THE TOPOGRAPHY OF CHRONIC GASTRITIS IN OTHERWISE NORMAL STOMACHS *

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Most observers are agreed that the changes in the gastric mucosa which, individually and together, constitute so-called chronic gastritis are frequently encountered in adults (Hillenbrand,[1] Faber,[2] Guiss and Stewart,[3] Hebbel[4]). While it is recognized that such deviations from the normal may be from focal to diffuse in distribution, determinations of the incidence of gastritis in otherwise normal stomachs have referred largely to the qualitative features of the process and there is uncertainty as to the frequency with which varying distributions of the changes may be found. That varying distributions do exist was emphasized by Hillenbrand in a detailed study of 21 stomachs from patients over 35 years of age. As part of a study of the relationship between chronic gastritis and gastric cancer it seemed desirable to have more information concerning the topography of gastritis in stomachs otherwise without disease. Gastritis, commonly found with cancer of the stomach, may vary in its extent (Hebbel) and the significance of that variation can be interpreted only in relation to similar processes found in stomachs without cancer. This paper presents the results of a survey of a group of stomachs with reference to the distribution of the gastritic changes encountered.

MATERIALS AND METHODS

The material consisted of stomachs obtained at autopsy from persons of both sexes and all ages in whom death resulted from a wide variety of causes and whose past histories recorded no gastro-intestinal complaints. Cases of pernicious anemia were excluded. The material was otherwise selected only by the exclusion of specimens with ulcer, scar, or tumor in either the stomach or duodenum and by further exclusion, after microscopic examination, of those specimens with obscuring post-mortem changes.

Strips of mucosa were removed from the entire lesser and greater curvatures of each specimen and made into rolls of convenient size from which blocks were cut and embedded in paraffin. Sections were prepared in the usual manner. By this means the entire length of the

stomach on each curvature was examined. From about half of the specimens similar preparations were made from mid-anterior and mid-posterior walls. It had been anticipated that differences might exist, but the findings were so constantly similar to those of the curvatures that preparation of these additional sections was discontinued.

The sections were searched for deviation from the usually accepted normal structure. The several features included in the picture of chronic gastritis are reasonably well established and have been dealt with in many reports (Konjetzny,[5] Hillenbrand,[1] Faber,[2] Magnus,[6] Guiss and Stewart,[3] and many others). Of these, only the following have been included in the accompanying tables (I to VII): Cellular infiltration, lymph follicles, atrophy, intestinal metaplasia, pseudopy-loric glands, cystic glands, and erosions. Other accompanying features such as fibrosis, thickening of the muscularis mucosae, Russell's cor-puscles, and heterotopic glands have been omitted. To indicate roughly the relative severity or extent, each of the changes, when present, was graded from 1 to 3.

Infiltration refers to the free cells, chiefly lymphocytes, in the stroma. A normal number is not established but there is general agreement (Hillenbrand,[1] Konjetzny,[5] Kalima [7]) that the diagnosis of chronic gastritis should seldom rest on cellular infiltration alone. In this mate-rial, infiltration was graded as follows: If free cells were scant and inconspicuous, they were considered to be absent. Grade 1 infiltration indicates a mild degree which was arbitrarily considered within normal limits. Grade 2 indicates moderate, and grade 3 severe, infiltration. There are no sharp divisions between these categories. Few would question that severe infiltration is abnormal and few would insist that a mild degree of infiltration is significant, but there may be differ-ence of opinion as to the proper designation of intermediate degrees. For the purposes of this paper, infiltration in excess of grade 1 has been considered abnormal. In the main, excess infiltration was found in conjunction with other changes and was, with few exceptions, uni-form throughout the segment considered. In a few specimens, excess infiltration alone was present and these were kept in a separate cate-gory. That such specimens deviate from the ideal normal is certain, but that this probably reversible change is as significant as, or of neces-sity related to, parenchymal alterations may be questioned.

Lymphoid aggregates, with or without reaction centers, were graded 1 to 3 in the following manner: Grade 1 indicates 1 to 5 nodules, grade 2 indicates 6 to 12 nodules, and grade 3 indicates more than 12 nodules

for the segment of mucosa concerned. No attempt has been made to make antrum and body more comparable in this respect by correcting for the greater length of the strips of body mucosa examined. A normal number has not been established. Konjetzny [5] considered lymphoid follicles to be rare under normal conditions, while Hillenbrand [1] frequently found them in the absence of other changes. In this material, no specimen has been considered abnormal on the basis of the number of lymph nodules alone. Few were encountered in the absence of other changes.

Atrophy, referring to the loss of normal glandular structure, with or without actual thinning of the mucosa, was graded as follows on the basis of distribution and not of severity in any area: Grade 1 refers to one or two foci of microscopic size. Grade 2 refers to several or more foci or small patches. The largest isolated patches encountered rarely exceeded about 5 mm. and larger patches were associated with diffuse changes. Grade 3 refers to atrophy of greater or less degree uniformly involving a whole segment. While the severity of the process varied, it may be noted that the majority of examples of diffuse atrophy were of moderate degree.

