STUDIES ON THE LYMPHONODI OF CATS III.
MACROSCOPICAL OBSERVATIONS ON THE LYMPHONODI IN THE ABDOMINAL AND PELVIC CAVITIES

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INTRODUCTORY

In the two previous papers the writers reported about macroscopical studies on the lymphonodi of the head, neck, body surface, thoracic and pelvic limbs of cats. It was clearly demonstrated that each group of lymphonodi, determined by their locations, differed in number, existence ratios and appearances of the afferent lymphatic vessels.

This paper is a report of a study of the lymphonodi in the abdominal and pelvic cavities of cats.

MATERIALS AND METHODS

For this research 24 cats, aged 20 days to 10 years, were used as indicated in table 1. The methods of observation were described in the writers' first report. It was so difficult to inject India ink into lymphatic vessels of the spleen, kidney, suprarenal body and pancreas that the writers were with difficulty able to make the injections into the lymphatic vessels of these organs in a few specimens only.

RESULTS

1. Groups of Lymphonodi Found in the Abdominal and Pelvic Cavities

The lymphonodi found in the abdominal and pelvic cavities were divided into two main groups, visceral and parietal (Figs. 1 and 2 respectively).

The lymphonodi of the visceral group are located on the walls of the viscera or in the peritoneal folds which connect the organs with the wall or with adjacent viscera, and are subdivided into 12 groups by their localities.

The lymphonodi of the parietal group are seen in the subserous tissue, mostly along *Aorta abdominalis*, and are subdivided further into 6 groups. The subdivided 18 groups were named provisionally as follows:

TABLE 1. *Materials Used for This Observation*

EXP. NO.	SEX	AGE	WEIGHT (g)
1	♂	20 Days	150
2	"	20 "	160
3	"	1 Month	260
4	"	1.5 Months	350
5	"	1.5 "	500
6	"	2 "	500
7	"	3.5 "	750
8	"	4 "	1,150
9	"	2 Years	2,500
10	"	2 "	2,600
11	"	2 "	3,100
12	"	3 "	3,600
13	"	6 "	3,700
14	"	7 "	4,000
15	♀	1.5 Months	450
16	"	2 "	500
17	"	2.5 "	650
18	"	2.5 "	700
19	"	4 "	800
20	"	6 "	1,200
21	"	8 "	1,100
22	"	4 Years	2,200
23	"	8 "	2,450
24	"	10 "	3,000

A. Visceral group

1) *Lnn. gastrici dextri*: Longest diameter 2.0~0.1 cm, situated along the anastomosing branch between *V. coronaria ventriculi* and *V. pylorica* at right side of lesser curvature of the stomach, shape ellipsoid or spherical.

2) *Lnn. gastrici sinistri*: These nodi are seen along *V. coronaria ventriculi* at the left side of the lesser curvature. The sizes range 1.45~0.7 cm in the longest diameter and the shapes were in most cases ellipsoid or spherical, but in one case it was gourd-shaped.

3) *Lnn. subpylorici*: Longest diameter 1.55~0.3 cm, situated at the juncture of *V. gastroepip'oica dextra* and *V. pancreaticoduodenalis* lying at the caudal side of the pylorus. They were mostly ellipsoid in shape.

4) *Lnn. lienales*: Longest diameter 2.2~0.2 cm, situated at the juncture of *Vv. gastricae breves* with *V. lienalis* and along *V. lienalis*, shape spherical or ellipsoid.

5) *Lnn. gastrolienales*: Longest diameter 2.0~0.35 cm, situated at the juncture of *V. coronaria ventriculi* with *V. lienalis*, shape spherical or ellipsoid.

6) *Lnn. hepatogastrici*: Longest diameter 3.05~0.15 cm, lied along *V. portae* at the juncture of *V. portae* with *V. gastroduodenalis* and *V. pylorica*, shape mostly ellipsoid.

7) *Lnn. intestinales*: Longest diameter, 0.9~0.15cm, situated along *A.* and *V. intestinalis*. The majority of them were seen near the distal part of the ilium in *Mesostenium*; they were spherical in shape.

8) *Lnn. mesentrici communes* (the pancreas aseri): These nodi, measuring 7.9~0.5 cm in the longest diameter, were seen along *A.* and *V. mesentrica cranialis* on both sides of *Mesostenium* bilaterally. They showed various shapes and sizes. Generally, the nodi situated more proximal to the root of *Mesostenium* were comparatively smaller and ellipsoid or spherical in shape, and those situated more distal to the root were larger and club-shaped.

9) *Lnn. caecales*: Longest diameter 1.4~0.3 cm, situated along the caecal rami of *A.* and *V. iliocaecocolica*, bilaterally at both sides of the caecum. The majority of them were ellipsoid in shape.

10) *Lnn. mesocolici dextri*: Longest diameter 3.4~0.1 cm, lied near the converging portion of the ileal, caecal and colic branches of *V. iliocaecocolica*, bilaterally on both sides of the mesocolon. Most of them were ellipsoid in shape, but some times the nodi of opposite sides fuse, mostly at the ileal side, to take an irregular form.

11) *Lnn. mesocolici medii*: Longest diameter 2.82~0.1 cm, situated at the union of *V. colica sinistra* and *V. colica dextra* on the mesocolon of the transverse colon. Most of them were ellipsoid in shape, and some of them were gourd-shaped.

12) *Lnn. mesocolici sinistri*: Longest diameter 1.45~0.5 cm, found at the union of cranial and caudal branches of *A. mesentrica caudalis* on the mesocolon of the descending colon. In some cases, they were arranged along *V. colica sinistra* up to the portion of *Lnn. mesocolici medii*. In such cases it was difficult to distinguish this group from *Lnn. mesocolici medii*. The lymphonodi situated on the mesocolon of the descending colon were placed in this group by the present writers. They were mostly ellipsoid in shape, but some were gourd-shaped.

B. Parietal group

1) *Lnn. lumbales craniales*: Longest diameter 1.45~0.05 cm, found along both sides of *Aorta abdominalis* between *A. phrenicoabdominalis* and *A. renalis*. Most of them were ellipsoid or spherical in shape, but some were gourd-shaped.

2) *Lnn. lumbales caudales*: These nodi, 1.75~0.05 cm in the longest diameter, were found along *Aorta abdominalis* and *Vena cava caudalis* between *A. renalis* and *A. circumflexa ilium profunda*. Most of these nodi are comparatively small and spherical in shape, but some of them are comparatively large, gourd-shaped.

3) *Lnn. ilici externi*: Longest diameter 2.75~0.06 cm, situated bilaterally along the two sides of *Aorta abdominalis* between *A. ilica externa* and *A. circumflexa ilium profunda*. Most of them were club-shaped.

4) *Lnn. ilici interni*: Longest diameter 2.75~0.06 cm, lied along the caudal side of *A. ilica interna*. Generally, these bodies were fused to take horseshoe shape, but in some cases numerous separate nodi were arranged along the caudal side of *A. ilica interna*.

5) *Lnn. sacrales laterales*: Longest diameter 0.45~0.05 cm, found along *V. ilica interna* at the caudal side of *Lnn. ilici interni*, shape mostly spherical.

6) *Lnn. subinguinales profundi*: Longest diameter 0.55~0.05 cm, situated at the juncture of *V. ilica externa* with *V. profunda femoris* and usually were spherical in shape.

As a rule, in well nourished fattened cats, all lymphonodi of the above-mentioned groups were found embedded in the fatty tissue.

2. The Numbers of Lymphonodi

The lymphonodi found in the abdominal and pelvic cavities were distributed into the above classifications of lymphonodi as indicated in table 2.

With respect to the numbers of lymphonodi of each group found in the abdomen and pelvis, some remarkable individual differences, but not sexual differences, were observed.

