IV.—RECENT GASTRIC LITERATURE.

By A. Lockhart Gillespie, M.D., F.R.C.P. Ed.

A complete review of the literature which has been published during the last year in connexion with diseases of the intestinal tract would be a labour of some difficulty and of considerable length. In these days of innumerable journals, and still more numerous investigators, the writings on this one subject alone are more than can be comfortably assimilated. The predominating impression, however, which may be gathered from a perusal of some of the papers bearing on this subject, is that a large mass of evidence is being rapidly accumulated in support of those methods of practical examination of the accessible contents of the alimentary canal, which have comparatively recently been published, and which are, even now, really on their trial.

Of the different problems involved none is of greater interest than that which concerns the origin, diagnosis, and treatment of gastric ulcer. One of the most valuable contributions comes from the pen of Dr Boas, Berlin ("Certain New Views concerning the Diagnosis and Treatment of Round Ulcer of the Stomach," *Medical Record*, June 17, 1893). After describing the ordinary diagnostic signs and symptoms, the frequent co-existence of chlorosis, the hyperacidity especially due to hydrochloric acid, and the localized pain in the epigastrium, all of which may be due to some other condition, he alludes to a test which he looks upon as almost pathognomonic. A sharply circumscribed zone, pressure on which causes sharp pain, is in such cases frequently located at the level of and to the left of the tenth to the twelfth dorsal vertebra, rarely higher or lower. The painful area usually lies directly against the vertebræ, seldom at a slight distance. Sometimes a similar area may be found on the right side, either separately or along with one on the left. Such painful points may also be defined in gastric neurosis, in malignant disease of the stomach or œsophagus. They do not exhibit, however, such a fixed character, and may even be found as high up as the cervical region. In cholelithiasis, again, an important diagnostic painful area is to be found on the right of and close to the twelfth dorsal vertebra. The painful spots so frequently noted in muscular rheumatism, pleuritic effusions, and caries of the vertebræ cannot be confounded with the above, the other symptoms being sufficiently distinctive. Dr Boas, to estimate the amount of algesia at these spots, uses an instrument which he terms an "algesimeter." By means of this he can accurately determine the amount of pressure requisite to cause pain either on the epigastric region or on the dorsal area above described, and by comparing the increase or decrease of the pressure required is able to gauge the result of treatment.

With regard to the treatment itself, if the Leube-Ziemssen

method is not successful, Dr Boas strongly recommends a persevering trial of silver nitrate, beginning with gr. iij.–ʒiv., and rising to gr. vj.–ʒiv., in tablespoonful doses. If this be ineffectual, rectal alimentation should be tried, nothing being given by the mouth. Fourteen days of this is quite sufficient. I have found, however, that a little milk given by the mouth, when the injections are used, often assuages the pain which may be caused by the reflex secretion of gastric juice.

Dr Curnow (*The Clinical Journal*, April 12, 1893) adds to the nutrient enemata used in such a case seven minims of laudanum. He does not give suppositories, since he discovered in the rectum of a patient who had died more than twenty of these articles undissolved.

The fact that the stomach contents as a rule contain a larger percentage of hydrochloric acid in cases where a gastric ulcer is present than they do normally, continues to be very generally corroborated. Elsner (*New York Medical Journal*, May 20, 1893) comes to the conclusion that in two-thirds of all cases there is an excess of HCl, while in the remainder the acidity may be normal or subnormal, or as Ewald (*Klinik der Verdauungs Krankheiten*, 2nd ed., Bd. ii. s. 232) puts it, "the gastric juice always contains HCl in cases of gastric ulcer, and usually an excess of it;" while Riegel, writing of the same matter ("Zur Lehre vom Ulcus ventriculi rotundum," *Deutsche Med. Wochenschrift*, 1886, No. 52, s. 931), expresses the opinion that "on account of the hyperacidity an erosion or injury of the mucous membrane, trivial in itself and tending to rapid repair, attains a greater significance; it heals more slowly or the ulcer spreads."