Metaplasia refers to the presence of epithelium, similar to that of the small intestine, in crypts and glands. Grade 1 refers to one or two focal areas of microscopic size. Grade 2 refers to several such focal or slightly larger areas. Grade 3 refers to many patchy areas or uniform involvement. The more severe degrees parallel atrophy.

Cysts, referring to cystic changes in the glands, were graded as follows: Grade 1 indicates one or two cystic glands, grade 2 indicates several cystic foci, and grade 3 indicates numerous cysts.

Erosions were rare in this material and those encountered were all healed. They were graded as follows: Grade 1 indicates an isolated erosion, grade 2 indicates several, and grade 3 indicates numerous erosions.

Pseudopyloric glands were graded as follows: Grade 1 refers to one to several focal areas of microscopic size, grade 2 refers to moderate numbers, and grade 3 refers to numerous glands of this type. In the main this feature is observed in association with other changes but may exist alone.

With the exceptions noted in respect to infiltration and lymph follicles, the presence of any of the above changes placed a specimen in the abnormal group. The findings are assembled in Tables I to VII. Since there were no differences related to sex, the sex incidence of the

several changes has been omitted. With some tabulations, totals for the first and second 5 decades of life as well as for the entire series have been given to emphasize the predominance of the changes in the older age groups.

PRESENTATION OF DATA

Table I shows the graded findings in each of the several categories for the lesser curvature of the antrum. Infiltration was absent in 20 and present in 77 specimens (44, grade 1; 29, grade 2; 4, grade 3). Follicles were absent in 31 specimens and were present in 66 (36, grade 1; 26, grade 2; 4, grade 3). Atrophy was absent in 61 specimens and was present in 36 (9, grade 1; 16, grade 2; 11, grade 3). Metaplasia was absent in 62 specimens and present in 35 (20, grade 1; 13, grade 2; 2, grade 3). Cysts were absent in 75 specimens and present in 22 (17, grade 1; 5, grade 2). Healed erosions, all grade 1, were present in 12 specimens.

Table II shows, in similar manner, the findings on the greater curvature of the antrum. Infiltration was absent in 21 specimens and was present in 76 (50, grade 1; 23, grade 2; 3, grade 3). Follicles were absent in 34 specimens and present in 63 (45, grade 1; 17, grade 2; 1, grade 3). Atrophy was not found in 71 specimens and was present in 26 (7, grade 1; 14, grade 2; 5, grade 3). Metaplasia was absent in 71 specimens and present in 26 (16, grade 1; 9, grade 2;, 1, grade 3). Cysts were absent in 83 specimens and present in 14 (9, grade 1; 5, grade 2). Erosions were absent in 83 specimens and present in 14 (13, grade 1; 1, grade 2).

Table III shows the graded findings for the mucosa of the lesser curvature of the body. Infiltration was absent in 29 specimens and present in 68 (37, grade 1; 26, grade 2; 5, grade 3). Follicles were not present in 33 specimens and were found in 64 (31, grade 1; 30, grade 2; 3, grade 3). Atrophy was absent in 72 specimens and present in 25 (6, grade 1; 5, grade 2; 14, grade 3). Metaplasia was absent in 79 specimens and present in 18 (7, grade 1; 11, grade 2). Pseudo-pyloric glands were absent in 81 specimens and present in 16 (3, grade 1; 12, grade 2; 1, grade 3). Cysts were absent in 87 specimens and present in 10 (8, grade 1; 2, grade 2). Only one specimen showed a healed erosion.

Table IV shows the findings on the greater curvature of the body. Infiltration was absent from 33 specimens and present in 64 (37, grade 1; 22, grade 2; 5, grade 3). Follicles were absent from 33 specimens and were present in 64 (32, grade 1; 29, grade 2; 3, grade 3). Atrophy was absent in 74 specimens and was present in 23 (10, grade 1; 2, grade

TABLE I

Findings, as Graded, on Lesser Curvature of Antrum

Age groups	No.	Infiltration				Follicles				Atrophy				Metaplasia				Cysts				Erosions			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
1–10	6	5	1			5	1			6				6				6				6			
11–20	4	3	1			3	1			3			1	3	1			4				3	1		
21–30	11	4	4	3		6	2	3		11				10	1			10	1			9	2		
31–40	9	4	3	2		4	2	3		6	1	2		8	1			9				8	1		
41–50	14	2	8	4		3	6	5		8	3	2	1	8	4	2		9	3	2		13	1		
51–60	11		9	2		4	4	2	1	6	3	2		7	2	2		7	4			10	1		
61–70	21	1	7	11	2	4	11	3	3	11		4	6	8	6	5	2	15	5	1		19	2		
71–80	16		9	7		2	5	9		8	1	5	2	10	3	3		11	3	2		13	3		
81–90	4	1	1		2		4			1	1	1	1	1	2	1		3	1			3	1		
91–100	1		1					1		1				1				1				1			
Totals	97	20	44	29	4	31	36	26	4	61	9	16	11	62	20	13	2	75	17	5		85	12		

