Rass. u. Gesell. Biol.*, 13.
- GATENBY, J. B. and H. W. BEAMS 1935. The cytoplasmic inclusions in the spermatogenesis of man. *Q. J. M. S.*, 78, p. 1.
- GERLACH, L. 1906. Ueber die Bildung der Richtungskörper bei *Mus musculus*. Wiesbaden.
- GOLDSCHMIDT, R. und A. FISCHER 1929. Chromosomenstudien an Karzinomzellen in vitro. *Zeits. Krebsforsch.*, 30, S. 281.
- GREENWOOD, A. W. 1923. Marsupial spermatogenesis. *Q. J. M. S.*, 67, p. 203.
- GROSSER, O. 1921. Ueber die Chromosomenzahl beim Menschen. *A. A.*, 54, Erg. - 5, S. 181.

- GROSSER, O. 1927. Frühentwicklung, Eihautbildung und Placentation der Menschen und Säugetieren. *Frauenheilkunde*, 5.
- GUTHERZ, S. 1912. Ueber ein bemerkenswertes Strukturelement (Heterochromosom?) in der Spermiogenese des Menschen. *A. M. A.*, 79, S. 79.
- 1918. Zum Geschlechtschromosomen-Problem bei den Vertebraten. Beobachtungen aus der Oogenese der Hauskatze. *Sitz. Gesell. Naturf. Fr. Berlin*, No. 8, S. 289.
- 1920. Das Heterochromosomen-Problem bei den Vertebraten. I. Untersuchung der frühen Oogenese der Hauskatze. *A. M. A.*, 94, S. 338.
- 1922a. Das Geschlechtschromosomen-Problem bei den Säugetieren und dem Menschen. *Z. I. A. V.*, 27, S. 261.
- 1922b. Das Heterochromosomen-Problem bei den Vertebraten. II. Untersuchung der weissen Maus. *A. M. A.*, 96, S. 85.
- GUYER, F. M. 1910. Accessory chromosome in man. *B. B.*, 19, p. 219.
- 1914. A note on the accessory chromosomes of man. *Sci.*, 39, p. 721 and p. 941.
- HANCE, R. T. 1917a. The fixation of mammalian chromosomes. *A. R.*, 12, p. 371.
- 1917b. The diploid chromosome complexes of the pig (*Sus scrofa*) and their variations. *J. M.*, 30, p. 155.
- 1918. Variations in somatic chromosomes. *B. B.*, 35, p. 33.
- HANSEMANN, D. 1891. Ueber pathologische Mitosen. *Virch. Arch. Anat.*, 123, S. 356.
- HARMAN, M. T. and F. P. ROOT 1926. Number and behaviour of the chromosomes in *Cavia cobaya* (the common guinea pig). *B. B.*, 51, p. 73.
- HARTMAN, C. 1919. Studies in the development of the opossum (*Didelphis virginiana*). *J. M.*, 32, p. 1.
- HERMANN, F. 1889. Beiträge zur Histologie des Hodens. *A. M. A.*, 34, S. 58.
- HILL, J. P. 1918. The early development of *Didelphis aurita*. *Q. J. M. A.*, 63, p. 91.
- HOADLEY, L. and D. SIMONS 1928. Maturation phases in human oocytes. *A. J. A.*, 41, p. 497.
- HOLL, M. 1893a. Ueber die Reifung der Eizelle bei den Säugetieren. *Verh. Anat. Gesell.*, 7, Vers. 1893, S. 122.
- 1893b. Ueber die Reifung der Eizelle bei den Säugetieren. *S. B. Wien Akad. Wiss.*, 102, Abt. 3, S. 249.
- HOOF, L. van 1911a. La spermatogénèse dans les mammifères. I. L'évolution de l'élément chromatique dans la spermatogénèse de rat. *L. C.*, 27, p. 289.
- 1911b. La spermatogénèse dans les mammifères. II. Le synapsis dans les spermatocytes des mammifères. *L. C.*, 27, p. 349.
- 1913. La spermatogénèse dans les mammifères. III. Les spermatocytes leptotènes et amphitènes dans le taureau. *L. C.*, 30, p. 5.
- HOY, W. E. and W. C. GEORGE 1929. The somatic chromosomes of the opossum (*Didelphis virginiana*). *J. M.*, 47, p. 201.