Two interesting papers may be noted here dealing with the more remote effects of gastric ulcer. Sidney Coupland (*The Clinical Journal*, March 15, 1893), in a clinical lecture on this subject, gives the details of a case diagnosed during life as one of pouching of the stomach from cicatrization of a large ulcer, in which the symptoms of anæmia and cachexia were so profound as to imitate malignant disease. Another case with symptoms identical with those of cancer died, and post-mortem a chronic inflammatory state of the mucous membrane of the stomach with the remains of old ulceration was found. The lymphatic glands in the vicinity were all enlarged, but only with fibrous tissue. Unfortunately the stomach contents were not analyzed in either patient, as Dr Coupland is chary of passing a stomach tube in such cases. A still more interesting case, however, will be found in the No. 31 *Bulletin of the Johns Hopkins Hospital*, vol. iv., where Dr W. S. Thayer gives a short account of the history, symptoms, and the autopsy of a patient suffering from cicatricial stenosis of the pylorus following peptic ulcer. During life the presence of an ulcer did not seem probable, from the absence of pain and the want of free hydrochloric acid in the gastric juice. Unluckily quantitative estimations of the acids

present were not attempted. The patient was only 22 years old and appeared anæmic, but the number of corpuscles in her blood was 4,630,000, and the amount of hæmoglobin 69 per cent. Dr Thayer incidentally calls attention to the fact that in the anæmia dependent on carcinoma of the pylorus the red blood corpuscles are frequently increased in number and the hæmoglobin in amount, the volume of the blood being smaller than normal. As the patient was emaciating rapidly and did not improve either on Condurango, nux vomica, or nutrient enemata, Dr Finney performed gastro-enterostomy with, temporarily, a successful result, although dysentery carried her off fourteen days later.

In two very marked cases of cicatricial stenosis of the pylorus following on the same condition as in the above, which I have seen and examined, one of which came to an autopsy, the acidity of the contained and retained food in the consequently dilated stomach was extremely high, reaching in one case ·536 per cent. as HCl, in the other ·489 per cent., free HCl being abundantly present. In the fatal case death was preceded by muscular twitchings and convulsions. Kriege (*Berlin. Klin. Woch.*, No. 49, December 5, 1892) records a case in which recovery took place after the rupture of a gastric ulcer. Laparotomy was performed. The ulcer was at the cardiac end of the organ.

The etiology of hyperacidity is a fruitful source of theory. Many of those, however, who discuss the subject forget to distinguish sufficiently between hyperacidity, caused by diminished HCl secretion, and hyperacidity, due to increased secretion of that acid,—*hyperchlorhydrie*, as the French have it. The normal acidity of the gastric juice—from ·25 to ·3 per cent.—is looked upon by Bunge and others as almost exactly the amount necessary to make the food aseptic. That calculation, however, was made on the supposition that all the acidity of the gastric contents was available for this purpose. But, as I have shown elsewhere (*Journal of Pathology and Bacteriology*, Jan. 1893), the hydrochloric acid combined with proteids has little antiseptic power compared with the originally free acid, and that, therefore, the normal acidity of the gastric contents will allow the more resistant of the micro-organisms swallowed with the food to survive, and that, also, this combined acid does not inhibit the conversion of starches and sugars so powerfully. L. Wolff ("The Dyspepsia of Hyperacidity," *Medical News*, May 27, 1893) overlooks these facts, and he also states that the pancreatic ferments are inactive save in an alkaline medium, a statement which I also believe to be incorrect. He regards the hyperacidity—meaning by this increase of HCl over the normal—as produced "by special irritations, as psychical strain, ingestion of acid and irritant substances, and also very often after smoking, especially of very strong tobacco." The word which I have underlined is very misleading, for it requires a large quantity of acid in the ingesta to cause hyperacidity,—indeed, I could well believe that