TABLE II

Findings, as Graded, on Greater Curvature of Antrum

Age groups	No.	Infiltration				Follicles				Atrophy				Metaplasia				Cysts				Erosions			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
1–10	6	5	1			4	2			6				6				6				6			
11–20	4	3	1			3	1			3	1			3	1			4				3	1		
21–30	11	5	4	2		7	2	2		10	1			10	1			10	1			10	1		
31–40	9	4	3	2		6	3			7	1	1		8	1			9				8	1		
41–50	14	2	11	1		3	9	2		12	1	1		12	2			12	1	1		11	3		
51–60	11	1	8	2		5	3	2	1	9	1	1		9	2			7	4			10	1		
61–70	21		11	9	1	4	12	5		12	1	6	2	13	2	5	1	18	2	1		18	2	1	
71–80	16		7	7	2	2	8	6		10	1	3	2	8	5	3		14	1	1		14	2		
81–90	4	1	3				4			1		2	1	1	2	1		2		2		2	2		
91–100	1		1				1			1				1				1				1			
Totals	97	21	50	23	3	34	45	17	1	71	7	14	5	71	16	9	1	83	9	5		83	13	1	

TABLE III

Findings, as Graded, on Lesser Curvature of Body

Age groups	No.	Infiltration				Follicles				Atrophy				Metaplasia				Pseudopyloric glands				Cysts				Erosions			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
1–10	6	6				6				6				6				6				6				6			
11–20	4	2	2			2	1			4				4				4				4				4			
21–30	11	6	3	2		7	2	2		10				11				10	1			11				11			
31–40	9	5	2	2		5	3	1		9		1		9				9		1		9				9			
41–50	14	4	6	4		5	4	5		12		1	1	12	1	1		12	1	2		13	1			14			
51–60	11	1	5	4	1	1	6	4		7	2	1	1	7	3	1		9		2		10	1			11			
61–70	21	2	10	7	2	2	9	7	3	11	2	3	5	14	2	5		16	2	3		17	3	1		21			
71–80	16	2	7	5	2	5	3	8		12		3	4	13	1	2	1	12	3	2	1	15		1		15	1		
81–90	4		2	2		2	2					2	2	2	2			2	1			2	1			4			
91–100	1	1								1				1				1				1				1			
Totals	**97**	29	37	26	5	33	31	30	3	72	6	5	14	79	7	11		81	3	12	1	87	8	2		96	1		

TABLE IV

Findings, as Graded, on Greater Curvature of Body

Age groups	No.	Infiltration				Follicles				Atrophy				Metaplasia				Pseudopyloric glands				Cysts				Erosions			
		0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
1–10	6	6				4	2			6				6				6				6				6			
11–20	4	4				3	1			4				4				4				4				4			
21–30	11	6	4	1		6	2	3		10				10	1			11				11				11			
31–40	9	6	2	1		5	2	2		9			1	9				9				8	1			9			
41–50	14	3	8	3		5	4	5		13		1		13	1			13				13	1			14			
51–60	11	2	5	3	1	1	8	4		8	2		1	9	1	1		10				11				11			
61–70	21	2	11	7	1	5	7	6	1	12	5	1	3	16	2	3		17	1	3		17	3	1		20	1		
71–80	16	4	5	5	2	4	6	5	1	11	1	1	3	13	1	2		12	1	2		15	1	1		15	1		
81–90	4	1	1	2	1	1	1	3		2	2		2	2			1	2			1	2	1			4			
91–100	1		1				1			1				1				1				1				1			
Totals	**97**	33	37	22	5	33	32	29	3	74	10	2	11	83	6	7	1	85	2	9	1	87	8	2		95	2		

2; 11, grade 3). Metaplasia was found in 14 specimens (6, grade 1; 7, grade 2; 1, grade 3) and was absent from 83. Pseudopyloric glands were absent in 85 specimens and were present in 12 (2, grade 1; 9, grade 2; 1, grade 3). Cysts were encountered in 10 specimens (8, grade 1; 2, grade 2) and were absent in 87 specimens. Only 2 specimens showed healed erosions (both grade 1).

Table V consolidates the findings in the antral mucosa. Thirty-three specimens (34 per cent) showed no change on either curvature. In 19 specimens (19.6 per cent) the changes were confined to the lesser curvature and, of these, the changes were focal in 15 and patchy in 4. In 2 specimens (2.1 per cent) there were isolated focal lesions on the greater curvature only. Ten specimens (10.3 per cent) showed changes over the whole lesser curvature with associated focal changes on the greater curvature. Of these, 2 showed only excess infiltrate. No specimens showed diffuse changes on the greater curvature alone. Both curvatures were similarly involved in 33 specimens (34 per cent). Of these, both curvatures showed focal lesions 12 times and small patchy lesions 9 times. The remaining 12 specimens showed diffuse changes: 4 showed excess infiltrate only, and 8 (8.2 per cent of entire series) showed diffuse parenchymal changes (chiefly atrophy and metaplasia). It is to be noted that 7 of these 8 specimens were among the 53 from persons over 50 years of age (an incidence of 13 per cent) and but one was among the 44 specimens from persons in the earlier decades (an incidence of 2.3 per cent).