- IRIKI, SH. 1936. A preliminary report on the human chromosomes. (人類染色體豫報). *動. 雜.: Z. M. (Japan)*, 48, p. 184.

- JORDAN, H. E. 1911. The spermatogenesis of the opossum (*Didelphis virginiana*) with special reference to the accessory chromosome and the chondriosomes. *A. Zf.*, 7, p. 41.
- 1912. Notes on the spermatogenesis of the bat. *A. A.*, 40, p. 513.
- 1914. The spermatogenesis of the mongoose and a further comparative study of mammalian spermatogenesis, with special reference to sex chromosomes. *Carnegie Inst. Publ.*, 182, p. 163.
- KARPLUS, H. 1929. Ein Beitrag zur Kenntnis der somatischen Mitose beim Menschen. *Z. Z. M. A.*, 10, S. 38.
- KEMP, T. 1928. Du nombre des chromosomes dans les cellules somatiques de l'homme. *C. R. S. B.*, 99, p. 1601.
- 1929. Ueber das Verhalten der Chromosomen in den somatischen Zellen des Menschen. *Z. M. A. F.*, 16, S. 1.
- 1930. Ueber die somatischen Mitosen bei Menschen und warmblütigen Tieren unter normalen und pathologischen Verhältnissen. *Z. Z. M. A.*, 11, S. 429.
- KING, R. L. and H. W. BEAMS 1936. The sex chromosomes in man, with special reference to the first spermatocyte. *A. R.*, 65, p. 165.
- KINGERY, H. M. 1914. So-called parthenogenesis in the white mouse. *B. B.*, 27, p. 240.
- 1917. Oogenesis in the white mouse. *J. M.*, 30, p. 261.
- KIRILLOW, S. 1912. Die Spermatogenese beim Pferde. 1. *A. M. A.*, 79, S. 125.
- KIRKHAM, W. B. 1907. The maturation of the mouse egg. *B. B.*, 12, p. 259.
- 1908. Maturation of the egg of the white mouse. *Trans. Connecticut Acad. Arts and Sci.*, 13, p. 65.
- KOLLER, P. Ch. 1936a. The origin and behavior of chiasmata. XI. *Dasyurus* and *Sarcophilus*. *Cyt.*, 7, p. 82.
- 1936b. The genetical and mechanical properties of the sex-chromosomes. II. Marsupials. *J. G.*, 32, p. 451.
- 1936c. Cytological studies on the reproductive organs. Chromosome behaviour in the male grey squirrel (*Sciurus carolinensis leucotus*). *Proc. Roy. Soc. Edinburgh*, 56, p. 196.
- KOLLER, P. Ch. and C. D. DARLINGTON 1934. The genetical and mechanical properties of the sex-chromosomes. I. *Rattus norvegicus*, ♂. *J. G.*, 29, p. 159.
- KRALLINGER, H. F. 1927. Ueber die Chromosomenzahl beim Rinde sowie einige allgemeine Bemerkungen über die Chromosomenforschung in der Säugtierklasse. *Verh. Anat. Gesell.*, 1927, S. 209.
- 1928. Gibt es einen Sp rmatzoen-dimorphismus beim Hausrind? Zugleich eine Chromosomenstudie und ein Beitrag zur Kritik der Chromosomenlehre. *Arb. dtsh. Ges. Züchtgskde.*, 40, S. 1.
- 1931. Cytologische Studien an einigen Haussäugetieren. *Arch. Tierennähr. Tierzucht. Abt. B.*, 5, S. 127.
- 1936. Die Chromosomen des Halsbandpekaris (*Pecari tajacu*). *Z. Z. M. A.*, 24, S. 1.
- LAMS, H. 1913. Etude de l'oeuf de Cobaye aus premiers stades de l'embryogenèse. *A. B.*, 28, p. 229.

- LAMS, H. et J. DOORME, 1907. Nouvelles recherches sur la maturation et la fécondation de l'oeuf des mammifères. *A. B.*, 23, p. 259.
- LEAGUE, B. B. 1928. The chromosomes of the guinea-pig. *J. M.*, 46, p. 131.
- LENHOSSEK, v. M. 1898. Untersuchungen über Spermatogenese. *A. M. A.*, 51, S. 215.
- LONG, J. A. 1908. Some maturation stages of the mouse egg. *Sci.*, 27, p. 443.
