

commoner complication than is generally supposed. The presence of gonorrhoeal rheumatism is exceedingly likely to cause its being mistaken for ordinary rheumatic iritis, especially as the patient will seldom volunteer a statement about his urethritis, and, in two misguided cases I have seen, actually denied its presence. In women it is, of course, exceedingly difficult to make sure of the diagnosis.

THE TREATMENT OF GONORRHOEAL CONJUNCTIVITIS.

Taking the ordinary case of an infant, commencing on the third day, we find the usual condition: the upper lid red, glossy, oedematous, overhanging the lower; the lids gummed by dried matter, the scarlet villous palpebral conjunctiva and theropy pus. The microscope may be used to clinch the diagnosis, but it is a matter of scientific rather than therapeutic interest. What we at once look at is the cornea, and as to this we have a rule—almost a canon of surgery—"if the cornea is clear a favourable issue may be predicted." The neonatal cornea is exceedingly vulnerable, the more so as there are no tears to protect it and the affected infants are so often syphilitic. At the best, the cornea is not remarkable for vitality. Dependent for its nutrition on lymph diffusing along the interlamellar canals from the marginal vascular loops, any stasis in the circumcorneal vessels will threaten necrosis. In the infant it is thinner as to the substantia propria and yet more so in the epithelium, where, instead of a transitional layer five or six cells thick, it consists of one layer of squames on a single layer of cuboidal cells. Hence we can understand how it is that whilst in the adult the ulcers are usually peripheral and are caused by the retention of pus between the corneal edge and the overhanging ring of chemosed conjunctiva in the infant the ulcer is central from simple devitalisation. That such stasis exists is clear from the researches of Schridde,¹³ Golesecano,¹⁴ and others.

On the question of remedies, beyond a universal admission of the specific value of silver salts, the atmosphere is almost polemic. For some time nitrate of silver was thrown in the shade by the newer organic preparations, whose universal goodness glowed so enticingly in our daily batch of circulars. But it was not long before it came into its own again and we find Th. Saemisch, in the new edition of Graefe and Saemisch's "Handbuch für Augenheilkunde," discarding entirely the new compounds and pinning his faith to the old salt. In this he is supported by many of the foremost authorities, notably by Bernheimer,¹⁵ Baillart,¹⁶ and Alvarado.¹⁷ So far the strongest rival of the nitrate is protargol,¹⁸ and Saemisch's attack elicited a vigorous rejoinder from Pfalz¹⁹ who has used protargol exclusively for six years and never required a solution stronger than 10 per cent.

In my own experience I have learned to rely greatly on protargol much more than on any of the others, but one difficulty—and it is indeed a drawback—is the need for its continuous use in a serious case. Whereas with the nitrate one can manage well with three applications daily, with protargol applications have to be made every half hour, day and night, so that the patient, to say nothing of the attendants, is worn out by want of sleep. Apart from this, it is questionable if it is really equal to the nitrate, as witness the statement of Darier and Abadie,²⁰ that whenever the cornea shows signs of necrosis they always resort to the nitrate. In the adult my practice is, firstly, to irrigate the sound eye and then to instil 10 per cent. protargol before putting on the Buller shield, since we have no ground for assuming its freedom from infection. The affected eye is then irrigated thrice daily with 200 cubic centimetres of a solution of nitrate, 1 in 300, in warm distilled water. After each irrigation, applied by a glass undine, I instil two drops of 2 per cent. nitrate and do not neutralise with salt solution. In all adult cases I divide the external canthus. This may seem a heroic proceeding but in view of the extreme danger to sight it is insignificant. One blade of a pair of strong scissors is pushed under the commissure as far as it will go, and the intervening tissues are severed at a single stroke. The outer tarsal ligament is very resilient and will elude the grasp of any but sharp blades. It is remarkable how greatly this facilitates the proper handling of a