Especially, it was noted that *Lnn. mesentrici communes* (on an average 5.17±3.93), *Lnn. mesocolici dextri* (on an average 4.38±3.05), *Lnn. mesocolici medii* (on an average 4.08±2.05). *Lnn. ilici externi* (on an average 4.17±2.61) and *Lnn. lumbales caudales* (on an average 7.09±3.91) showed conspicuous variations in number. In comparison with the number of lymphonodi found in the heads, necks, body surfaces, thoracic and pelvic limbs, those of the visceral group (on an average 26.63±8.63) and parietal group (on an average 18.54±6.82) in this investigation showed more conspicuous variations of number.

3. The Ratio of Existence of Categorized Each Group

Each group of lymphododi was classified into 3 groups of constant, nearly constant and inconstant by their ratio of existence as indicated in table 3.

A. Visceral group

1) Group of constant existence (existence ratio of 100%): This group includes *Lnn. subpylorici, Lnn. gastrolienales, Lnn. hepatogastrici, Lnn. mesenterici communes, Lnn. mesocolici dextri, Lnn. mesocolici medii* and *Lnn. mesocolici sinistri.*

2) Group of nearly constant existence (existence ratio less than 100%, but over 80%): In this group are included *Lnn. caecales* and *Lnn. gastrici dextri.*

3) Group of inconstant existence (existence ratio less than 80%): This group includes *Lnn. gastrici sinistri, Lnn. liena'es* and *Lnn. intestinales.*

B. Parietal group

1) Group of constant existence: In this group are included *Lnn. lumbales craniales, Lnn. ilici externi* and *Lnn. ilici interni.*

2) Group of nearly constant existence: This group includes *Lnn. lumbales caudales* only.

3) Group of inconstant existence: Members of this group are *Lnn. sacrales laterales* and *Lnn. subinguinales profundi.*

TABLE 2. *Number of Lymphonodi Appearing in Each Group*

GROUPS OF LYMPHONODI		EXP. NO. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	TOTAL	AVERAGE
Visceral Group	*Gastrici dextri*	·	1	2	2	·	2	·	4	1	1	1	3	1	1	·	2	3	1	2	2	1	1	1	1	33	1.65± 0.87
	Gastrici sinistri	2	1	1	2	1	1	1	·	1	1	·	·	1	1	1	1	1	1	1	·	·	·	1	1	20	1.11± 0.32
	Subpylorici	1	1	1	1	1	1	1	1	1	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1	26	1.03± 0.28
	Lienales	1	·	1	2	1	3	·	·	·	1	·	2	2	3	1	1	4	1	·	·	2	1	1	1	28	1.65± 0.96
	Gastrolienales	1	1	1	1	1	2	1	1	1	3	2	1	2	3	2	1	2	1	1	2	2	1	2	2	37	1.54± 0.62
	Hepatogastrici	1	2	2	3	2	1	2	4	1	1	1	2	3	3	2	1	1	3	2	2	2	1	2	6	50	2.04± 1.14
	Intestinales	·	3	·	1	·	·	3	1	·	1	·	·	1	·	·	·	1	·	1	·	·	4	·	1	17	1.70± 1.15
	Mesenterici communes	4	4	2	2	4	2	5	10	5	4	3	4	4	6	2	2	20	7	6	6	4	5	2	11	124	5.17± 3.93
	Caecales Dorsal Side	·	1	1	1	1	·	·	1	1	1	1	·	1	2	1	1	1	1	2	1	1	1	·	1	21	1.12± 0.32
	Caecales Ventral Side	1	·	·	1	1	·	·	1	1	1	2	1	·	1	1	1	1	1	·	1	·	1	1	1	18	1.06± 0.24
	Mesocolici dextri	2	4	4	7	3	4	2	9	7	2	4	1	3	3	2	2	10	14	2	4	5	4	3	4	105	4.38± 3.05
	Mesocolici medii	3	4	4	2	4	3	1	4	8	2	2	3	5	6	9	6	6	5	5	5	2	3	1	5	93	4.03± 2.05
	Mesocolici sinistri	1	2	2	5	5	4	2	1	1	3	2	1	3	3	4	1	3	3	4	2	2	2	3	3	62	2.53± 1.21
Parietal Group	*Lumbales craniales*	7	2	4	4	4	3	6	5	5	3	6	2	2	3	3	2	7	5	3	3	2	3	3	2	89	3.71± 1.61
	Lumbales caudales	7	3	·	7	9	9	15	6	3	7	10	4	6	6	9	2	10	6	4	8	2	3	8	19	163	7.09± 3.91
	Ilici externi	4	2	2	7	2	8	5	3	4	4	5	3	3	13	2	3	3	2	7	3	3	2	3	7	100	4.17± 2.61
	Ilici interni	1	1	1	2	3	1	1	2	1	2	5	4	3	1	3	1	4	3	4	3	2	2	6	6	62	2.58± 1.54
	Sacrales laterales Right Side	·	1	1	5	·	·	·	·	·	1	·	·	1	·	·	1	·	2	·	·	1	·	·	·	13	1.40± 0.93
	Sacrales laterales Left Side	·	2	·	3	·	·	·	·	·	·	·	·	1	·	1	1	·	1	·	·	1	·	·	1	11	
	Subinguinales profundi Right Side	·	·	·	·	·	·	2	·	·	·	·	·	1	·	·	·	·	·	·	·	·	·	·	·	3	1.40± 0.12
	Subinguinales profundi Left Side	·	·	·	·	·	·	2	·	·	·	·	·	1	·	1	·	·	·	·	·	·	·	·	·	4	
Total of Main Groups	Visceral	17	24	21	30	24	23	18	37	28	22	20	19	27	34	26	20	54	39	27	26	22	25	18	38	639	26.63± 8.63
	Parietal	19	11	8	28	18	21	31	16	13	17	26	13	18	23	19	10	24	19	18	17	11	10	20	35	445	18.54± 6.82
Total		36	35	29	58	42	44	49	53	41	39	46	32	45	57	45	30	78	58	45	43	33	35	38	73	1084	46.57±12.57

TABLE 3. *Showing the Ratio of Existence of Each Group*

	GROUPS OF LYMPHONODI	Numbers of Sides Found Lymphonodi	Numbers of Sides Searched for Lymphonodi	Ratio of Existence (%)	Groups Differentiated by Ratio of Occurrence
VISCERAL GROUP	*Subpylorici*	24	24	100.0	Constant
	Gastrolienales	24	24	100.0	
	Hepatogastrici	24	24	100.0	
	Mesenterici communes	24	24	100.0	
	Mesocolici dextri	24	24	100.0	
	Mesocolici medii	24	24	100.0	
	Mesocolici sinistri	24	24	100.0	
	Caecales	22	24	99.5	Nearly Constant
	Gastrici dextri	20	24	83.3	
	Gastrici sinistri	18	24	75.0	Inconstant
	Lienales	17	24	70.8	
	Intestinales	10	24	41.7	
PARIETAL GROUP	*Ilici externi*	24	24	100.0	Constant
	Ilici interni	24	24	100.0	
	Lumbales craniales	24	24	100.0	
	Lumbales caudales	23	24	95.8	Nearly Constant
	Sacrales laterales Right Side	8	24	33.3	Inconstant
	Sacrales laterales Left Side	8	24	33.3	
	Subinguinales profundi Right Side	2	24	8.3	
	Subinguinales profundi Left Side	3	24	12.5	

TABLE 4 *Showing the Areas of Origin of Afferent Lymphatic Vessels Which Entered into Each Group of Lymphonodi of Visceral Group*