- LONG, J. A. and E. L. MARK 1911. The maturation of the egg of the mouse. Carnegie Inst. Publ., 142, p. 1.
- LONGLEY, W. H. 1911. The maturation of the egg and ovulation in the domestic cat. *A. J. A.*, 12, p. 139.
- LUKIANOW, S. M. 1898. Contribution à l'étude de la spermatogénèse chez la souris blanche. *Arch. Sci. Biol. St. Petersburg*, 6, p. 285.
- MALONE, J. Y. 1918. Spermatogenesis of the dog. *Trans. Am. Micr. Soc.*, 37, p. 97.
- MASUI, K. 1919a. The spermatogenesis of the domestic mammals. I. The spermatogenesis of the horse (*Equus caballus*). *J. Coll. Agr. Imp. Univ. Tokyo*, 3, p. 357.
- 1919b. The spermatogenesis of the domestic mammals. II. The spermatogenesis of the domestic mammals. II. The spermatogenesis of cattle (*Bos taurus*). *J. Coll. Agr. Imp. Univ. Tokyo*, 3, p. 377.
- 1923. The spermatogenesis of domestic mammals. III. The spermatogenesis of the mouse and the rabbit. *J. Coll. Agr. Imp. Univ. Tokyo*, 8, p. 207.
- MATHEY, R. 1934a. La formule chromosomiale du kangourou *Macropus parryi* Benn. *C. R. S. B.*, 117, p. 406.
- 1934b. La formule chromosomiale du chat domestique. *C. R. S. B.*, 117, p. 435.
- 1936a. Le problème des hétérochromosomes chez les mammifères. *A. B.*, 47, p. 319.
- 1936b. La formule chromosomiale et les hétérochromosomes chez les *Apodemus* européens. *Z. Z. M. A.*, 25, S. 501.
- MATHEY, R. et P. RENAUD 1935. Le type de digamétie male et les chromosomes chez deux campagnols. *C. R. S. B.*, 120, p. 595.
- 1936. Les chromosomes des myoxidés. *C. R. S. B.*, 121, p. 1034.
- MELADZE, D. D. 1937. Die Chromosomenzahl bei *Equus asinus* (Russ. m. deutsch. Zus.). *Bull. Biol. Med. Exp. (Moskaw)*, 3, Nr. 4 (in press).
- MELISSINOS, K. 1907. Die Entwicklung des Eies der Mäuse. *A. M. A.*, 70, S. 577.
- MINOUCHI, O. 1928a. On the fixation of chromosomes in mammals and some other animals. *Jap. J. Z.*, 1, p. 219.
- 1928b. Spermatogenesis of the albino rat (*Mus norvegicus albus*). *Jap. J. Z.*, 1, p. 235.
- 1928c. The spermatogenesis of the dog, with special reference to meiosis. *Jap. J. Z.*, 1, p. 255.
- 1928d. On the chromosomes of the domestic mouse (*Mus wagneri* var. *albula*). *Jap. J. Z.*, 1, p. 269.
- 1928e. On the chromosomes of the cat. *P. I. A.* (Tokyo), 1.

- MINOUCHI, O 1928f. On the chromosomes of the racoon dog and the cat. (哺乳類殊に狸及び猫の染色体に就いて). 動. 雑.: Z. M. (Japan), 40, p. 490.
- 1929. On the spermatogenesis of the racoon dog (*Nyctereutes viverrinus*), with special reference to the sex-chromosomes. Cyt., 1, p. 88.
- MINOUCHI, O. and T. OHTA 1932a. The chromosome number in man. (人間の染色体数). 動. 雑.: Z. M. (Japan), 44, p. 85.
- 1932b. The chromosome number in the oogonium of the cat. (猫の卵原細胞の染色体数). 動. 雑.: Z. M. (Japan), 44, p. 86.
- 1932c. The chromosome number of the rabbit. (家兎の染色体数). 動. 雑.: Z. M. (Japan), 44, p. 86.
- 1934a. On the chromosome number and the sex-chromosomes in the germ cells of male and female cats. Cyt., 5, p. 355.
- 1934b. On the number of chromosomes and the type of sex-chromosomes in man. Cyt., 5, p. 472.