Table VI consolidates the findings with reference to their distribution in the body mucosa. In 49 specimens (50.5 per cent) both curvatures were unchanged. Eight specimens (8.2 per cent) showed changes on the lesser curvature only. Three of these showed only excessive infiltrate, 3 showed focal lesions, and 2 showed patchy lesions. Seven specimens (7.2 per cent) showed changes on the greater curvature only. In one of these there was a moderate infiltrate only, while in 6 there were isolated focal lesions. In 3 specimens (3.1 per cent) there were diffuse changes on the lesser curvature (1 with excessive infiltrate only, 2 with parenchymal changes) and only focal lesions on the greater curvature. In one specimen (1 per cent) excessive infiltrate on the greater curvature was associated with focal changes on the lesser curvature. (In this case there was actually a similar infiltrate on the lesser curvature, but the presence of parenchymal change placed it in the distinctly abnormal category.) Twenty-nine specimens (29.9 per cent) showed comparable changes on both curvatures. Eight of these showed isolated focal or patchy lesions and 21 (7 with excessive infil-

TABLE V

Distribution of Changes in Antral Mucosa

Age group	Number of specimens	Normal on both curvatures	Lesser curv. only — Excess infiltrate only	Lesser — Paren. Focal	Lesser — Paren. Patchy	Lesser — Paren. Through-out	Greater curv. only — Excess infiltrate only	Greater — Paren. Focal	Greater — Paren. Patchy	Greater — Paren. Through-out	Both abnormal: thru lesser, focal greater — Excess infiltrate only	thru lesser, focal greater — Paren. changes	thru greater, focal lesser — Excess infiltrate only	thru greater, focal lesser — Paren. changes	Both similarly involved — Focal	Both similarly involved — Patchy	Diffuse — Excess infiltrate only	Diffuse — Paren. changes
1–10	6	6																
11–20	4	1		1											1			
21–30	11	6		2											1			1
31–40	9	4		2	1											1		
41–50	14	5		3	1						1	1			2	2	2	
51–60	11	2		4				1				1				1		
61–70	21	4		2	1			1								1		1
71–80	16	3		1	1						1	5			5	3	1	3
81–90	4	1										1			2	1	1	2
91–100	1	1													1			1
Totals	97	33		15	4			2			2	8			12	9	4	8
First 5 decades	44	22		8	2						1	1			4	3	2	1
Second 5 decades	53	11		7	2			2			1	7			8	6	2	7

TABLE VI

Distribution of Changes in Body Mucosa

Age group	Number of specimens	Normal on both curvatures	Abnormal on lesser curvature only				Abnormal on greater curvature only				Both curvatures abnormal							
			Parenchymal changes					Parenchymal changes			Changes throughout lesser changes with focal changes greater		Changes throughout greater changes with focal changes lesser		Both curvatures similarly involved			
			Excess infiltrate only	Focal	Patchy	Throughout	Excess infiltrate only	Focal	Patchy	Throughout	Excess infiltrate only	Parenchymal changes	Excess infiltrate only	Parenchymal changes	Focal	Patchy	Excess infiltrate only	Diffuse parenchymal changes
1–10	6	6						1										1
11–20	4	4																1
21–30	11	7																1
31–40	9	6	1	1										1		1		1	1
41–50	14	9	1		1													2	1
51–60	11	6															1	1	2
61–70	21	5	1	1	1		1	2			1	1		1	2	2	1	4
71–80	16	6		1				2				1		1	2		2	3
81–90	4																	2
91–100	1							1										
Total	**97**	**49**	**3**	**3**	**2**		**1**	**6**			**1**	**2**	**1**	**2**	**5**	**3**	**7**	**14**
First 5 decades	44	32	2	1	1			1					1		1		3	3
Second 5 decades	53	17	1	2	1		1	5			1	2		2	4	3	4	11

trate only) showed diffuse changes. Of the specimens with diffuse changes, 6 were from the 44 persons in the first 5 decades and 15 were from the 53 in the second 5 decades of life. Considering only the 14 specimens with parenchymal changes (14.4 per cent of the entire series), 3 were from the former group (an incidence of 6.8 per cent) and 11 were from the latter group (an incidence of 20.8 per cent).