GROUPS OF LYMPHONODI		REGIONS OF ORIGIN OF AFFERENT LYMPHATIC VESSELS																																				
		Stomach							Pancreas			Small Intestine					Large Intestine					Diaphragm																	
		Pars cardiaca and *oesophagia*	Lesser curvature side of *Pars fundica*	Greater curvature side of *Pars fundica*	Lesser curvature side of *Pars pylorica*	Greater curvature side of *Pars pylorica*	Liver	Spleen	*Caput pancreatis*	*Corpus pancreatis*	*Cauda pancreatis*	Cranial portion of Duodenum	Caudal portion of Duodenum	Jejunum	Most portions of Ileum	End portion of Ileum	*Caecum*	*Colon dextrum*	*Colon transversum*	*Colon sinistrum*	Rectum	*Pars lumbalis*	*Pars costalis* and *sternalis* 1)	Portion around *Foramen oesophagicum*	*Lnn. gastrici dextri*	*Lnn. gastrici sinistri*	*Lnn. subpylorici*	*Lnn. lienales*	*Lnn. gastroepiploici* 4)	*Lnn. hepatogastrici* 5)	*Lnn. intestinales*	*Lnn. mesenterici communes* 6)	*Lnn. caecales*	*Lnn. mesocolici dextri* 7)	*Lnn. mesocolici medii* 8)	*Lnn. mesocolici sinistri*
Gastrici dextri	F	2	19	·	20	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	6	·	·	·	·	·	·	·	·	·	·	·
	S	20	20	·	20	·	20	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	20	·	·	·	·	·	·	·	·	·	·	·
	%	10.0	95.0	·	100.0	·	5.0	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	30.0	·	·	·	·	·	·	·	·	·	·	·
Gastrici sinistri	F	·	18	·	16	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·	·	·
	S	·	18	·	18	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	18	·	·	·	·	·	·	·	·	·	·
	%	·	100.0	·	88.9	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	11.1	·	·	·	·	·	·	·	·	·	·
Subpylorici	F	·	·	·	·	24	·	·	·	13	·	24	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
	S	·	·	·	·	24	·	·	·	13	·	24	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
	%	·	·	·	·	100.0	·	·	·	100.0	·	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
Lienales	F	·	·	17	·	·	·	9	·	·	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	·	·	·	·	·	·	·	·
	S	·	·	17	·	·	·	9	·	·	6	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	17	·	·	·	·	·	·	·	·
	%	·	·	100.0	·	·	·	100.0	·	·	16.7	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	11.8	·	·	·	·	·	·	·	·
Gastrolienales	F	23	21	24	9	·	·	9	·	2	8	·	·	·	·	·	·	·	·	·	·	·	2	3	17	1	17	4	2	·	1	·	·	·	·	·
	S	24	24	24	24	·	·	14	·	12	8	·	·	·	·	·	·	·	·	·	·	·	5	24	24	24	24	24	24	·	24	·	·	·	·	·
	%	95.8	87.5	100.0	37.5	·	·	64.3	·	16.7	100.0	·	·	·	·	·	·	·	·	·	·	·	40.0	12.5	70.8	4.2	70.8	16.6	8.3	·	4.2	·	·	·	·	·
Hepatogastrici	F	7	3	1	8	·	24	·	·	·	·	3	·	·	·	·	·	·	·	·	·	·	7	16	5	19	·	7	12	·	·	·	·	·	·	·
	S	24	24	24	24	·	24	·	·	·	·	5	·	·	·	·	·	·	·	·	·	·	7	24	24	24	·	24	24	·	·	·	·	·	·	·
	%	29.2	12.5	4.2	33.2	·	100.0	·	·	·	·	60.0	·	·	·	·	·	·	·	·	·	·	100.0	66.7	20.8	79.2	·	29.2	50.0	·	·	·	·	·	·	·
Intestinales	F	·	·	·	·	·	·	·	·	·	·	·	·	·	4	10	·	·	·	·	·	·	·	·	·	·	·	·	·	1	1	·	·	·	·	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	10	10	·	·	·	·	·	·	·	·	·	·	·	·	·	10	10	·	·	·	·	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	40.0	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	10.0	10.0	·	·	·	·	·
Mesenterici communes	F	·	·	·	·	·	·	·	14	·	·	·	24	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	·	8	12	·	6	11	1		
	S	·	·	·	·	·	·	·	14	·	·	·	24	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·	24	24	24		
	%	·	·	·	·	·	·	·	100.0	·	·	·	100.0	100.0	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	·	33.2	50.0	·	25.0	45.8	4.2		
Caecales	F	·	·	·	·	·	·	·	·	·	·	·	·	·	·	3	22	·	·	·	·	·	·	·	·	·	·	·	·	·	·	2	1	·	·	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	·	22	22	·	·	·	·	·	·	·	·	·	·	·	·	·	·	22	22	·	·	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	·	13.6	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	·	9.1	4.5	·	·	·
Mesocolici dextri	F	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	11	24	1	·	·	·	·	·	·	·	·	·	·	1	1	22	15	1	·	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	24	24	·	·	·	·	·	·	·	·	·	·	24	24	24	24	24	·	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	·	100.0	45.8	100.0	4.2	·	·	·	·	·	·	·	·	·	·	4.2	4.2	91.7	62.5	4.2	·	·
Mesocolici medii	F	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	17	10	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	100.0	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	70.8	41.7	·
Mesocolici sinistri	F	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	12	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	24	24	·	·	·	·	·	·	·	·	·	·	·	·	·	24	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	100.0	100.0	·	·	·	·	·	·	·	·	·	·	·	·	·	50.0	·

4. The Places of Origin of Afferent Lymphatic Vessels

Each group of lymphonodi received lymphatic vessels whose origins were as indicated in tables 4 and 5.

A. Visceral group

1) *Lnn. gastrici dextri* in all cases receive lymphatic vessels which arise from the side of the lesser curvature of *Pars pylorica*. In the majority of cases they receive lymphatic vessels which arise from the side of the lesser curvature of *Pars fundica*, in some cases from *Pars cardiaca* and *oesophagea* of the stomach, liver and other nodi of this group.

2) *Lnn. gastrici sinistri* in all cases received lymphatic vessels which arise from the side of the lesser curvature of *Pars fundica*, in many cases from the side of the lesser curvature of *Pars pylorica*, and in some cases from other nodi of this group.

3) *Lnn. subpylorici* in all cases receive lymphatic vessels which arise from the side of the greater curvature of *Pars pylorica*, *Corpus pancreatis* and the cranial portion of the duodenum, but no efferent lymphatic vessels of other nodi enter into this group.

4) *Lnn. lienales* in all cases receive lymphatic vessels which arise from the side of the greater curvature of *Pars fundica* and the spleen, in some cases from *Cauda pancreatis* and other nodi of this group.

5) *Lnn. gastrolienales* in all cases received lymphatic vessels which arise from the side of the greater curvature of *Pars fundica* and *Cauda pancreatis*, in many cases from *Pars oesophagea* and *cardiaca*, the side of the lesser curvature of *Pars fundica*, the spleen and *Lnn. gastrici sinistri*, and in some cases from the side of the lesser curvature of *Pars pylorica*, *Corpus pancreatis*, the diaphragm around *Foramen oesophagicum*, *Lnn. gastrici dextri*, *Lnn. subpylorici*, *Lnn. hepatogastrici*, *Lnn. mesenterici communes* and other nodi of this group. When *Lnn. lienales* are present, the efferent lymphatic vessels from them in all cases enter into this group.

6) *Lnn. hepatogastrici* in all cases received lymphatic vessels which arise from the liver and diaphragm around *Foramen oesophagicum*, in many cases from the cranial portion of the duodenum, *Lnn. gastrici dextri* and *Lnn. subpylorici*. In some cases, moreover, these nodi received lymphatic vessels which arise from *Pars oesophagea* and *cardiaca*, *Pars fundica*, the lesser curvature of *Pars pylorica*, *Lnn. gastrici dextri*, *Lnn. gastrolienales* and other nodi of this group.