- MOLAS, L. G. G. 1926. Nucléogénèse ovulaire et transmission héréditaire chez l'homme. Trav. Lab. Rech. Biol. Univ. Madrid, 24, p. 333.
- MOLLÉ, J. VAN 1906. La spermiogénèse dans l'ecureuil. L. C., 23, p. 6.
- 1907. Les spermatoctyes dans l'ecureuil. L. C., 24, p. 257.
- MOLS, G. 1923. Etude comparative des mitoses chez le cobaye. (Mitoses seminales hétérochromosome-mitoses de l'amnion). A. B., 38, p. 31.
- MONTGOMERY, T. H. 1911. Differentiation of the human cells of Sertoli. B. B., 21, p. 367.
- 1912. Human spermatogenesis, spermatoctyes, and spermiogenesis: a study in inheritance. Journ. Acad. Nat. Sci., Phila., 15, p. 1.
- MOORE, J. E. S. 1893. Mammalian spermatogenesis. A. A., 8, p. 683.
- 1894. Some points in spermatogenesis of Mammalia. Internat. Monatsch. Anat. Physiol., 11, p. 129.
- MOORE, J. E. S. and G. ARNOLD 1905. On the existence of permanent forms among the chromosomes of the first meiotic division in certain animals. P. R. S. London, B 77, p. 563.
- MOORE, J. E. S. and J. WALKER 1906. The meiotic process in the Mammalia. Liverpool Univ. Rep., 1906, p. 1.
- NEWMAN, H. H. 1912. The ovum of the nine-banded armadillo. Growth of the oocytes, maturation, and fertilization. B. B., 23, p. 100.
- NEWMAN, H. H. and J. PATTERSON 1910. The development of the nine-banded armadillo from the primitive streak stage to birth: with special reference to the question of specific polyembryony. J. M., 21, p. 359.
- NOVIKOV, I. I. 1935. Chromosomes in the spermatogenesis of interspecific hybrids of the European mouflou and the domesticated sheep (Merino). (Russ. w. Engl. sum.). C. R. Acad. Sci. U. S. S. R., 4, p. 93.
- OGUMA, K. and H. KIHARA 1922. A preliminary report on the human chromosomes. (人類の染色体に關する研究豫報). 動. 雑.: Z. M. (Japan), 34, p. 424.
- 1923. Etude des chromosomes chez l'homme. A. B., 33, p. 493.
- OGUMA, K. 1928. On the chromosomes of *Rattus rattus*. (野生クマネズミの染色体に就いて). 動. 雑.: Z. M. (Japan), 40, p. 489.
- 1930. A further study on the human chromosomes. A. B., 40, p. 205.

- OGUMA, K. 1934a. A revision of the mammalian chromosome. (哺乳動物の染色体綜説). 遺傳雜.: Jap. J. G., 9, p. 65.
- 1934b. A new type of the mammalian sex-chromosome, found in a field mouse, *Apodemus speciosus*. Cyt., 5, p. 460.
- 1935a. On the sex chromosomes of rats and mice. (鼠類の性染色体に就いて). Proc. Jap. Assoc. Adv. Sci., 10, p. 143.
- 1935b. The chromosomes of four wild species of Muridae. J. F. S. Hokkaido I. U., Ser. VI. 4. p. 35.
- 1936. Problems on the human chromosomes and their solution. (人類染色体に關する問題と其の解決). Proc. Jap. Assoc. Adv. Sci., 11, p. 147.
- 1937a. The segmentary structure of the human X-chromosome compared with that of rodents. J. M., 61, p. 1.
- 1937b. Absence of the Y-chromosome in the vole, *Microtus montebelli* Edw. with supplementary remarks on the sex-chromosomes of *Evotomys* and *Apodemus*. Cyt., Fujii Jubilee Volume, p. 796.
- PAINTER, TH. S. 1921. The Y-chromosome in mammals. Sci., 53, p. 503.
- 1922a. Studies in Mammalian spermatogenesis. I. The spermatogenesis of the opossum (*Didelphys virginiana*). J. E. Z., 35, p. 13.
- 1922b. The sex chromosomes of the monkey. Sci., 56, p. 286.
- 1923a. Studies in Mammalian spermatogenesis. II. The spermatogenesis of man. J. E. Z., 37, p. 291.
- 1923b. Further observations on the sex chromosomes of mammals. Sci., 58, p. 247.