TABLE VII

Summary of Findings in Antrum and Body Combined

Age	Males	Females	Total no. specimens	Antrum and body both normal	Body normal, antrum abnormal		Antrum normal, body abnormal		Both antrum and body abnormal			
					Focal, patchy, etc.	Diffuse	Focal, patchy, etc.	Diffuse	Focal, patchy, etc. in both	Diffuse in antrum, focal etc. in body	Focal etc. in antrum, diffuse in body	Diffuse both antrum and body
1–10	5	1	6	6								
11–20	3	1	4	1	2	1						
21–30	4	7	11	5	2		1		1	1	2	1
31–40	4	5	9	3	3		1				2	
41–50	8	6	14	5	4				2		3	
51–60	9	2	11	1	5			1	1	1	1	1
61–70	13	8	21	3	2		1		8	2	4	1
71–80	11	5	16	3	1	2			4	1	5	
81–90	2	2	4				1			1	2	
91–100	1	0	1				1					
Total	60	37	97	27	19	3	5	1	16	6	17	3
First 5 decades	24	20	44	20	11	1	2	0	3	1	5	1
Second 5 decades	36	17	53	7	8	2	3	1	13	5	12	2

The distribution of the changes for the whole stomach is shown in Table VII. Changes less than diffuse are here combined and the variations, from focal lesions to alterations over the whole of a single curvature, thereby lose identity. These specimens, however, are all quite sharply set apart from those with uniformly diffuse changes. Reference is made to the variations below.

Both antrum and body were free of change in 27 specimens (27.8 per cent). Twenty of these were from persons in the first 5 decades and 7 were from those in the second 5 decades.

Twenty-two specimens (22.7 per cent) showed changes in the antrum and a normal body mucosa. In 3 of this group the antrum showed diffuse changes (2 with parenchymal changes, one with excessive infil-

trate only). The remaining 19 showed less than diffuse changes and, of these, 17 showed focal or patchy lesions on one or both curvatures and 2 showed only excessive infiltrate on one curvature. As may be seen in Table VII, specimens in this group fall throughout the several decades and were proportionately somewhat more frequent in the earlier than in the later decades. In quantitative terms it is doubtful that any of the 19 should be considered significantly abnormal.

In 6 specimens (6.2 per cent) a normal antrum was associated with changes in the body mucosa. In 4 of these the body mucosa showed isolated focal lesions, one showed only an excessive infiltrate confined to the lesser curvature, and one showed diffuse parenchymal changes. In this group only one specimen, the last, can be considered quanti-tatively abnormal.

Both antrum and body showed changes of some degree in 42 speci-mens (43.3 per cent) and, as shown in Table VII, there was consider-able variation in this group. In 16 of these the changes were less than diffuse in each of the two mucosal divisions. Seven of the 16 showed changes (2 with only excessive infiltrate) in the entire lesser curvature of antrum or body and the remainder showed focal or small patchy lesions. Six specimens showed diffuse changes in the antrum (one with excessive infiltrate only) and but focal lesions in the body. Seventeen specimens showed less than diffuse changes in the antrum and diffuse changes in the body. Here the body mucosa showed only excessive infiltrate 4 times and parenchymal changes 13 times. Twelve of the 17 were from persons over 50 years of age. In but 3 specimens were the changes diffuse in both antrum and body. One showed only ex-cessive infiltrate in both regions, one showed excessive infiltrate in the antrum and parenchymal changes in the body, and one showed diffuse parenchymal changes in both.

COMMENT

Wide variation has been noted in the distribution of gastritic changes, ranging from focal to diffuse processes involving all of the antrum or body, but rarely both. There is no uniformity in the pattern of involvement of the antrum and body of the same stomach and these divisions must, in the main, be considered separately. These marked variations in distribution emphasize the necessity of designating the source of gastric material subjected to microscopic examination. It is clear that the presence of lesions on the lesser curvature of the antrum or body is not necessarily indicative of diffuse changes. On the other hand, extensive changes were encountered on the greater curvature only

as part of a diffuse process in the segment concerned. The uniformity of change from one area to another under these circumstances has been mentioned. It would appear, then, that changes, in excess of a focal lesion, encountered in a section of reasonable size from the greater curvature of the antrum or body well reflect the condition of the whole segment in so far as diffuse processes are concerned. The inference may be drawn, however, only in the case of stomachs otherwise free of disease.

While 27 specimens were free of change, many of those in which changes were found presented only isolated focal or patchy lesions. It seems quite certain that, if enough sections were prepared, few of the 27, at least among adults, would be entirely free of change. Consequently, a number of those tabulated as abnormal must be considered free of significant change. Where, short of diffuse involvement, to draw a line between normal and abnormal on the basis of quantitative change must be arbitrarily determined and remains uncertain. In this material there are no specimens which serve fully to bridge the gap between those showing focal or patchy lesions and those with diffuse processes. A somewhat intermediate position is taken by those specimens which showed changes along the entire lesser curvature with but focal or no changes on the greater curvature. This distribution was more frequently encountered in the antrum. How far on the anterior and posterior walls such a process may extend is not certain. The findings in this material suggest that, particularly in the body, the process is limited to the immediate vicinity of the curvature, but the number of pertinent cases is small and the impression could well be modified by a larger material. In those specimens which showed diffuse changes the process was quite uniform throughout and they were, consequently, sharply set apart from those with lesser degrees of abnormality. The uniformity of the process from one area to another suggests simultaneous involvement of the whole in its evolution. Here again the number of pertinent cases is too small to permit exclusion of spreading changes.