case. The cornea is at once removed from pressure as the oedematous lids are depleted by the free bleeding and orbicular spasm is also done away with. Even more valuable is the free access to the retrotarsal folds. Contrary to what one would expect, when all swelling has subsided, there is very little wound left and blepharoplasty is not needed, although that would be a simple matter if it were. During the interval between the irrigations it is usual to employ frequently renewed dressings kept moist and cold on a block of ice. As a general surgical measure, the use of cold topical applications is diminishing as a result of our increased acquaintance with the pathology of inflammation. This applies with unusual force to ophthalmic surgery, where there is *ab initio* a lessened vitality, in the face of which it is illogical to reduce the corneal temperature, and where, moreover, owing to the thinness of the intervening tissues, the temperature can be influenced to an unusual degree. Warm applications, on the other hand, maintain an impaired nutrition and are much more grateful to the patient than cold ones. When the stage of ocular gleet has been reached it will be found, as in urethral work, that simple astringents are of more use than the antiseptics. There are many which may be employed but I have found none superior to the old-fashioned "lapis divinus" rubbed on the inner surfaces of the lids.

ON SUBSTANCES FAVOURING AND INHIBITING THE ACTION OF THE HÆMOLYSINS OF BILE AND SERUM.

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INTRODUCTION.

IN the course of some previous investigations it was noticed that an animal might have marked jaundice without any obvious alterations in the structure of red corpuscles and that the serum of an animal had a hæmosozic effect on the bile of that species of animals from which the serum had been taken. Later, we showed that urine prevented the action of certain hæmolytic sera and that this hæmosozic effect could not be due to the presence of salts only, as dialysed urine had the same effect. The present paper is concerned with the influence of various substances (salts, urine, sugars) on the hæmolysis produced by various fluids such as bile, and specific sera.

I. EFFECT OF CONCENTRATION OF SALTS ON BILE.

Methods Used.

(a) *Preparation of blood.*—A measured quantity of fresh ox blood was washed with normal (9 per 1000) salt solution and centrifugalised. The supernatant liquid was decanted and replaced with fresh normal salt solution, and after this process had been repeated three times the washed blood corpuscles were suspended in a quantity of normal salt solution equal to the original volume of fluid. When used, the washed blood was never more than two or three hours old.

(b) *Preparation of standard solution of bile.*—As the hæmolytic properties of bile vary greatly a solution of approximately constant strength was prepared by suspending a measured volume of bullock's blood (prepared as above) in normal salt solution and ascertaining what amount of bile dissolved the blood completely in ten minutes. If, for instance, one volume of bile added to nine volumes of (9 per 1000) salt solution dissolved one volume of blood in ten minutes, then the standard solution used on that day was made up of nine cubic centimetres of normal salt solution plus one volume of bile. If two volumes of bile dissolved one volume of blood, the standard solution for the day contained two cubic centimetres of bile and eight volumes of salt solution. Such a standard solution (hereafter called standard bile) was prepared every day. Unless otherwise stated 0.1 cubic centimetre of this standard bile was added to each cubic centimetre of fluid in all our experiments.

(c) *Preparation of mixture of blood and bile.*—1 per cent., 10 per cent., or more concentrated solutions of the salts to be tested were prepared and varying volumes of these solutions were added in test-tubes to distilled water in such proportions that each tube contained exactly one cubic

¹³ Zeitschrift für Augenheilkunde, December, 1905.

¹⁴ Recueil d'Ophtalmologie, July, 1904.

¹⁵ Klinische Monatsschrift für Augenheilkunde, 1906, Band i, S. 253.

¹⁶ Bulletin Général de Thérapeutique, August 30th, 1906.

¹⁷ Archiv de Oftalmologia Hispano-Americanos, April, 1906.

¹⁸ Darier: Les Nouveaux Sels d'Argent en Thérapeutique Oculaire, Paris, 1906.

¹⁹ Zeitschrift für Augenheilkunde, March, 1905.

²⁰ Comptes Rendus de l'Assemblée d'Ophtalmologie, Paris, December, 1905.

centimetre of fluid. Standard bile and blood were then added. (Slight hæmolysis = +. Intermediate stages = ++ and +++). I means that the blood dissolved completely in not more than half an hour. D means that more than half an hour elapsed between the addition of the blood and complete hæmolysis. The numbers in parentheses indicate in hours the time after which hæmolysis was complete. St. B. = standard bile. The experiments were always considered as complete after 18 hours.)