7) *Lnn. intestinales* in all cases received lymphatic vessels which arise from the ileum, in some cases from *Lnn. mesenterici communes* and other nodi of this group.

8) *Lnn. mesenterici communes* in all cases received lymphatic vessels which arise from *Caput pancreatis*, the caudal portion of the duodenum, the jejunum and ileum, in some cases efferent lymphatic vessels of *Lnn. hepatogastrici*, *Lnn. intestinales*, *Lnn. mesocolici dextri*, *Lnn. mesocolici medii*, *Lnn. mesocolici sinistri* and other nodi of this group.

9) *Lnn. caecales* in all cases receive lymphatic vessels which arise from the caecum, in some cases from the distal portion of the ileum, *Lnn. mesocolici dextri* and other nodi of this group.

10) *Lnn. mesocolici dextri* in all cases received lymphatic vessels which arise from

the distal portion of the ileum and ascending colon, in many cases from the caecum and other nodi of this group. When *Lnn. caecales* are present, the efferent lymphatic vessels from them in all cases enter into this group. In some cases these nodi receive lymphatic vessels from the transverse colon, *Lnn. intestinales*, *Lnn. mesenterici communes* and *Lnn. mesocolici medii*.

11) *Lnn. mesocolici medii* in all cases received lymphatic vessels which arise from the transverse colon and descending colon, in many cases efferent lymphatic vessels of *Lnn. mesocolici sinistri* and in some cases from other nodi of this group.

12) *Lnn. mesocolici sinistri* in all cases receive lymphatic vessels which arise from the descending colon and rectum, in some cases efferent lymphatic vessels of other nodi of this group.

B. Parietal group

1) *Lnn. lumbales craniales* in all cases received lymphatic vessels arising from *Pars lumbalis* of the diaphragm, the kidney, suprarenal body, dorso-cranial and dorso-medial portion of the abdominal wall and a part of the efferent lymphatic vessels of *Lnn. ilici externi* and *Lnn. ilici interni*. In many cases, moreover, these nodi received lymphatic vessels from the testis, ovary, and a part of the efferent lymphatic vessels of *Lnn. gastrolienales*, *Lnn. hepatogastrici*, *Lnn. mesenterici communes*, *Lnn. mesocolici dextri*, *Lnn. mesocolici medii* and *Lnn. lumbales caudales*, in some cases from other nodi of this same group.

2) *Lnn. lumbales caudales* in all cases received lymphatic vessels which arise from the testis and a part of efferent lymphatic vessels of *Lnn. ilici externi* and *Lnn. ilici interni*, in many cases from the ovary and *Lnn. mesocolici sinistri*. In some cases these nodi receive lymphatic vessels which arise from the horns of the uterus, *Lnn. gastrolienales*, *Lnn. hepatogastrici*, *Lnn. mesenterici communes*, *Lnn. mesocolici dextri*, *Lnn. mesocolici medii* and other nodi of this same group.

3) *Lnn. ilici externi* in all cases received lymphatic vessels which arise from the horns of the uterus, the medial and caudal portions of the abdominal wall, *Extremitas pelvina*, *Lnn. ilici interni*, *Lnn. subinguinales superficiales* and *Ln. popliteus*. When *Lnn. subinguinales profundi*, *Ln. prefemoralis* and *Ln. femoralis lateralis* were present, the efferent lymphatic vessels from them entered into this group. In many cases, moreover, these nodi receive lymphatic vessels which arise from the testis, ovary, urinary bladder, *Regio lumbalis*, *Regio glutaea*, *Lnn. mesocolici sinistri* and other nodi of this group, in some cases from *Lnn. lumbales caudales*.

4) *Lnn. ilici interni* in all cases received lymphatic vessels arising from the rectum, body of the uterus, *Ln. popliteus* and *Lnn. subinguinales superficiales*, in many cases from the urinary bladder, ventro-medial and ventro-caudal portions of the abdominal wall, tail, *Regio analis*, *Regio glutaea*, *Extremitas pelvina* and *Lnn. ischiadici*. When *Lnn. sacrales laterales* and *Lnn. subinguinales profundi* are present, the efferent lymphatic vessels from them enter into this group. In some cases these nodi received efferent lymphatic vessels of *Lnn. ilici externi* and other nodi of this group.

5) *Lnn. sacrales laterales* in all cases received lymphatic vessels originating from the tail, *Regio analis*, *Extremitas pelvina* and *Lnn. ischiadici*, in some cases from other

TABLE 5 *Showing the Areas of Origin of Afferent Lymphatic Vessels Which Entered into Each Group of Lymphonodi of Parietal Group*

GROUPS OF LYMPHONODI		REGIONS OF ORIGIN OF AFFERENT LYMPHATIC VESSELS: Diaphragm								Uterus			Portions of Abdominal Wall																									
		Pars lumbales	*Pars costalis and sternalis* 1)	Around *Foramen oesophagicum* 2)	Rectum	Kidney	Suprarenal Body	Testis	Ovary	Horn	Body	Urinary Bladder	Ventro-cranial 3)	Ventro-medial	Ventro-caudal	Dorso-cranial	Dorso-medial	Dorso-caudal	Tail	*Regio analis*	*Regio lumbalis*	*Regio glutaea*	*Extremitas pelvina*	*Lnn. gastrolienales* 4)	*Lnn. hepatogastrici* 5)	*Lnn. mesenterici communes* 6)	*Lnn. mesocolici dextri* 7)	*Lnn. mesocolici medii* 8)	*Lnn. mesocolici sinistri*	*Lnn. lumbales craniales*	*Lnn. lumbales caudales*	*Lnn. ilici externi* 9)	*Lnn. ilici interni* 10)	*Lnn. sacrales laterales*	*Lnn. subinguinales profundi*	*Lnn. subinguinales superficiales*	*Ln. popliteus*	*Lnn. ischiadici*	*Ln. prefemoralis*	*Ln. femoralis lateralis*
Lumbales craniales	F	13	·	·	·	9	4	7	7	·	·	·	·	·	·	10	10	·	·	·	·	·	·	14	14	14	14	14	·	13	18	15	8	·	·	·	·	·	·	·
	S	13	·	·	·	9	4	11	10	·	·	·	·	·	·	10	10	·	·	·	·	·	·	15	15	15	15	15	·	23	23	15	8	·	·	·	·	·	·	·
	%	100.0	·	·	·	100.0	100.0	63.6	70.6	·	·	·	·	·	·	100.0	100.0	·	·	·	·	·	·	93.3	93.3	93.3	93.3	93.3	·	56.5	78.3	100.0	100.0	·	·	·	·	·	·	·
Lumbales caudales	F	·	·	·	·	·	·	10	9	1	·	·	·	·	·	·	·	·	·	·	·	·	·	1	1	1	1	1	14	·	12	23	10	·	·	·	·	·	·	·
	S	·	·	·	·	·	·	10	11	4	·	·	·	·	·	·	·	·	·	·	·	·	·	21	21	21	21	21	23	·	23	23	10	·	·	·	·	·	·	·
	%	·	·	·	·	·	·	100.0	81.8	25.0	·	·	·	·	·	·	·	·	·	·	·	·	·	4.5	4.5	4.5	4.5	4.5	60.9	·	52.2	100.0	100.0	·	·	·	·	·	·	·
Ilici externi	F	·	·	·	·	·	·	10	7	4	·	7	·	13	14	·	12	14	·	·	23	22	24	·	·	·	·	·	17	·	10	17	24	·	3	24	24	·	3	2
	S	·	·	·	·	·	·	11	10	4	·	8	·	13	14	·	12	14	·	·	24	24	24	·	·	·	·	·	24	·	24	24	24	·	24	24	24	·	24	24
	%	·	·	·	·	·	·	90.9	70.0	100.0	·	87.5	·	100.0	100.0	·	100.0	100.0	·	·	95.8	91.7	100.0	·	·	·	·	·	70.8	·	41.7	70.8	100.0	·	12.5	100.0	100.0	·	12.5	8.3
Ilici interni	F	·	·	·	9	·	·	·	·	·	4	6	·	9	11	·	·	·	21	21	·	23	23	·	·	·	·	·	·	·	·	3	13	10	3	24	22	9	·	2
	S	·	·	·	9	·	·	·	·	·	4	9	·	12	14	·	·	·	24	24	·	24	24	·	·	·	·	·	·	·	·	24	24	24	24	24	22	24	·	24
	%	·	·	·	100.0	·	·	·	·	·	100.0	66.7	·	75.0	78.5	·	·	·	87.5	87.5	·	95.8	95.8	·	·	·	·	·	·	·	·	12.5	54.2	21.7	12.5	100.0	100.0	37.5	·	8.3
Sacrales laterales	F	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	10	10	·	·	10	·	·	·	·	·	·	·	·	·	·	2	·	·	·	10	·	·
	S	·	·	·	·		·	·	·	·	·	·	·	·	·	·	·	·	10	10	·	·	10	·	·	·	·	·	·	·	·	·	·	10	·	·	·	10	·	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	100.0	100.0	·	·	100.0	·	·	·	·	·	·	·	·	·	·	20.0	·	·	·	100.0	·	·
Subinguinales profundi	F	·	·	·	·	·	·	·	·	·	·	·	·	·	3	·	·	·	·	·	·	·	3	·	·	·	·	·	·	·	·	·	·	·	1	3	3	·	·	·
	S	·	·	·	·	·	·	·	·	·	·	·	·	·	3	·	·	·	·	·	·	·	3	·	·	·	·	·	·	·	·	·	·	·	3	3	3	·	·	·
	%	·	·	·	·	·	·	·	·	·	·	·	·	·	100.0	·	·	·	·	·	·	·	100.0	·	·	·	·	·	·	·	·	·	·	·	33.3	100.0	100.0	·	·	·