As in a previously reported series,[4] there is nothing in the available information concerning the patients represented which gives any clue to the origin or causes of the changes encountered. The only constant association seems to be that of advancing age. There is no necessity of believing that all of the changes encountered are causally related. That one may be observing qualitatively similar end-stages of reactions to a variety of causes seems likely. The striking separation between focal and diffuse processes as observed here may be a reflection of such differences.

It appears that the findings described are at least roughly indicative of the expected changes in the stomachs of individuals free of manifest gastric disease. The incidences recorded of the several degrees of change would no doubt be modified by a larger material. That the data fairly reflect the autopsy experience of this laboratory seems reasonable and is supported by collateral evidence. The 97 specimens on which this study was based were selected from a much larger group of similar specimens because of freedom from post-mortem change in the sections examined. It has been noted that those with diffuse changes presented a similar pattern throughout and, consequently, uniform changes in a relatively small area of the greater curvature fairly well reflect the condition of the whole in respect to the presence or absence of diffuse processes. Though unsuitable for inclusion in this series, those specimens which showed partial post-mortem changes in the rolls or those from which blocks only were available could be used for the determination of the incidence of diffuse changes. On this basis, diffuse gastritis has about the same frequency as noted above. Furthermore, allowing for the differences in technic of examination, the findings in this study compare rather favorably with those reported by me previously [4] on a similar material.

<center>SUMMARY</center>

Gastritic lesions were found at autopsy in 70 (72 per cent) of 97 stomachs of persons free from manifest gastric disease. Of the 27 stomachs which showed no change, 20 were from the group of 44 persons less than 51 years of age and 7 were from the group of 53 persons over 50 years of age. There was no uniformity of involvement between antrum and body and the changes in each segment varied widely from isolated foci to diffuse alterations. Each segment is best considered separately. Many of the lesions encountered are not quantitatively significant but where, short of a diffuse gastritis, to draw a line between normal and abnormal on the basis of quantitative change is uncertain. The antrum was abnormal in some degree in 64 specimens (66 per cent of the total, 50 per cent of those from persons less than 51 years, 79 per cent of those from persons over 50 years of age). The lesions in the younger group were largely focal. Diffuse parenchymal changes were found in 8 specimens (8.2 per cent of the total), or in 1 (2.3 per cent) of those from persons under 51 years and in 7 (13 per cent) of those from persons over 50 years of age. The body mucosa was abnormal in some degree in 48 specimens (49.5 per cent of the total, 27 per cent of those from persons less than 51 years, 68 per cent of those from persons over 50 years of age). Diffuse parenchymal changes were found in 14 specimens (14.4 per cent of the total), occurring in 3 (6.8

per cent) from persons less than 51 years and in 11 (20.8 per cent) from persons over 50 years of age.

CONCLUSIONS

In otherwise normal stomachs, gastritic lesions are common. They predominate in the older decades, do not uniformly involve antrum and body, and within either area range from focal to diffuse in distribution.

Diffuse gastritis with parenchymal changes was found at autopsy in the antrum in 8 per cent and in the body in 14 per cent of a series of 97 stomachs of persons free of manifest gastric disease.

The gastritic changes observed in conjunction with other gastric lesions must be interpreted in the light of associated findings.

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DESCRIPTION OF PLATES

PLATE 17

FIG. 1. Normal antral mucosa. Hematoxylin and eosin stain. × 65.

FIG. 2. Antral mucosa with moderately heavy lymphocytic infiltration which splits the muscularis mucosae. Hematoxylin and eosin stain. × 65.

FIG. 3. Focus of intestinal metaplasia in antral mucosa adjacent to lymph follicle. Hematoxylin and eosin stain. × 65.

