

VIII. *On the Immunity enjoyed by the Stomach from being digested by its own Secretion during Life.* By F. W. PAVY, M.D.

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IN a communication, bearing the above title, that was read before the Royal Society, January 8, 1863, I brought forward experimental evidence which had conducted me to view the immunity enjoyed by the stomach from being digested by its own secretion during life, as resulting from the neutralizing influence on the acidity of the gastric juice exerted by the stream of alkaline blood flowing through its parietes. The opposition that this view received on the evening of its announcement induced me to extend my experiments, and as from the additional results obtained some important confirmatory evidence can be adduced, I have deemed it desirable to present this further communication, in which the whole subject is concisely reviewed with the aid of the new matter that has been brought to light.

JOHN HUNTER directed attention to the point under consideration in a paper entitled “On the Digestion of the Stomach after death,” which is contained in the Philosophical Transactions for 1772. After adverting to the fact that in occasional instances, especially in persons who have died of sudden and violent deaths, the stomach is found so dissolved at its greater extremity as to have allowed of the escape of its contents into the abdominal cavity, and, without an actual perforation occurring, that there are very few dead bodies in which some degree of digestion of the coats of the organ may not be observed, HUNTER gives reasons for concluding that the condition described must be owing to the action of the digestive fluid after the occurrence of death, and not the result of disease in the living subject. The stomach being thus affirmed to be susceptible of digestion by its own secretion after death, it became necessary to account for its not undergoing a similar process of digestion during life. According to HUNTER’S view it was the “living principle” that afforded the required protection to the living organ.

Post-mortem examinations of the human body supply constantly recurring examples of the gastric solution that HUNTER has described. Experimentally, however, the effect may be rendered much more strikingly manifest. If, for instance, an animal, as a rabbit, be killed at a period of digestion, and afterwards exposed to artificial warmth to prevent its temperature from falling, not only the stomach but many of the surrounding parts will be found to have been dissolved. With a rabbit killed in the evening and placed in a warm situation (100° to 110° Fahr.) during the night, I have seen in the morning the stomach, diaphragm, part of the liver and lungs, and the intercostal muscles of the side

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upon which the animal was laid, all digested away; with the muscles and skin of the neck and upper extremity on the same side also in a semi-digested state.

Submitted to examination, HUNTER'S idea about the protecting influence of the "living principle" does not stand the test of experiment. To CLAUDE BERNARD, of Paris, science is indebted for suggesting an ingenious mode of experimenting with reference to this point. Through an artificial opening into the stomach of a dog, BERNARD introduced the hind legs of a living frog whilst digestion was going on. As the result, the parts were digested and dissolved away notwithstanding the frog continued alive. My own experience enables me to offer corroborative evidence as regards this experiment upon the frog; but further, I have found that tissues belonging to a warm-blooded mammal have likewise shown themselves susceptible of attack under subjection to the influence of the gastric digestive menstruum.

Taking for experiment a vigorous rabbit, I carefully introduced one of its ears through a fistulous opening into the stomach of a dog at a period of full digestion. Precautions were used to avoid inflicting mechanical injury upon the ear in placing and retaining it in position; and, at the same time, to avoid, as far as possible, obstructing the flow of blood through its vessels. At the end of two hours, the ear was withdrawn, and several spots of erosion, some as large as a sixpenny piece, were observed on its surface; but nowhere was it eaten completely through. On being replaced for another two hours and a half, the tip, to the extent of rather more than half an inch, was almost completely removed, a small fragment only being left attached by a narrow shred to the remainder of the ear; a considerable escape of blood took place, especially towards the latter part of the experiment.

To replace the refuted influence of the "living principle," it has been suggested, that it is the epithelial lining which gives to the stomach the immunity from destruction it enjoys during life. The stomach, it has been said, is lined with an epithelial layer, and this, with the mucus secreted, acts as a kind of varnish in protecting the deeper parts. Whilst digestion is proceeding, the epithelium and mucus are constantly being dissolved like the food contained in the stomach; but, a fresh supply being as constantly produced, the organ is thereby maintained intact. Death taking place, and the epithelial layer being no longer produced, the gastric juice, after acting upon and dissolving it, reaches the deeper coats, and then, continuing to exert its influence, may ultimately, the temperature being maintained sufficiently favourable for the purpose, occasion a perforation of the organ.

Such is the view that has been propounded, but, like the "living principle," it fails to stand the test of experiment.

As regards the mucus, an exaggerated notion may be formed, respecting its amount and importance, if an examination of the stomach be made when even a short time only has been allowed to elapse after death. With the rabbit, for example, under such circumstances, on opening the stomach a more or less thick, pulpy, white pellicle is found to adhere to the mass of food which the organ contains. This, however, consists of

digested mucous membrane; for, examined immediately after death, the stomach lifts off from the food, leaving the latter uncovered by anything that is visible. The mucous membrane itself, also, is firm in structure throughout.