Remarks of Tables 4 and 5:

F ; Number of cases whose area of origin was found.
S ; Number of cases whose area of origin was searched.

Lymphatic vessels arised from 1) and 3) emptied into *Lnn. sternales*.
Lymphatic vessels arised from 2) emptied into *Lnn. hepatogastrici* or *Lnn. gastrolienales*.
Main efferent vessels of 4), 5), 6), 7) and 8) formed *Truncus intestinalis*.
Main efferent vessels of 9) and 10) formed *Truncus lumbalis*.

nodi of this same group.

6) *Lnn. subinguinales profundi* in all cases received lymphatic vessels arising from the ventro-caudal portion of the abdominal wall, *Extremitas pelvina*, *Lnn. subinguinales superficiales* and *Ln. popliteus*, in some cases from other nodi of this group.

In addition to above-mentioned lymph streams, some branches of lymphatic vessels which arise from the testis (Exp. no. 10, 11) and ovary (Exp. no. 19, 21, 24) flowed into *Cisterna chyli* or *Truncus lumbalis* and certain other branches of lymphatic vessels which arise from the diaphragm (Exp. no. 6. 13, 18) flowed into *Cisterna chyli* or *Ductus thoracicus*. In one case (Exp. no. 14) the writers found that a lymphatic vessel which arises from the transverse colon flowed into *Truncus intestinalis*.

5. Main Lymphatic Truncus

Truncus lumbalis is formed by the confluence of efferent vessels of *Lnn. ilici externi*, *Lnn. ilici interni* and *Lnn. lumbales caudales*, but in some cases (Exp. no. 4, 19) efferent vessels of *Lnn. mesocolici sinistri* join with it. *Truncus lumbalis* consists of two main canals and a plexus of fine lymphatic vessels; the former runs along the dorsal side of *Aorta abdominalis* and pours into *Cisterna chyli* as a rule, the latter occurs around *Aorta abdominalis* passing through some one of *Lnn. lumbales caudales*.

Truncus intestinalis is begun by the confluence of efferent vessels of *Lnn. mesenterici communes*, *Lnn. mesocolici dextri* and *Lnn. mesocolici medii*, in some cases efferent lymphatic vessels of *Lnn. subpylorici* (Exp. no. 9, 20, 24), *Lnn. intestinales* (Exp. no. 7) and *Lnn. mesocolici sinistri* (Exp. no. 23) empty into it. *Truncus intestinalis* runs along *A. mesenterica cranialis* and close to the root of the mesentery joins with efferent vessels of *Lnn. gastrolienales* and *Lnn. hepatogastrici* before it pours into *Cisterna chyli*.

These two trunks divide into many branches near *Cisterna chyli*. From amongest which, larger branches corresponding to the parent vessels enter into *Cisterna chyli*, and other fine branches pass through *Lnn. lumbales craniales*.

Cisterna chyli, approximately 3~0.7 cm with well developed fusiform in adult cats, is situated between *V. renalis* and the crura of the diaphragm along the dorsal side of the aorta and forms the beginning of the thoracic duct.

6. The Number of 3 Types of Lymphonodi According to the Natures of Afferent Lymphatic Vessels

According to the state of afferent lymphatic vessels, the lymphonodi were classified into 3 types of Z, ZT and T as described in the writers' first report. The number of lymphonodi of these types in each group are set out in table 6. However, some lymphonodi, whose origin could not be determined owing to insufficient injection by technical failure, were omitted from this table.

A. Visceral group

In *Lnn. gastrici dextri*, 22 among 33 cases (66.7 %) were type Z, 9 cases (27.3%) type ZT and the remainder (6.0%) type T.

TABLE 6. *Numbers of Writers' Proposed 3 Types Found in Each Group of Lymphonodi*

	GROUPS OF LYMPHONODI	TYPES OF LYMPHONODI Z		Z T		T		TOTAL	
		Cases	%	Cases	%	Cases	%	Cases	%
Visceral Group	*Gastrici dextri*	22	66.7	9	27.3	2	6.0	33	100
	Gastrici sinistri	17	85.0	2	10.0	1	5.0	20	100
	Subpylorici	26	100.0	0	0	0	0	26	100
	Lienales	26	92.9	2	7.1	0	0	28	100
	Gastrolienales	2	5.4	34	91.9	1	2.7	37	100
	Hepatogastrici	16	32.0	32	64.0	2	4.0	50	100
	Intestinales	14	82.4	3	7.6	0	0	17	100
	Mesenterici communes	45	39.2	35	30.4	35	30.4	115	100
	Caecales	36	92.3	2	5.1	1	2.6	39	100
	Mesocolici dextri	34	32.5	48	45.6	23	21.9	105	100
	Mesocolici medii	37	37.8	45	45.8	16	16.4	98	100
	Mesocolici sinistri	44	71.0	18	29.0	0	0	62	100
Parietal Group	*Lumbales craniales*	0	0	56	100.0	0	0	56	100
	Lumbales caudales	17	15.0	21	18.0	75	66.4	113	100
	Ilici externi	3	3.7	68	84.0	10	12.3	81	100
	Ilici interni	1	2.2	42	91.3	3	6.5	46	100
	Sacrales laterales	0	0	20	83.3	4	16.7	24	100
	Subinguinales profundi	0	0	7	100.0	0	0	7	100

In *Lnn. gastrici sinistri*, the majority of cases, 17 among 20 cases (85.0%), were type Z, 2 cases (10.0%) type ZT and only one case (5.0%) type T.