FIG. 4. Antral mucosa showing complete atrophy of glands and scant lymphocytic infiltration. Remaining crypts show epithelium of the intestinal type. Hematoxylin and eosin stain. × 65.
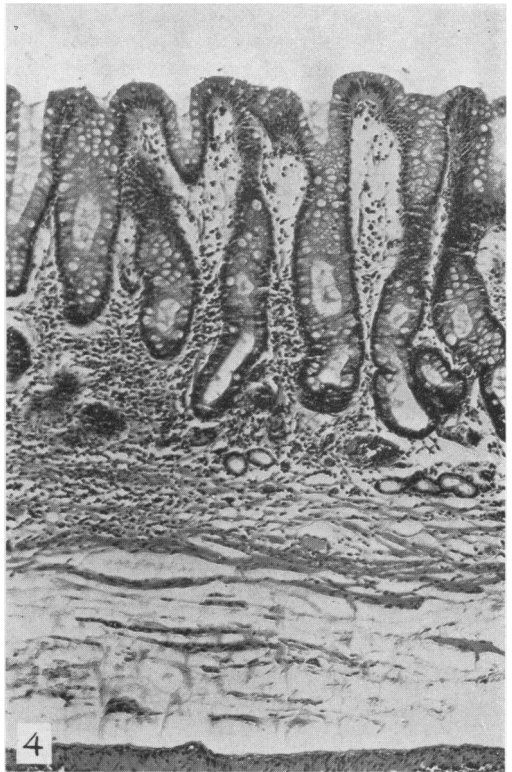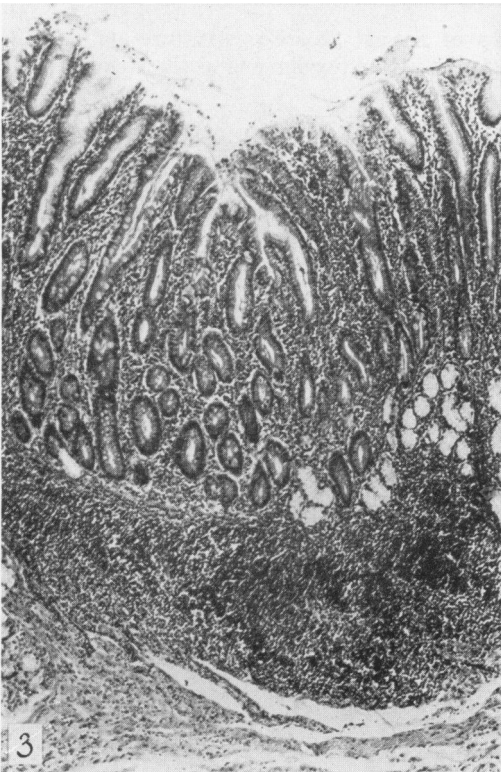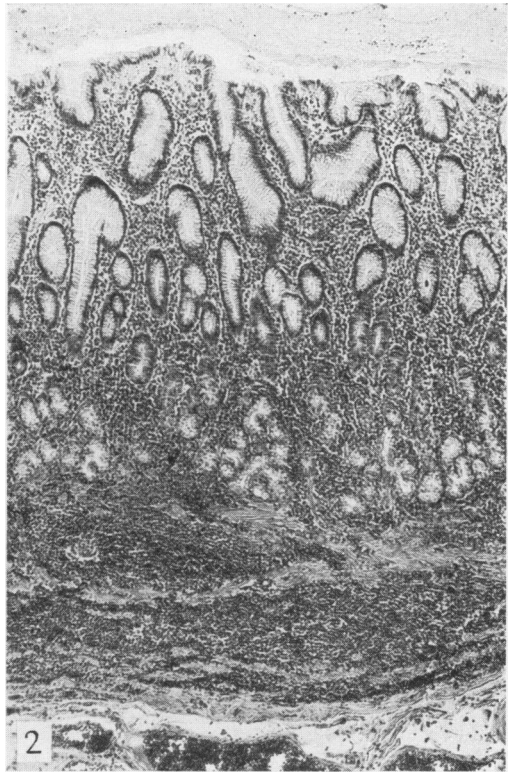
PLATE 18
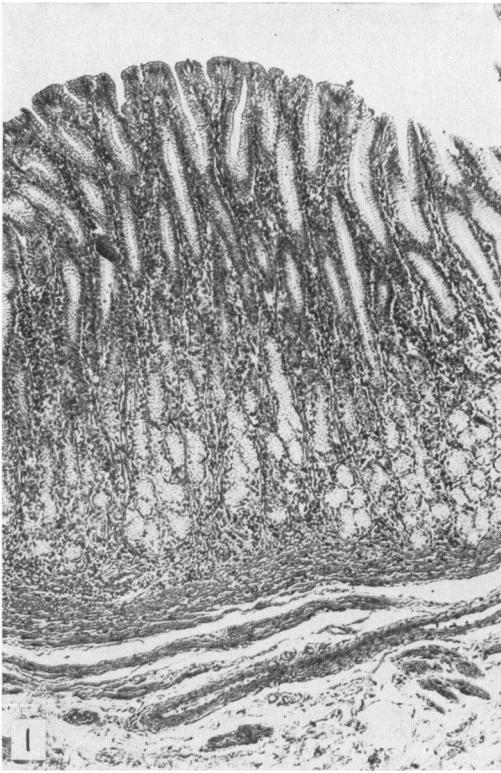
FIG. 5. Normal body mucosa with mild interfoveolar lymphocytic infiltration. Hematoxylin and eosin stain. $\times$ 65.

FIG. 6. Body mucosa showing heavy lymphocytic infiltration in superficial half and mild infiltration below. The crypts are deepened and the functional parts of the gland tubes correspondingly reduced. Hematoxylin and eosin stain. $\times$ 65.

FIG. 7. Body mucosa showing complete loss of normal glandular structure and presence of numerous pseudopyloric glands. Hematoxylin and eosin stain. $\times$ 65.