Experiments with sodium chloride.—If one drop of blood be added to 0·9 cubic centimetre of normal salt solution together with 0·1 of standard bile no hæmolysis takes place, but if the blood is suspended in the same volume of a hypertonic solution of the same salt and the same quantity of bile the result is quite different. The following table illustrates this :—

TABLE I.—*Blood Suspended in Sodium Chloride Solutions plus Standard Bile (0.1 cubic centimetre).*

NaCl.					Result.
0.05 per cent....	...	...	...	...	00
1.3 "	...	...	...	...	++
2.2 "	...	...	...	...	D (5)
3.3 "	...	...	...	...	I

Hypertonicity therefore favours the hæmolytic action of bile. This fact can be demonstrated in another way. Standard bile is diluted with various volumes of physiological salt solution and each of these dilutions is tested on blood suspended in salt solutions of various strengths.

TABLE II.—*Blood Suspended in Sodium Chloride Solutions plus Standard Bile.*

	Sodium chloride solutions.						
	0.05 %	0.86 %	1.3 %	1.8%	2.2%	2.7%	3.3%
St. B. 1.0 c.c.	00	00	++	++	D (5)	D (5)	I
„ 0.05 c.c.	00	00	00	00	++	?	D (18)
„ 0.015 c.c.	00	00	00	00	00	00	+++

These and many other experiments show that a solution of bile too weak to hæmolyse blood suspended in isotonic solutions dissolves the same blood suspended in hypertonic solutions of the same salt.

Action of concentrated solutions of sodium chloride.—The following table shows the action of bile suspended in very concentrated solutions.

TABLE III.—*Blood Suspended in Sodium Chloride Solutions plus Standard Bile.*

	Sodium chloride solutions.		
	10%	20%	30%
St. B. 0·02 c.c.	+++	I	I
„ 0·01 c.c.	00	+++	I
„ 0·005 c.c.	00	++	I

The more hypertonic the solution the more active the hæmolytic properties of bile. Whereas, for instance, 0.1

cubic centimetre of standard bile does not hæmolyse blood suspended in normal salt solution, a volume of bile 20 times less immediately dissolves the same blood suspended in 30 per cent. of salt solution.

Action of concentrated solutions of sodium chloride.—It must be borne in mind that concentrated solutions of sodium chloride and alkaline earths dissolve bovine red blood corpuscles after some hours. This action, however, is very slow and not to be compared with the immediate hæmolytic action of bile added to these concentrated solutions.

Conclusions.—1. Bile is least hæmolytic when blood is suspended in isotonic solutions of sodium chloride. 2. The more concentrated the salt solution the less is the quantity of bile necessary to dissolve a given volume of blood.

Hæmolytic action of bile on blood suspended in solution of other salts.—Solutions of various salts of gradually increasing concentrations were prepared, and one drop of blood was suspended in one cubic centimetre each of these solutions, and 0.1 cubic centimetre of standard bile was added. Table IV. gives the main results of these experiments.

A certain volume (0.1 cubic centimetre) of standardised bile, therefore, added to one cubic centimetre of an isotonic or nearly isotonic solution of certain salts (e.g., sulphate of sodium, barium chloride, phosphate of ammonium, nitrate of ammonium, magnesium salts, and chloride calcium) dissolves one drop of blood within half an hour. The same volume of bile mixed with one cubic centimetre of a solution of the other salts (sodium chloride, iodide of potassium, bromide of sodium, nitrate of sodium, chloride of potassium, &c.) dissolves one drop of blood suspended in markedly hypertonic solutions. The activity of bile increases as the solutions become more hypertonic, just as it does in NaCl solutions. The salts of the first group (sulphate of sodium, &c.) also are least active when blood is suspended in isotonic or slightly hypertonic solutions. This can easily be proved by diminishing the quantity of bile. Let us take CaCl_2 as an example.

TABLE V.—*Blood Suspended in Calcium Chloride Solutions.*

	Calcium chloride solutions.			
	1%	2%	3%	4%
St. B. 0.1 c.c.	I	I	I	I
„ 0.05 c.c.	I	I	I	I
„ 0.025 c.c.	—	—	—	I

0.025 of standard bile, therefore, is least hæmolytic in an isotonic or nearly isotonic CaCl_2 solution. Similarly, when 0.05 of standard bile is added to a 2 or 3 per cent. solution of barium chloride hæmolysis is retarded. With 0.025 of standard bile hæmolysis is absent in a 2 or 3 per cent. solution of barium chloride but takes place immediately in more concentrated solutions. By suitably diminishing the volume of bile the same results may be obtained with all the salts of the first group.