In *Lnn. subpylorici*, all cases were type Z.

In *Lnn. lienales*, the majority of cases, 26 among 28 (92.9%), were type Z and the remainder (7.1%) were type ZT.

In *Lnn. gastrolienales*, the majority of cases, 34 among 37 (91.9%), were type ZT, 2 cases (5.4%) type Z and only one case (2.7%) was type T.

In *Lnn. hepatogastrici*, slightly more than one-half (32 among 50) (64.0%) were type ZT, 16 cases (32.0%) type Z and 2 cases (4.0%) type T.

In *Lnn. intestinales*, the majority of cases, 14 among 17 (82.4%), were type Z and the remainder (7.6%) were type ZT.

In *Lnn. mesenterici communes*, 45 among 115 cases (39.2%) were type Z, 35 cases (30.4%) type ZT and the remaining 35 (30.4%) type T.

In *Lnn. caecales*, the majority of cases, 36 among 39 (92.3 %) were type Z, 2 cases (5.1 %) type ZT and only one case (2.6%) was type T.

In *Lnn. mesocolici dextri*, 48 among 105 cases (45.6%) were type ZT, 34 cases (32.5%) type Z and the remaining 23 (21.9%) type T.

In *Lnn. mesocolici medii*, 45 among 98 cases (45.8%) were type ZT, 37 cases (37.8%) type Z and the remainder (16.4%) type T.

In *Lnn. mesocolici sinistri*, 44 among 62 cases (71.0%) were type Z and the remainder (29.0%) were type ZT.

B. Parietal group

In *Lnn. lumbales craniales*, all cases were type ZT.

In *Lnn. lumbales caudales*, more than one half of cases, 75 among 113 (66.4%), were type T, 21 case (18.0%) type ZT and the remainder (15.0%) type Z.

In *Lnn. ilici externi*, the majority of cases, 68 among 81 (84.0%), were type ZT, 10 cases (12.3%) type T and the remainder (3.7%) type Z.

In *Lnn. ilici interni*, the majority of cases, 42 among 46 (91.3%), were type ZT, 3 cases (6.5%) type T and only one case (2.2%) was type Z.

In *Lnn. sacrales laterales*, the majority of cases, 20 among 24 (83.3%), were type ZT and the remainder (16.7%) were type T.

In *Lnn. subinguinales profundi*, all cases were type ZT.

The appearance of each type shows a different tendency in each group respectively.

The majority of the writers' type T, small nodes of approximately 1 mm in adult cats, received only fine branches of efferent vessels of other nodes, but are never drained by the afferent and main efferent vessels. Especially, it is notable that lymphonodi of type T appear in the groups which show conspicuous variations in number of lymphonodi.

7. The Reversible Communications between Adjacent Lymphonodi through Lymphatic Vessels

In this observation, the writers also found the communication among lymphonodi through lymphatic vessels, by which the lymph was able to flow retrogradely. Each type of such phenomena classified in the writers' first report was found in each group of lymphonodi as shown in table 7.

The communications appeared in *Lnn. gastrici dextri*, *Lnn. gastrici sinistri*, *Lnn. mesenterici communes*, *Lnn. mesocolici dextri*, *Lnn. mesocolici medii*, *Lnn. mesocolici sinistri*, *Lnn. ilici externi*, *Lnn. ilici interni* and *Lnn. lumbales craniales*, and more between different lymphonodi.

In regard to the appearance of each type, in *Lnn. gastrici dextri* one case each of types B and C were found. In *Lnn. gastrici sinistri* only one case of type A was found. In *Lnn. mesenterici communes* 3 among 4 cases were found to belong to type C and the other to type B. In *Lnn. mesocolici dextri* all cases belonged to type C. In *Lnn. mesocolici medii* one case each of types A, B and C were found. In *Lnn. mesocolici sinistri* there was only one case, type C. In *Lnn. ilici externi* 2 cases were found to be type C and one case each to be types A and B. In *Lnn. ilici interni* all cases were found to be type C. In *Lnn. lumbales craniales* one case was found to be type C, and other types did not

TABLE 7. *Showing Types of Communication in Each Group of Lymphonodi*

	GROUPS OF LYMPHONODI	TYPES OF COMMUNICATION A Cases	A %	B Cases	B %	C Cases	C %	TOTAL Cases	TOTAL %
In	*Gastrici dextri*	0	0	1	50.0	1	50.0	2	100
	Gastrici sinistri	1	100.0	0	0	0	0	1	100
	Mesenterici communes	0	0	1	50.0	3	75.0	4	100
	Mesocolici dextri	0	0	0	0	2	100.0	2	100
	Mesocolici medii	1	33.3	1	33.3	1	33.3	3	100
	Mesocolici sinistri	0	0	0	0	1	100.0	1	100
	Ilici externi	1	25.0	1	25.0	2	50.0	4	100
	Ilici interni	0	0	0	0	4	100.0	4	100
	Lumbales craniales	0	0	0	0	1	100.0	1	100
Between	*Gastrolienales* and *Hepatogastrici*	0	0	0	0	1	100.0	1	100
	Mesenterici communes and *Intestinales*	0	0	0	0	1	100.0	1	100
	Mesenterici communes and *Mesocolici dextri*	1	100.0	0	0	0	0	1	100
	Ilici externi and *Ilici interni*	0	0	1	33.3	2	66.7	3	100
	Total	4	14.3	5	17.9	19	67.8	28	100

appear. Between *Lnn. gastrolienales* and *Lnn. hepatogastrici* type C was found in only one case. Between *Lnn. mesenterici communes* and *Lnn. intestinales* only one case of type C was found. Between *Lnn. mesenterici communes* and *Lnn. mesocolici dextri* only one case of type A was found. Between *Lnn. ilici externi* and *Lnn. ilici interni* 2 cases were found to type C and one case to type B.

It is notable that the frequency of such phenomena in *Cavum abdominis* was smaller numbers than those in the superficial areas of the body.

DISCUSSION

Lymphonodi found in the abdominal and pelvic cavities were classified into two main groups: visceral and parietal; principally according to their locations the former was subdivided into 12 sub-groups and the latter into 6 sub-groups.

The general descriptions of the lymphatic system of the abdomen and pelvis of the cat have been given by REIGHARD and JENNINGS, TAYLOR and WEBER, TOMITA, and partial ones by MATSUMOTO (stomach, ileum and caecum), TAKESHITA

(stomach), INOUE (colon and rectum), NOMAGUCHI (rectum) and MUKAO (lymphatic trunk in the abdominal cavity).

In reargd to the localization and nomenculture of lymphonodi, the present writers have referred to the reports of the above-mentioned investigators generally, but in several details the findings differ from these previous descriptions; several lymphonodi which occur at the root of *A. hepatica*, *A. gastrica sinistra* and *A. lienalis* were divided into 3 groups of *Lnn. gastrici sinistri*, *Lnn. hepatici* and *Lnn. lienales* by MATSUMOTO and TAKESHITA. The present writers classified them into two groups of *Lnn. hepatogastrici* and *Lnn. gastrolienales*, but found it difficult to divide them into 3 groups according to their localization. The former is situated along *V. portae* and in all cases received lymphatic vessels arising from the liver and gall-bladder. MATSUMOTO's *Lnn. suprapylorici* and TOMITA's *Lnn. hepatici proprii* were incorporated in this group, because they were not different from the writers' *Lnn. hepatogastrici*. The latter is situated at the junction of *V. coronaria ventriculi* with *V. lienalis* and does not receive lymphatic vessels of the liver. The writers' *Lnn. gastrolienales* included MATSUMOTO's *Lnn. cardiaci* because they were difficult to distinguish from the writers' *Lnn. gastrolienales*. *Lnn. lienales* include several lymphonodi which are situated along *V. lienalis* and at the hilus of the spleen. This group corresponds to TOMITA's *Lnn. lienales* except for those lymphonodi which are situated at the root of *A. lienalis*. The lymphonodi which occur at the root of *A. lienalis* are difficult to separate from the present writers' *Lnn. gastrolienales*. Various sized lymphonodi found in *Mesostenium* were subdivided into two groups, *Lnn. mesenterici communes* and *Lnn. intestinales*. The former, which are the largest ones of all lymphonodi in the cat, belong to the so-called pancreas aseri (REIGHARD and JENNINGS), but *Lnn. intestinales* do not participate in the formation of the pancreas aseri. *Lnn. mesenterici communes* are the same as *Lnn. mesosteniales* named by TOMITA, but in this paper they were distinguished from *Lnn. intestinales* under this name. Lymphonodi corresponding to MATSUMOTO's *Lnn. duodenales* were found in 17 among 24 cases, but in other 7 cases they were combined with the present writers' *Lnn. mesenterici communes*. For that reason, MATSUMOTO's *Lnn. duodenales* should be included in the writers' *Lnn. mesenterici communes*.