- 1924a. Studies in Mammalian spermatogenesis. III. The fate of the chromatin-nucleolus in the opossum. J. E. Z., 39, p. 197.
- 1924b. Studies in Mammalian spermatogenesis. IV. The sex-chromosomes of monkeys. J. E. Z., 39, p. 433.
- 1924c. Studies in Mammalian spermatogenesis. V. The chromosomes of the horse. J. E. Z., 39, p. 229.
- 1924d. The sex-chromosomes of man. A. N., 58, p. 506.
- 1925a. Chromosome numbers in mammals. Sci., 61, p. 423.
- 1925b. A comparative study of the chromosomes of mammals. A. N., 59, p. 385.
- 1925c. Chromosome studies in the rabbit. A. R., 31, p. 304.
- 1926a. The chromosomes of rodents. Sci., 64, p. 336.
- 1926b. Studies in Mammalian spermatogenesis. VI. The chromosomes of the rabbit. J. M., 43, p. 1.
- 1927. The chromosome condition of GATES' 'non-disjunction' (*v-o*) mice. Genet., 12, p. 379.
- 1928a. A comparison of chromosomes of the rat and mouse with special reference to the question of chromosome morphology in mammals. Genet., 13, p. 180.
- 1928b. The chromosome condition of the LITTLE and BAGG abnormal eyed mice. A. N., 62, p. 284.
- PICON, J. M. O. 1930. Investigaciones cuantitativas sobre los cromosomas de las células cancerosas humanas. Arch. Espanoles Oncologia, 1, p. 277.

- PINCUS, G. 1927. A comparative study of the chromosomes of the Norway rat (*Rattus norvegicus* Erxl.) and the black rat (*Rattus rattus* L.). J. M., 44, p. 515.
- PRATT, B. and J. LONG 1917. The period of synapsis in the egg of the white rat, *Mus norvegicus albinus*. J. M., 29, p. 441.
- RANQUINI, J. 1934. Trab. Inst. Biol. Anim., 2 (cited from MATHEY, R., 1936a).
- RAPPEPORT, TH. 1922. Ueber die somatische Mitose des Menschen. A. Zf., 16, S. 371.
- RATH, O. VOM 1894. Ueber die Konstanz der Chromosomenzahl bei Tieren. B. Z., 14, S. 449.
- RAUH, W. 1925. Ursprung der männlichen Keimzellen und die chromatischen Vorgänge bis zur Entwicklung des Spermatocten, beobachtet an der Ratte (*Mus decum. alb.*) Z. A. E., 76, S. 561.
- RAYNAUD, M. A. 1936. Les hétérochromosomes du Mulot. C. R. A. S., 202, p. 1942.
- REGAUD, CL. 1901a. Indépendance relative de la fonction sécrétoire et de la fonction spermatogénétique de l'épithélium seminal. C. R. S. B., 53, p. 472.
- 1901b. Etudes sur la structure des tubes séminifères et sur la spermatogénèse chez les mammifères. A. A. M., 4, p. 231.
- 1909. Etude sur la structure des tubes seminifères et sur la spermatogénèse chez les mammifères. A. A. M., 11, p. 291.
- SAEZ, F. A. 1930. Lcs cromosomas de algunos mamíferos de América del sur. Nota sobre el complejo cromosómico de *Didelphis paraguayensis* (Oken): Marsupialia. Con. Inter. Biol. Montevideo, 7-12, Oct. 1930, p. 1.
- 1931. The chromosomes of the south American opossum, *Didelphis paraguayensis*. A. N., 65, p. 287.
- SCHACHOW, S. D. 1926. Ueber die Chromosomenzahl in den somatischen Zellen des Menschen. A. A., 62, S. 122.
- 1930. Zum Problem der Chromosomenzahl in den Eizellen weisser Mäuse. (Mit einem Versuch der Rekonstruktion der ovarialen Tetraden). A. A., 69, S. 315.
- SHIWAGO, P. I. 1930. Ueber Chromosomenkomplexe beim kleinen Hornvich. (Russ. m. deutsch. Zus.). Journ. Biol. Exp., 6, S. 385.
- 1931. Karyotypische Studien an Ungulaten. I. Ueber die Chromosomenkomplexe der Schafe und Ziegen. Z. Z. M. A., 13, S. 511.