Comparative action of salts.—Certain salts therefore favour the hæmolytic properties of bile far more than others. An approximate idea of the favouring properties of each salt is obtained by adding varying volumes of standardised bile to

TABLE IV.—BLOOD SUSPENDED IN SOLUTIONS OF VARIOUS SALTS PLUS STANDARD BILE.

[illegible]

blood suspended in isotonic or nearly isotonic solutions of each salt and ascertaining the quantity of bile producing hæmolysis in each case. Such an experiment is noted in the following table.

TABLE VI.—Comparative Action of Salts.

Isotonic solutions of—	St. B. 0·1	St. B. 0·05	St. B. 0·03	St. B. 0·025
Sodium chloride	—	—	—	—
Potassium nitrate	—	—	—	—
Sodium iodide	D (5)	+	—	—
Sodium bromide	D (5)	++	+	—
Sodium nitrate	D (18)	+	+	—
Magnesium sulphate	I	D (18)	++	—
Barium chloride	D (5)	+++	+	+
Calcium chloride	I	D (15)	+++	++

Magnesium sulphate and calcium chloride therefore favour hæmolysis most, and sodium and potassium chloride least. A table might be constructed showing in actual numbers the favouring effect of each salt and it can thus be shown, for instance, that bile acted on blood suspended in a 15 per cent. solution of CaCl₂ 60 to 80 times more powerfully than on blood suspended in an isotonic solution of NaCl. Such a table would have but little value unless all the experiments made on the same day had been with the same bile, on the same blood—conditions not easily realised. Calcium chloride and other salts favouring hæmolysis exert their action even in presence of less active salts—e.g., NaCl. If, for instance, an isotonic solution of CaCl₂ be added to a non-hæmolytic mixture of sodium chloride 1 cubic centimetre (0·9 per cent.), bile (standard bile 0·1 cubic centimetre), and blood (one drop), hæmolysis begins as soon as the solution contains 0·018 per cent. and is complete when the solution contains 0·54 per cent. of CaCl₂.

II. EFFECT OF CONCENTRATION OF SALTS ON HÆMOLYTIC SERA.

In all these experiments the blood corpuscles were prepared in exactly the same manner as before. The sera came from animals repeatedly injected with large quantities of bovine red blood corpuscles. A 1 per 1000 solution dissolved one drop of bovine red blood corpuscles suspended in one cubic centimetre of a 9 per cent. solution of sodium chloride.

Effect of sodium chloride.—If blood be suspended in solutions of sodium chloride of varying strengths and serum be

added, the hæmolysis differs in intensity according to the amount of salt present.

TABLE VII.—Blood Suspended in Sodium Chloride Solution and in Sodium Chloride Solution plus Serum (1 per 1000).

Sodium chloride solution.	Result.	Sodium chloride solution + serum (1 per 1000).	Result.
5 per 1000	+++	5 per 1000	+1 ... C
6 "	+	6 "	+1 ... C
7 "	00	7 "	+1 ... C
8 "	00	8 "	+1 ... C
9 "	00	9 "	+1 ... C
1 per cent.	00	1 per cent.	+1 ... +++
2 "	00	2 "	+1 ... —

(By C is meant complete hæmolysis in less than 18 hours.)

In higher concentrations of salts no hæmolysis takes place. Evidently, therefore, the serum is most active in isotonic or nearly isotonic solutions of sodium chloride and inactive in hypertonic solutions.

Effect of other salts on hæmolysis.—Blood was suspended in solutions of various salts differing in strength and the same quantity of serum (1 per 1000) was added to each. The main results of these experiments are embodied in Table VIII. (On the left hand of the table the effect of the various salts acting alone on the blood is tabulated. Under each strength of salt the result of the experiment is entered. On the right hand of the table the effect of salt solution to which 1 per 1000 hæmolytic serum has been added is given.) N.B.—Solutions less concentrated than the lowest concentration given in each table always hæmolysed immediately.

Hæmolytic serum added to blood suspended in isotonic or nearly isotonic solutions of many salts does not hæmolysed. When the salt is less concentrated the solution plus serum may be less hæmolytic than the salt solution alone. With other salts—namely, bromide of sodium, the chloride of potassium and sodium and iodide of sodium, the serum dissolves blood corpuscles suspended in isotonic or nearly isotonic solutions, but not in hypertonic solutions. Whereas, therefore, bile is most active in hypertonic solutions of salts, hæmolytic serum is least active under such conditions.