the more acid the food the less HCl is secreted. The diet he recommends is chiefly proteid in character, with absence of salted foods, and, indeed, as great a diminution of the salt taken as is possible. The treatment consists of lavage, the giving of diluents and of alkalies before meals. In his hands alkalies before meals have been better borne and of greater efficacy than when given after. I suppose that he believes in alkalies given before food reducing the acidity of the gastric contents after meals. Unluckily for this theory it has long been understood that alkalies given before meals have a very considerable power of causing an increased secretion of HCl when food has been taken. Ringer states so in his book. Linossier and Lemoine ("Contribution à l'étude de l'action des alcalins sur la digestion gastrique chez l'homme," *Archives Générales de Médecine*, Juin 1893), however, have conclusively proved in a very careful series of observations, made on a man the subject of rumination, that bicarbonate of soda in doses of from 1 to 10 grammes increases gastric secretion, the maximum effect being produced by the administration of 5 grms. of the drug one hour before the meal; and that while the smaller doses only excite the secretion of HCl in a fugitive manner, the larger doses do so more persistently. After meals the increase in acidity is not so marked. Here, then, we have it proved, in the clearest manner possible, that alkalies are the very worst drugs to exhibit in hyperacidity,—the present effect is fleeting, the future aggravates the condition.

The authors, in addition, found that the action of the alkali is prolonged beyond the period of administration. Their contention that alkalies, especially the bicarbonate of soda, are the drugs *par excellence* for use in insufficient secretion of HCl is, on the other hand, not a logical induction from their experiments, for the stomach cells in such cases are already incapable of responding to the stimulus afforded them by the food, and drowning them in an alkaline solution would still more effectually quench their secreting power. In some cases small doses before meals would probably bring about the result required, especially if the lowered acidity be due to nervous causes. Where the insufficient gastric secretion is due to local degeneration little good can result.

This gastric anacidity is the subject of a paper by Dr Allen A. Jones (*New York Medical Journal*, May 27, 1893), in which he very properly points out that however one may despise the stomach *quâ* a digestive organ, in such a state of its secretory powers the whole task of digestion is imposed on the intestine, which soon becomes incapable of performing it perfectly. *Ergo*, the stomach must have some digestive action. He forgets the result of the unfettered passage of micro-organisms into the intestinal tract under such conditions. This alone, however, could not cause all the symptoms observed. After detailing one or two cases in which the contents of the stomach were either neutral or only very

slightly acid, Dr Jones gives some rules for treatment. He advocates an attempt to re-establish gastric digestion by giving copious doses of HCl, with pepsin if necessary. Nux vomica and physostigma may be given also if required. He thus exactly reverses the procedure recommended by Robin (*Brit. Med. Journ.*, 1892, i. p. 283), who would try the nux vomica first, and then, if it did no good, exhibit the acid. Dr Jones also advises the ingestion of much common salt and salted foods, the employment of lavage with a weak solution of sodium chloride (Löwenthal, *Medical Week*, Jan. 6, 1893, recommends a 0·6 per cent. solution), and the use of both galvanic and faradic currents of electricity to promote the secretion of acid, the faradic also stimulating the motility of the gastric walls.

Sir Dyce Duckworth (*Clinical Journal*, June 4, 1893) is pleased to be facetious over the withdrawal and examination of the stomach contents in cases of dyspepsia. He calls it a dirty, unpleasant job. The dirtiness depends entirely on the performer, and it is not so unpleasant as many other routine duties a practitioner may be called upon to perform. He alludes to the fact that HCl is diminished in Cancer of the Stomach, the subject on which he writes, but is satisfied with this knowledge, and wishes no further local chemical information. For medicines he finds creasote in minim doses, or a similar quantity of pure carbolic acid, the most useful.

Einhorn (*New York Medical Journal*, July 8, 1893) gives some further experiences with direct electrization of the stomach with his deglutable electrode. The details of his treatment of thirty-one cases by direct gastro-faradization, and of eight cases by direct faradization and then by direct galvanization of the stomach, show that in many cases, after such applications, free HCl appeared where there had been none before, and that the distressing symptoms were generally relieved. What diet and medicinal treatment, if any, these patients got does not appear. Three cases were also treated simply by direct galvanization of the stomach, with good results. He thinks, therefore, that secretion and absorption of the stomach are increased by direct electrization, that it is a potent agent in chronic (non-malignant) diseases, especially in dilatation and enteroptosis, and that it is "almost a sovereign means of combating severe and most obstinate gastralgias, no matter whether their origin is of a nervous nature or caused by a cicatrized ulcer of the stomach."