- SHIWAGO, P. I. und A. H. ANDRES 1932a. Die heteromorphen Chromosomen in der menschlichen Spermatogenese. (Russ. m. deutsch. Zus.). Z. B. (Moskaw), 1, S. 68.
- 1932b. Die Geschlechtschromosomen in der Spermatogenese des Menschen. Z. Z. M. A., 16, S. 413.
- SCHOENFELD, H. 1902. La spermatogénèse chez le taureau et chez les mammifères en général. A. B., 18, p. 1.
- SOBOTTA, J. 1895. Befruchtung und Furchung des Eies der Maus. A. M. A., 45, S. 15.
- 1907. Die Bildung der Richtungkörper bei der Maus. A. Hf., 35, S. 493.
- SOBOTTA, J. und G. BURCKHARD 1910. Reifung und Befruchtung des Eies der weissen Ratte. A. Hf., 42, S. 433.

- SOKOLOV, I. 1930. The chromosomes in spermatogenesis of the goat (*Capra hircus*). (Russ. w. Engl. sum.). Bull. Bureau Genet. Acad. Sci. U. S. S. R., 8, p. 63.
- STARKS, D. J. 1928. The spermatogenesis of the pribilof fur seal (*Callorhinus alascanus* Jordan and Clark). A. J. A., 40, p. 471.
- STEVENS, N. M. 1911a. Preliminary note on heterochromosomes in the guinea pig. B. B., 20, p. 121.
- 1911b. Heterochromosomes in the guinea pig. B. B., 21, p. 155.
- STRICHT, O. VAN DER. 1910. La structure de l'oeuf des mammifères. Mem. Acad. Roy. Belgique, (Sci.), Ser. 2., t. 2. No. 2, p. 1.
- 1911. Vitellogénèse dans l'ovule de chatte. A. B., 26, p. 365.
- SWEZY, O. 1926. The chromosomes of the rat. Sci., 66.
- 1928. On the existence of two chromosome numbers in a mixed rat strain. J. E. Z., 51, p. 135.
- 1929a. Maturation of the male germ cells in the rat. J. M., 48, p. 433.
- 1929b. The ovarian chromosome cycle in a mixed rat strain. J. M., 48, p. 445.
- SWEZY, O. and H. M. EVANS 1930. The human ovarian cells. J. M., 49, p. 543.
- TAFANI, A. 1889. I primi momenti dello sviluppo dei mammiferi. Arch. Anat. Norm. Pathol., 5, p. 1.
- TATEISHI, S. 1933. Cytological study on the mammals from Formosa. I. Spermatogenesis of *Rattus losea*. (臺灣産哺乳類の細胞學的研究第一報コキバラネズミの精子發生). 動. 雜.: Z. M. (Japan), 45, p. 115.
- 1934. A preliminary report on some peculiar shaped chromosomes in three species of *Apodemus*. (*Apodemus* 屬三種の染色体特に性染色体ならんと考へらるゝものゝ行動, 形態等に就て). Trans. Nat. Hist. Soc. Formosa, 24, p. 15.
- 1935. On the sex chromosomes of 11 species of the Muridae, etc. (鼠科動物 11 種(臺灣産 10 種を含む)の性染色体, 特に XY 各要素の消長に就て). Proc. Jap. Assoc. Adv. Sci., 10, p. 1007.
- 1936. The chromosomes of the Formosan hare, *Lepus formosus* and of the rabbit, *Lepus cuniculus*. (タイワンノウサギ並に家兎の染色体に就て). 動. 雜.: Z. M. (Japan), 48, p. 617.
- WIEMAN, H. L. 1913. Chromosomes in man. A. J. A., 14, p. 461.
- 1917. The chromosomes of human spermatocytes. A. J. A., 21, p. 1.
- WILCOX, E. W. 1900. Human spermatogenesis. A. A., 17, p. 316.
- WINGE, Ö. 1930. Zytologische Untersuchungen über die Natur maligner Tumoren. II. Teerkarzinome bei Mäusen. Z. Z. M. A., 10, S. 683.
- WINIWARTER, H. DE 1899. Le corpuscule intermédiaire et le nombre de chromosomes du lapin. A. B., 16, p. 685.
- 1900. Recherches sur l'ovogénèse et l'organogénèse de l'ovaire des mammifères (lapin et homme). A. B., 17, p. 33.