Marked inhibitive action of certain salts.—It has been shown already that certain salts, more especially chloride of calcium, greatly favour the hæmolysis produced by bile, but not that of hæmolytic serum. The action of calcium

TABLE VIII.—BLOOD SUSPENDED IN SOLUTIONS OF VARIOUS SALTS, AND ALSO WITH THE SAME QUANTITY OF SERUM (1 PER 1000) ADDED TO EACH.

Salt.	Strength of solution.					Strength of Solution + serum 1 per 1000.				
KBr	2 per cent. 0					1 per cent. +++		2 per cent. 0		
NaBr	3 per cent. +++	4 per cent. 0				5 per cent. +++		6 per cent. 0		
BaCl ₂	3 per cent. 0					2 per cent. +		3 per cent. 0		
CaCl ₂	2 per cent. 0					9 per 1000 +++	1 per cent. +	2 per cent. 0		
MgCl ₂	1 per cent. +	2 per cent. 0				7 per 1000 +++	8 per 1000 +++	9 per 1000 ++	1 per cent. +	2 per cent. 0
KCl	7 per 1000 +++	8 per 1000 ++	9 per 1000 +	1 per cent. 0		9 per 1000 C	1 per cent. +	2 per cent. 0		
NaCl... ..	5 per 1000 +++	6 per 1000 +	7 per 1000 +	8 per 1000 0	9 per 1000 0	1 per cent. +++	2 per cent. 0			
KI	2 per cent. 0					2 per cent. +++	3 per cent. 0			
NaI	2 per cent. 0					2 per cent. C	3 per cent. 0			
NH ₄ PO ₄ ...	2 per cent. +	3 per cent. 0				1 per cent. +++	2 per cent. 0			
NH ₄ SO ₄ ...	2 per cent. +++	3 per cent. 0	4 per cent. 0			2 per cent. +	3 per cent. 0			
MgSO ₄	3 per cent. +++	4 per cent. 0				2 per cent. C	3 per cent. 0			

chloride on hæmolytic sera is very remarkable and is demonstrated in the following experiment :—

TABLE IX.—The Action of Calcium Chloride on Hæmolytic Sera.

—	Serum.	Physiological salt solution.	1% CaCl solution.	Red blood cor-puscles.	Result.
I. ...	0·1	0·8	0·1	1 drop.	+++ (18 h.)
II. ...	„	0·7	0·2	„	+
III. ...	„	0·6	0·3	„	00

As soon as the solution contains 0·03 per cent. of calcium chloride no hæmolysis takes place. This action of calcium chloride on hæmolytic serum, therefore, is exactly the opposite of the action of the same salt on bile and, it may be added incidentally, on some agglutinating sera.

Effect of adding increased quantities of serum to red blood corpuscles suspended in hypertonic salt solutions.—As has been shown already, hæmolytic serum (1 per 1000) acting rapidly on blood suspended in a 9 per 1000 solution of sodium chloride does not dissolve blood suspended in a 2 per cent. solution of the same salt. Another series of experiments showed that no hæmolysis takes place as soon as the mixture contained 1·4 per cent. of sodium chloride, even if the volume of serum be increased. If, for instance, instead of 1 per 1000, 1·25 per cent. of serum was added, no hæmolysis took place when the mixture contained 1·4 per cent. of sodium chloride. Even more remarkable is the inhibiting effect of calcium chloride. Whereas a 1 per 1000 solution of a given serum immediately hæmolyses a given quantity of blood suspended in a 9 per 1000 solution of sodium chloride, a 1 per cent. solution of the same serum is inactive as soon as the mixture contains 0·03 to 0·04 per cent. of calcium chloride.

III. EFFECT OF URINE ON THE HÆMOLYSIS PRODUCED BY BILE AND SERUM.

From the fact that urine contains a large quantity of salts it was confidently expected that it would have a favouring effect on the hæmolysis produced by bile. The following experiment confirms this view.

TABLE X.—The Effect of Urine on the Hæmolysis produced by Bile and Serum.