Dr Charles Stockton ("Gastric Neuroses," *International Clinics*, second series, vol. iii.) also advocates electricity for use in treatment of such gastric complaints. He divides the hyperacidity of neurotic origin into—(*a*), uniform increase of HCl; (*b*), increase of HCl, coupled with dilatation of the stomach; and (*c*), excess of HCl one day, diminution the next; while the motor neuroses are divisible into those occasioning a lack of motility or an excess of the same, or premature relaxation of either orifice of the stomach.

Dr Einhorn states (*loc. cit.*), as will be seen above, that he can induce by means of direct electrization of the stomach an increased absorption by the mucous membrane of that organ. Now it is still a moot question whether the stomach absorbs fluids to any extent at all. I believe that it does so very considerably in health. Professor Dr J. von Mering, however ("Ueber die Function des Magens," *Forschritte der Medicin*, No. 14, July 15th, 1893), has set himself to answer this question. Experimenting on large dogs, he opened the abdomen, cut across the duodenum not far from the pylorus, and formed a duodenal fistula. A finger introduced through the pyloric ring could feel it open and close twice to six times in a minute, while on each occasion 2 to 15 c. cms. of fluid were discharged. He then introduced 440 c. cms. of water into the stomach. The following table gives the amounts evacuated through the pylorus:—

Minutes after.	Amount in c. cms.	Number of expulsions through Pylorus.
0–5	120	10
5–8	35	10
8–15	185	20
15–20	90	18
20–30	15	1, fluid slimy.
	445	59

No absorption had, therefore, taken place.

300 c. cms. of a 25 per cent. solution of alcohol were then introduced.

Minutes after.	Amount in c. cms.	Reaction.	Alcohol per cent.
0–10	105	Neutral.	10·5
10–15	77	"	9·5
15–35	109	Acid.	5·2
35–60	130	"	2·7
60–90	75	"	1·0

Or in all 496 c. cms. were recovered, an increase of 196 c. cms., the contained alcohol, however, being only 28·2 c. cms. instead of 75 c. cms. Fluid had been secreted while alcohol was absorbed.

In conclusion, Dr v. Mering finds that the stomach absorbs very little water, but a considerable quantity of sugar, alcohol, and peptones, while it *neutralises* HCl if that be given in water on an empty stomach. He argues from this, that in cases of dilated stomach due to contraction of the pylorus little but concentrated food should be given, and lavage practised afterwards. His experiments would have been more convincing if he had given the animals food in a solid form, as well as in solution.

That curious disturbance of the gastric chemistry known as

hypersecretion of a hyperacid juice, sometimes called Reichmann's disease (Reichmann, *Berlin. Klin. Wochen.*, 1886, Nos. 32 and 33), has had some attention directed to it lately. A Russian practitioner, Dr Voinovitch (*Sémaine Médicale*, 1892, lxvi.), advocated the use of atropine in its treatment, while in a later number of the same journal Bouveret of Lyons and Devic are said to have been unable to observe any remedial action from that alkaloid. In the same place Dr Fostanini of Turin and Drs Leubuscher and Schoeffer are quoted as having found that atropine was of considerable use for a short time, but that it hinders digestion if persevered in. The last two observers found also that morphine, given hypodermically, diminishes the secretion of HCl both in health and in Reichmann's disease, while it does not do so when given by the mouth. Hitzig (*Berliner Klin. Wochenschrift*, No. 49, Dec. 5, 1892) obtained the same effect from the administration of morphia. Dr Thayer has reported a case of this affection in the *Johns Hopkins Bulletin* for December 1892, in which lavage and a diet chiefly made up of albuminoids relieved the symptoms.

During the meetings of the Société de Thérapeutique held in Paris in the months of November and December last year, very considerable friction and heat were caused by the question of the treatment of hyperacidity and hypersecretion. Dr Bardet advocated easily-digested articles of food and gastric antisepsis with benzo-naphthol, etc., Dr Huchard recommended large and continued doses of alkalies, Dr Bouchard albuminoids, Dr Dujardin Beaumetz a strictly vegetarian regimen, while Dr Bovet found benefit from the use of raw meat pulps with the addition of small quantities of vegetables!