The present writers' *Lnn. intestinales*, *Lnn. sacrales laterales* and *Lnn. subinguinales profundi* are not described in the reports of above-mentioned investigators. They belong to lymphonodi in the cat for the first time described on the basis of these observations. Lymphonodi situated at the juncture of *V. ilica externa* with *V. profunda femoris* correspond to *Lgg. inguinales profundae* of the horse and *Lgg. ilicae externae* of the dog (SISSON) according to their location, afferent and efferent lymphatic vessels. The writers called them

Lnn. subinguinales profundi, contrasting them with *Lnn. subinguinales superficiales.*

Lnn. sacrales laterales were found along *V. ilica interna* at the caudal side of *Lnn. ilici interni.* These nodes agree with *Lgg. sacrales laterales* of the dog (SISSON) with regard to their position.

The writers could not find NOMAGUCHI's *Lnn. sacrales medii* along *A. sacralis.*

Some investigators (ASCHOFF, GYLLENSTEN, HORII, NORDMANN, and others) pointed out that the structure and function of lymphonodi found in the abdominal cavity, especially in the mesentery, differ from those in other parts of the body.

In the present observation, the writers found that variation of numbers of lymphonodi in this part was more conspicuous than in the case of those found in the superficial areas of the body. As this variation was found to correlate with locations but not with sexes, the writers conjectured that such variations might correlate with functional changes at the source regions of their afferent lymphatic vessels. This conception might agree with the opinions of NORDMANN and other workers indirectly.

The appearance of lymphonodi of the writers' so-called inconstant group also did not correlate with sexes and ages, and used to appear at a definite location. According to SISSON lymphonodi which are found in such locations of the cat appear constantly in the horse and ox. This fact might signify a phylogenetic tendency by which numbers of lymphonodi of the mammals became more numerous with their evolution (KIHARA).

As a rule, the peripheral lymph passes through at least one lymphonodus prior to emptying into the vein, but in some cases the writers found that some branches of peripheral lymphatic vessels which arise from the testis, ovary and diaphragm poured into *Cisterna chyli* or *Ductus thoracicus* directly. Such lymphatic vessels may be anormalous, but it is interesting with regard to the function of the lymphatic system.

According to afferent lymphatic vessels each lymphonodus was placed in one of 3 types, Z, ZT and T. Their appearance seem to differ in each group of lymphonodi. Especially the appearance of the writers' type T correlated with the groups which are found in the mesentery and around *Aorta abdominalis.* They occurred only in areas of efferent lymphatic vessels of the main node in the lymph-center and were mostly small nodes, approximately 1 mm; they received only fine branches of efferent lymphatic vessels of other nodes, but did not receive main vessels (ref. Figs. 3, 4 and 5). It should be noted that these nodes often showed such states as to make the existence of young nodi conjectural as described in the writers' second report. The point should be ascertained by microscopical observation.

In lymphonodi of the inconstant group found in superficial areas of the body, such structures as to be conjectured to be young nodi usually appeared, but not in visceral group.

In this observation the writers also found the communication among lymphonodi by lymphatic vessels, by which the lymph was able to flow retrogradely. But such communications appeared in few cases as compared with those in superficial areas.

Most of those communications may be the same as the remainder of a lymphatic plexus existing in developmental stage as stated by ANDO and by GULLAND.

It is worthy of note that the appearance of this phenomenon correlated with the groups which showed a conspicuous variation of numbers of lymphonodi. Accordingly, the writers presume that this communication does represent the remainder of a lymphatic plexus in developmental stage and is more related with the development of lymphonodi. Variations in numbers of lymphonodi might be a characteristic property because the development of their structures have been so retarded as to show insufficiently developed stages.

SUMMARY

The results may be summarized as follows:

1. The lymphonodi found in the abdominal and pelvic cavities are divided into two main groups, visceral and parietal. The visceral group is subdivided into 12 groups: *Lnn. gastrici sinistri*, *Lnn. gastrici dextri*, *Lnn. subpylorici*, *Lnn. lienales*, *Lnn. gastrolienales*, *Lnn. hepatogastrici*, *Lnn. mesenterici communes*, *Lnn. intestinales*, *Lnn. caecales*, *Lnn. mesocolici dextri*, *Lnn. mesocolici medii* and *Lnn. mesocolici sinistri*; the parietal group into 6 groups; *Lnn. lumbales craniales*, *Lnn. lumbales caudales*, *Lnn. ilici externi*, *Lnn. ilici interni*, *Lnn. sacrales laterales* and *Lnn. subinguinales profundi*. Out of the above-mentioned 18 groups, about *Lnn. intestinales*, *Lnn. sacrales laterales* and *Lnn. subinguinales profundi* of the cat there is no description in the reports of many previous investigators.

2. With regard to the numbers of lymphonodi of each group found in this observation, the writers noted some remarkable individual differences, but not sexual differences. Variations in number of lymphonodi of the visceral and parietal groups were more conspicuous than variations in superficial areas of the body.

3. Each group of lymphonodi also was categorized into one of 3 groups of constant, nearly constant and inconstant by their ratio of existence in the cat body.

4. The origin of afferent lymphatic vessels which entered into each group of lymphonodi was investigated respectively. As a rule, the visceral group related with lymphatic vessels which arise from the digestive organs and the parietal group with those from the urogenital organs and body wall.

5. Each type, classified according to the states of their afferent lymphatic vessels, displayed different tendencies in each group of lymphonodi. Especially most of type T are small lymphonodi, approximately 1 mm in diameter, in adult cats.

6. The writers also found the communication among lymphonodi by lymphatic vessels, by which the lymph was able to flow retrogradely. The appearances of their communications may be correlative with the group of lymphonodi which show a conspicuous variation in number.

7. In some cases it was found that some branches of peripheral lymphatic vessels which arise from the testis, ovary and diaphragm empty directly into *Cisterna chyli* or *Ductus thoracicus* without passing through a lymphonodus.