—	Bile.	Physiological salt solution.	Human urine.	Blood.	Result.
I. (Control)	0·02	1 c.c.	0	1 drop.	+
II. „	„	0·5	0·5	1 „	++
III. „	„	0·4	0·6	1 „	+++
IV. „	„	0·3	0·7	1 „	I
V. „	„	0	1 c.c.	1 „	I

In a further series of experiments half this quantity of bile hæmolysed almost completely one drop of blood suspended in human urine, but not the same quantity of blood suspended in physiological salt solution. The favouring effect of urine, however, is not wholly due to the salts contained in it.

Experiment.—50 cubic centimetres of fresh human urine were mixed with 150 cubic centimetres of absolute alcohol and the precipitate was dialysed until all the salts had disappeared. The liquid remaining in the dialyser was precipitated with twice its volume of alcohol. Physiological salt solution was then added to the precipitate until the total amount of fluid amounted to 25 cubic centimetres. This fluid we shall call D.U.

TABLE XI.—The Effect of Urine Freed from Salts.

—	Bile.	Physiological salt solution.	D.U.	Red blood corpuscles.	Result.
I. (Control)	0·2	1 c.c.	0	1 drop.	+
II. „	0	0	1 c.c.	1 „	0
III. „	0·2	0·5	0·5	1 „	I
IV. „	0·2	0	1	1 „	I

Even when half the quantity was added the blood suspended in D.U. was dissolved immediately. Urine, therefore, even when freed from salts exerts a favouring influence on the hæmolysis produced by bile.

Effect of urine on hæmolysis produced by hæmolytic sera.—This question has been fully discussed in our paper published in the *Journal de Pathologie*. Among the conclusions arrived at two are of special interest: First, human urine inhibits the hæmolysis produced by hæmolytic sera prepared by the injection into rabbits of bovine red blood corpuscles; and secondly, this anti-hæmolytic action (or hæmosozic action) is not due to the salts contained in the urine, as dialysed urine is equally effective.

Conclusion.—Human urine favours the hæmolytic action of ox bile but inhibits the hæmolytic action of sera prepared by the injection of bovine red blood corpuscles. In both cases the effect is not wholly due to the presence of salts.

Experiments with various sugars.—If 0·1 of standardised bile be added to different solutions of saccharose, glucose, or lactose, hæmolysis takes place only in highly concentrated solutions of these sugars.

TABLE XII.—The Effect of Sugars on the Hæmolytic Action of Bile.

	Solutions of sugars + St. B. 0·1.											
	3%	4%	5%	6%	7%	8%	9%	10%	20%	30%	40%	50%
Cane sugar	I	I	+++	++	+	-	-	-	-	-	-	D (E)
Lactose	I	I	+++	+	-	-	-	+++	-	++	-	-
Glucose	++	++	-	-	-	-	-	-	-	-	-	D (3)

Under similar conditions the action of hæmolytic sera is different.

TABLE XIII.—Effect of Sugars on Hæmolytic Action of Sera.

—	Solutions of sugars + hæmolytic serum 0·1.																			
	¼%	½%	¾%	1%	1½%	2%	2½%	3%	3½%	4%	4½%	5%	5½%	6%	6½%	7%	7½%	8%	8½%	9%
Saccharose	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	—
Glucose ...	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	—
Lactose ...	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	—

Hæmolytic serum therefore does not act when the solution of sugars is highly concentrated.

Conclusion.—High concentration of sugars favours the action of bile and hinders that of hæmolytic serum.

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THREE STOMACH CASES FROM THE PHYSICIAN'S STANDPOINT: A POST-GRADUATE CLINIC.¹

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IN some quarters it seems to be thought that the time is not far distant when the art of the physician will become obsolete and be replaced by the craft of the surgeon. If this prediction be ever realised the fault will lie at the door of the physician and of the general practitioner. The latter, however much more he may be, ought certainly to be a physician, for to be a successful practitioner, in the only true sense, requires that he should be a careful and, as far as possible, a skilful diagnostician. In no region has a more debatable land arisen than in the domain of gastric disorder, and the cause of this is to be found in the following considerations.

In the very nature of things digestive and gastric disturbance comes into the hands of the practitioner and the physician. It is on them that the responsibility of diagnosis must primarily lie, and it is imperative that they should rise to their extended responsibilities in this department and

¹ These notes have necessarily been extended to make them suitable for publication.