The physiology and chemistry of gastric digestion have not been added to very extensively. A new method for the estimation of HCl has been published by Lüttke ("Eine neue Methode zur quantitativen Bestimmung der Salzsäure im Mageninhalt," *Deutsche Med. Wochenschrift*, 1891, No. 49, with a fuller account in *Die Magensäure der Menschen*, Martius und Lüttke, p. 101). It depends on the precipitation of all the chlorides with a strongly acidulated solution of silver nitrate. Several fundamental facts have been overlooked in the process recommended, and it seems, on the face of it, entirely fallacious. Some observations have been made by Contejean ("Contribution à l'étude de la Physiologie de l'estomac," *Journal de l'Anatomie et de la Physiologie*, i., 1893) on the surety of the presence of HCl in the gastric juice, by means of a reaction with carbonate of cobalt. It is rather late in the day to prove the presence of HCl. J. W. Pickering ("On Certain Proteid and Albuminoid Reactions and their Significance," *Journ. of Physiology*, vol. xiv., No. 6, p. 347) reviews the different tests for proteids, and endeavours to prove that in each there is a hydrobenzene nucleus, and that the various proteids only differ from each other by rearrangements of the atoms in their molecules. C. A. Pekelhäring

("Ueber das Pepton Kühnés," *Centralblatt für Physiologie*, April 22, 1893, Heft 2), in a paper he has kindly sent me, falls foul of Kühne's definition of pure peptone. He described it as that proteid which is not precipitated by a boiling saturated solution of ammonium sulphate. Pekelhäring, however, points out that the addition of ammonia to the boiling and saturated filtrate of the above often precipitates a substance on cooling with the characteristics of an albumose. He goes so far as to state that "peptone is only a name by which commercial preparations from the digestion of albumin are indicated. This word does not imply, in our present day terminology, a chemical entity." Kühne replies to him in his *Zeitschrift für Biologie*, admitting the occurrence of the precipitates, but denying that they affect his position. It seems to me more than likely that in time we will be able to separate out many more albumoses, probably in a regular descending series, from that which is now termed deutero-albumose to a substance which may prove ultimately to be pure peptone.

I will not add more to this already too long survey of the subject than the names of some papers on intestinal dyspepsia and fermentation. Dr J. Leva ("Ueber das Verhalten der Magenfunctionen bei verschiedenen Leber Krankheiten," *Virchow's Arch.*, Bd. 132, Heft 3, S. 490) finds the acidity and power of the stomach diminished in cirrhosis and cancer of the liver. Dr Géza Gara ("Beiträge zur Kenntniss der pathologischen Veränderungen der Darmfaulniss," *Ungarisches Archiv für Medizin*, Bd. i., s. 288) gives the proportion of sulphates to the ethereal sulphuric acid in the urine as nearly equal in chronic, as very dissimilar in acute, intestinal catarrh. Fleiner (*Sémaine Médicale*, Jan. 25, 1893) praises Kussmaul's method of injecting large enemata of pure olive oil in obstinate constipation. Forcheimer of Cincinnati has a short paper in the *American Journal of the Medical Sciences*, July 1893, on the intestinal origin of chlorosis, in which he places the principal seat of the formation of hæmoglobin in the intestinal tract, and states that antiseptics—salol or hydro-naphthol—act most efficaciously.

V.—THE GEOGRAPHICAL DISTRIBUTION OF GOITRE.

By Allen Thomson Sloan, M.D.

Though Switzerland is perhaps the one district in Europe where goitre is most common, yet it is by no means confined to that country. Ancient authors show that it occurred in Lombardy, Thrace, and among the Apennines in their day. More modern observers have noted its existence amidst mountain ranges so distant as the Urals and the Pyrenees; in countries so remote as Norway and Italy, Belgium and Turkey, Russia and France; while Germany, Austria, and other intervening States are far from being