- 1912. Etudes sur la spermatogénèse humaine. I. Cellule de Sertoli. II. Hétérochromosome et mitoses de l'épithélium séminal. A. B., 27, p. 91.
- 1914. L'hétérochromosome chez le chat. Bull. Acad. Roy. Belgique, No. 4, p. 221.
- 1919. Les mitoses de l'épithélium séminal du chat. A. B., 30 p. 1.

- WINIWARTER, H. DE 1921a. La formule chromosomiale dans l'espèce humaine. *C. R. S. B.*, 85, p. 266.
- 1921b. Le nombre des chromosomes chez l'homme. *Rev. Anthropolog.*, 1921, p. 25.
- 1922. Ovogénèse de la zone corticale définitive de l'ovaire de chatte. *C. R. Assoc. Anat.*, Dixseptième réunion, p. 1.
- 1923. Etude de la préspermatogénèse chez l'homme. *C. R. Assoc. Anat. Lyon*, 1923.
- 1934. La formule chromosomiale chez diverses races de chats (*Felis domest.*). *Bull. Acad. Roy. Belgique, (Sci.)*, 20, p. 512.
- WINIWARTER, H. DE et G. SAINMONT 1909. Nouvelle recherche sur l'ovogénèse et l'organogénèse de l'ovaire des mammifères (chat). IV. Ovogénèse de la zone corticale primitive. *A. B.*, 24, p. 165.
- WINIWARTER, H. DE et K. OGUMA 1925. Recherches sur quelques points controversés de la spermatogénèse humaine. *C. R. Assoc. Anat., Turin*, 1925, p. 1.
- 1926. Nouvelles recherches sur la spermatogénèse humaine. *A. B.*, 36, p. 99.
- 1930. La formule chromosomiale humaine (a propos de deux travaux récents). *A. B.*, 40, p. 541.
- WODSEDALEK, J. E. 1913a. Accessory chromosomes in the pig. *Sci.*, 38, p. 30.
- 1913b. Spermatogenesis of the pig with special reference to the accessory chromosomes. *B. B.*, 25, p. 8.
- 1914. Spermatogenesis of the horse with special reference to the accessory chromosome and the chromatoid body. *B. B.*, 27, p. 295.
- 1916. Causes of sterility in the mule. *B. B.*, 30, p. 1.
- 1920. Studies on the cells of cattle with special reference to spermatogenesis, oögonia, and sex determination. *B. B.*, 38, p. 290.
- 1922. Studies on the cells of sheep with special reference to spermatogenesis, oögenesis, and sex determination. *A. R.*, 23, p. 103.
- 1929. Spermatogenesis, oögenesis, and sex determination in the Columbian ground-squirrel (*Citellus columbianus columbianus*). *A. R.*, 44, p. 234.
- 1931. Spermatogenesis of the red fox, *Vulpes fulvus*. *A. R.*, 51, p. 70.
- YOCUM, H. B. 1917. Some phases of spermatogenesis in the mouse. *Univ. California Publ.*, 16, p. 371.
- ZDENKO, F. 1926. Ueber die Entwicklung des Eies der weissen Maus. *Biol. General.*, 2, S. 21.
- ZUITIN, A. I. 1935. On the chromosomes of the yak (*Poepagus grunniens* (L.)). (Russ. w. Engl. sum.). *C. R. Acad. Sci. U. S. S. R.*, 4, p. 81.

VII. Lists of the Chromosome Numbers (Vertebrata) hitherto published

- BRESSLAU-HARNISCH, 1927. Tierische Chromosomen-Zahlen. *Tabulae Biologicae*, Bd. IV, pp. 110-112.

- HARVEY, E. B. 1920. A review of the chromosome numbers in the Metazoa. Part II. *J. M.*, 34, pp. 1-67.
- OGUMA, K. and S. MAKINO 1931. Check-list of chromosome numbers in Vertebrata. *Z. M.*, (Japan), 43, pp. 176-212.
- 1932. A revised check-list of the chromosome number in Vertebrata. *J. G.*, 26, pp. 239-254.
- SCHRADER, F. 1928. Die Geschlechtchromosomen. (Zellen- und Befruchtungslehre I). Berlin. Pp. 158-162.
- WILSON, E. B. 1928. The cell in development and heredity. 3rd Ed., New York. Pp. 861-862.