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Symbols common to Figs. 1 and 2

a. *Lnn. gastrici sinistri*
b. *Lnn. gastrici dextri*
c. *Lnn. subpylorici*
d. *Lnn. lienales*
e. *Lnn. gastrolienales*
f. *Lnn. hepatogastrici*
g. *Lnn. intestinales*
h. *Lnn. mesenterici communes* (the pancreas aseri)
i. *Lnn. caecales*
j. *Lnn. mesocolici dextri*
k. *Lnn. mesocolici medii*
l. *Lnn. mesocolici sinistri*
m. *Lnn. lumbales craniales*
n. *Lnn. lumbales caudales*
o. *Lnn. ilici externi*
p. *Lnn. ilici interni*
q. *Lnn. sacrales laterales*
r. *Lnn. subinguinales profundi*

1. *Truncus intestinalis*; to *Cisterna chyli*
2. *Truncus lumbalis*; to *Cisterna chyli*
3. *Ductus thoracicus*
4. *Cisterna chyli*
5. Efferent lymphatic vessels of *Lnn. mesocolici sinistri*; to *Lnn. lumbales caudales* and *Lnn. ilici externi*

I. *V. portae*
II. *V. gastrolienalis*
III. *V. coronaria ventriculi*
IV. *V. lienalis*
V. *V. pylorica*
VI. *V. gastroduodenalis*
VII. *V. gastroepiploica dextra*
VIII. *V. pancreaticoduodenalis*
IX. *V. mesenterica cranialis*
X. *V. iliocaecocolica*
XI. *Vv. intestinales*
XII. *V. mesenterica caudalis*
XIII. *V. colica dextra*
XIV. *V. colica sinistra*
XV. *Aorta abdominalis*
XVI. *Vena cava caudalis*
XVII. *A. coeliaca*

XVIII. *A. mesenterica cranialis*
XIX. *A. mesenterica caudalis*
XX. *A.* and *V. phrenicoabdominalis*
XXI. *A.* and *V. renalis*
XXII. *A.* and *V. spermatica interna*
XXIII. *A.* and *V. circumflexa ilium profunda*
XXIV. *V. ilica communis*
XXV. *A.* and *V. ilica externa*
XXVI. *A.* and *V. ilica interna*
XXVII. *A.* and *V. profunda femoris*

EXPLANATION OF PLATE

PLATE I.

Fig. 1. Lymphonodi and lymphatic vessels of visceral group shown diagrammatically; Ventral view.

Fig. 2. Lymphonodi and lymphatic vessels of parietal group shown diagrammatically; Ventral view.

PLATE II.

Figs. 3, 4, 5 and 6 Small lymphonodi found in areas of efferent lymphatic vessels, injected with India ink, (× 23).

Fig. 3. Lymphonodus of Type T found in *Lnn. mesocolici medii.*

Fig. 4. Lymphonodus of Type T found in *Lnn. lumbales caudales*; this node receives only one fine branch of main efferent vessels of *Lnn. ilici externi.*

Fig. 5. Lymphonodus of Type T found in *Lnn. mesenterici communes*; fine lymphatic plexus which branch off from efferent vessels of main nodes of this group pass through this small node.

Fig. 6. Lymphonodus of Type ZT found in *Lnn. mesocolici dextri*; it is rare that such a small node of type ZT appears in areas of efferent lymphatic vessels.

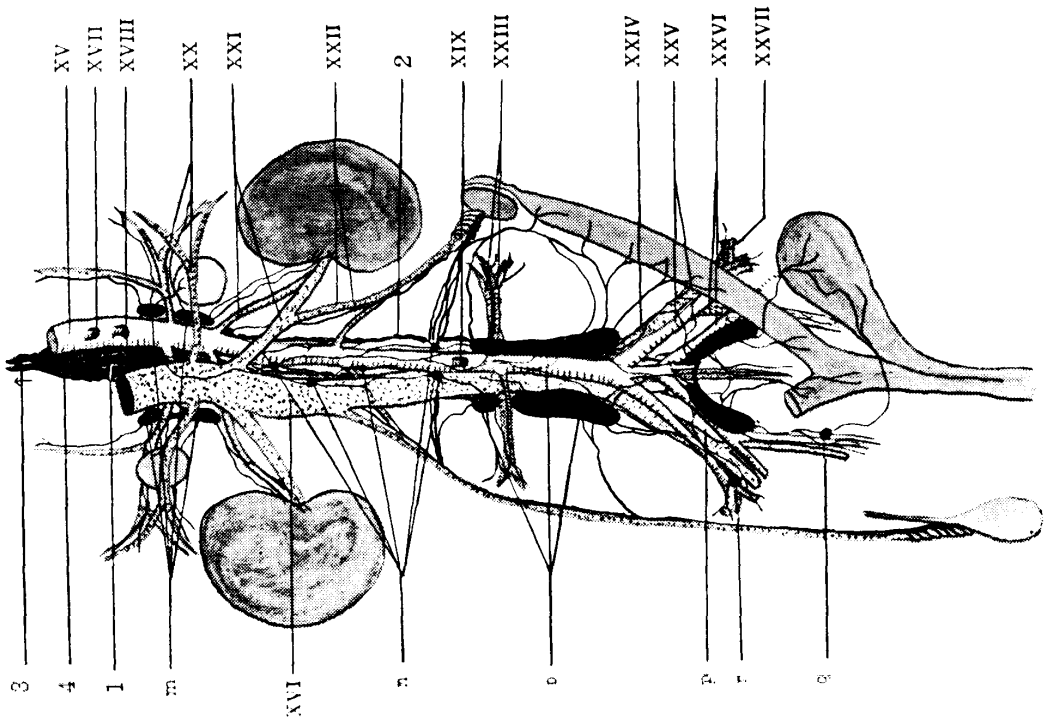
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FIG. 2

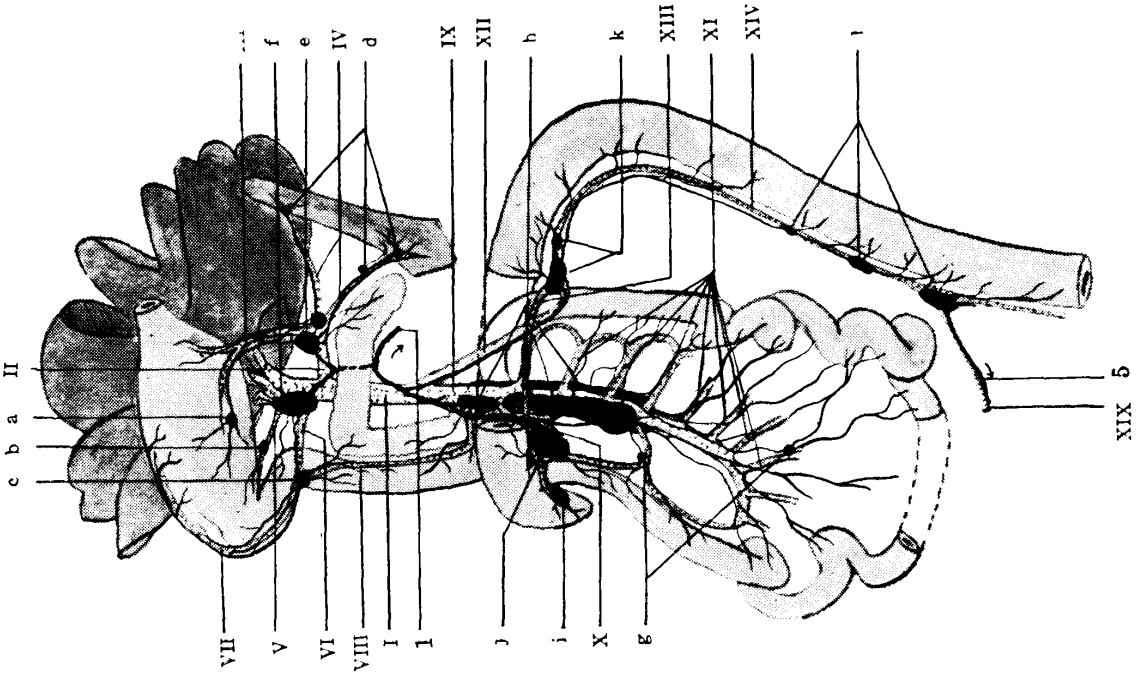
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FIG. 1

FIG. 3

FIG. 4

FIG. 5

FIG. 6