FIG. 8. Healed erosion in body mucosa. Adjacent glands partly replaced by pseudopyloric glands. Hematoxylin and eosin stain. $\times$ 65.
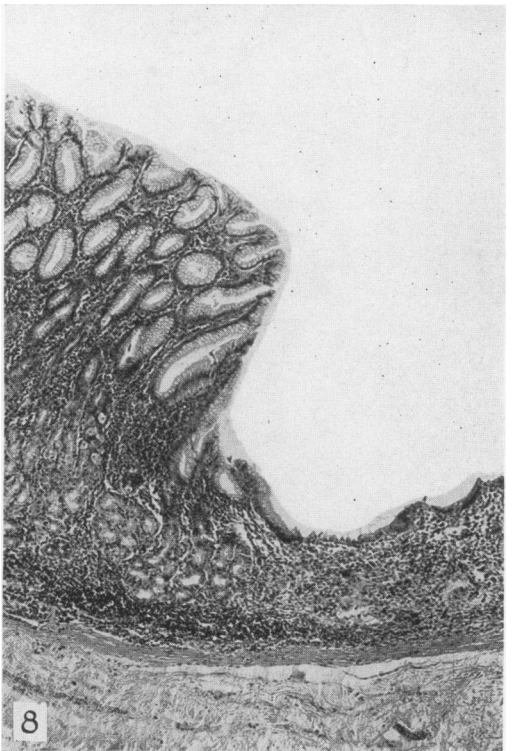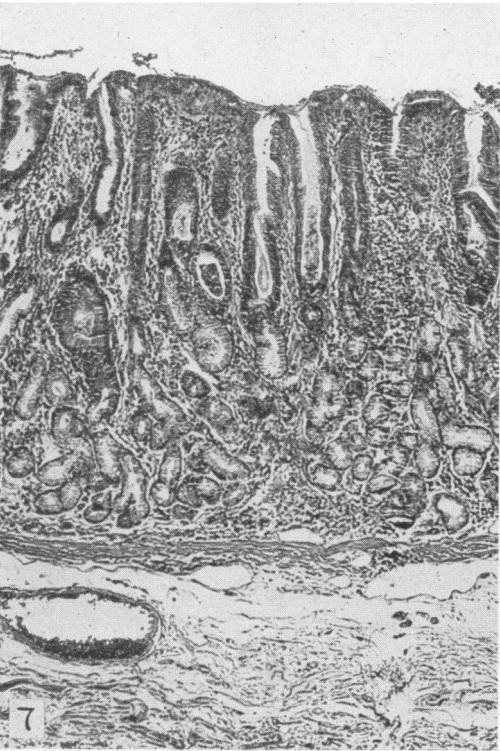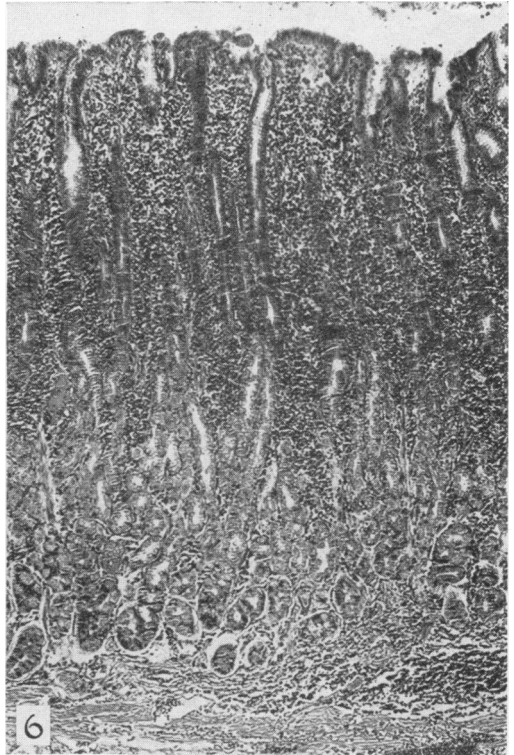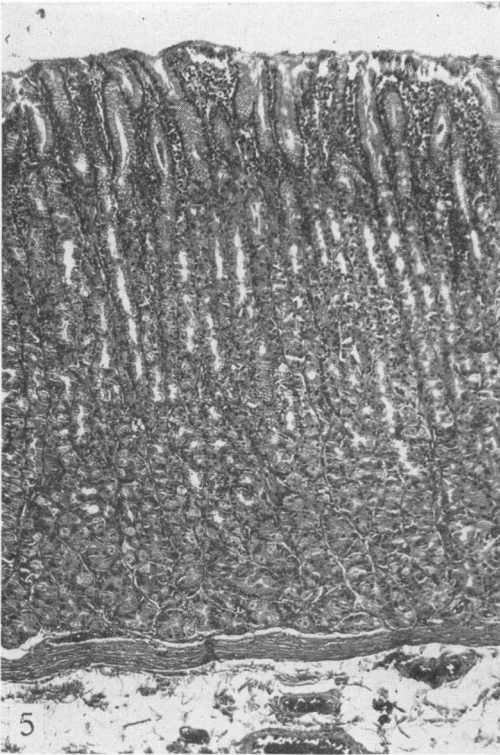
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