That the stomach cannot derive its protection from the epithelial layer, as suggested, is proved by the fact, that a patch of mucous membrane may be removed, and food will afterwards be digested without the slightest sign of attack being made upon the deeper coats of the organ. I have several times performed the experiment, to enable me to speak safely on the point, and never have I had the slightest evidence, that depriving the stomach of a portion of its mucous membrane has left the denuded part in a position of greater insecurity than the rest, on the score of liability to digestive attack. It is upon the dog that these experiments have been made; and, upon one occasion, after removing the mucous membrane, and exposing the muscular fibres over a space of about an inch and a half in diameter, the animal was allowed to live for ten days. It ate food every day, and seemed scarcely affected by the operation. Life was destroyed whilst digestion was being carried on, and the lesion in the stomach was found very nearly repaired: new matter had been deposited in the place of what had been removed, and the denuded spot had contracted to much less than its original dimensions. In other experiments, I have examined the stomach at earlier periods after the operation. Life has always been destroyed whilst digestion has been going on. The day after the operation, I have found the denuded spot irregular and raw. Then lymph is deposited upon its surface, and, apparently through the organization of this, the walls are gradually thickened, and the process of reparation carried out.

In addition to the evidence afforded by experiment, it may be assumed, upon reflection, that something more constant—some condition presenting less exposure to the chance of being influenced by external circumstances than that supplied by the existence of an epithelial layer, would be required to account for that unflinching security from *ante-mortem* solution which the stomach appears to enjoy. From the articles swallowed, abrasion of the mucous membrane may be presumed to have been not unfrequently produced, and ulceration is not so uncommon an occurrence; yet, perforation has not been observed as the necessary result. Perforation, it is true, does sometimes occur as a consequence of ulceration, but the same is the case in other parts of the alimentary tract, and there is reason to regard it here, as elsewhere, as resulting from a gradual advance of the ulcerative process, and not from a special digestive action exerted by the gastric juice.

The notion, then, that the stomach is prevented from being digested during life, because it is a living structure, is disproved by the consideration that the parts of living animals that have been introduced into the digesting stomach have not shown themselves capable of resisting its digestive influence. That the epithelial layer, also, with its capacity for constant renewal, does not afford the explanation needed, is proved by the absence of any solvent action being exerted by the digestive fluid upon the deeper coats when the part has been completely denuded of its mucous membrane. The question, therefore (and

an exceedingly important one it must be admitted by all to be), still remains open for solution, Why does the stomach, composed as it is of digestible materials, escape being digested itself, whilst digestion is being carried on in its interior? It is evident, whatever explanation, with any pretence to sufficiency, is given, must comprise some broad principle of action capable of providing against all contingencies—capable of affording, in fact, that uninterrupted security during life which upon looking around us we observe the stomach to enjoy.

The view that I have to offer refers the immunity observed to the circulation within the walls of the organ of an alkaline current; and this agrees with the principle I have laid down as indispensable, for the circulation of blood forms with us an essential condition of life. It will not be disputed, that the presence of acidity is one of the necessary circumstances for the accomplishment of gastric digestion. Now, alkalinity is a constant character of the blood, and as during life the walls of the stomach are everywhere permeated by a current of this alkaline blood, we have here an opposing influence, the effect of which would be to destroy, by neutralizing its acidity, the solvent properties of the digestive fluid tending to penetrate and act upon the texture of the organ.

The following point is also worthy of note in passing. In the arrangement of the vascular supply, a doubly effective barrier is, as it were, provided. The vessels pass from below upwards towards the surface: capillaries having this direction ramify between the tubules by which the acid of the gastric juice is secreted. Acid being separated by secretion below must leave the blood that is proceeding upwards correspondingly increased in alkalinity; and thus, at the period when the largest amount of acid is flowing into the stomach, and the greatest protection is required, then is the provision afforded in its highest state of efficiency. Looking to nature's secretion alone, the act creating a demand for protection enhances the character of the protection provided.

The blood being stagnant after death, the opposing influence is lost that is offered by the circulating current. Should life happen to be cut short at a period of digestion, there is only the neutralizing power of the blood actually contained in the vessels of the stomach, to impede the progress of attack upon the organ itself; and the consequence is, that digestion of its parietes proceeds, as long as the temperature remains favourable for the process, and the solvent power of the digestive liquid is unexhausted. There is, therefore, no want of harmony between the effect that occurs after death, and the explanation that refers the protection afforded during life to the neutralizing influence of the circulation.

Having thus stated the nature of the view propounded, I next proceed to show in what manner it answers to the test of experiment.

It occurred to me, that, if the circulation really fulfilled the office I have alleged, the act of arresting the flow of blood through the walls of the stomach during life ought to lead to the same, or about the same, effect on the organ, other circumstances being equal, as would occur after death. The experiment being performed upon dogs and rabbits, I observed, as the result, digestion proceed to the extent of perforation in the

rabbit, whilst in the dog I did not witness a greater effect than some amount of solution of the mucous layer.

Having before me the effect I have described as ensuing when a rabbit is killed, and its temperature is afterwards maintained artificially, and taking this as an index of the effect to be looked for in these experiments, I had to account for the absence of perforation occurring in the dog. I conceived, at first, that the circulation in the surrounding parts which would exist during life, and not after death, might produce a modifying influence on the result. To what extent this is true is shown by the following experiments.

A couple of rabbits that had been fed alike were killed at a period of digestion. The stomachs were immediately removed, and the one immersed in some freshly-drawn, defibrinated sheep's blood; the other, in a solution of gum and sugar made to correspond to the blood in density. The gum was introduced to take the place of the albumen, and the sugar, the salines, so as to have a fluid that would behave about like blood as regards osmosis. The liquids were placed side by side in an oven, and the temperature maintained at about 100° Fahr. At the end of 4½ hours, the stomach immersed in the solution of gum and sugar had undergone perforation, and allowed of the escape of its contents. The other was still entire, but digested in its interior so as to be reduced to only a thin layer. In another experiment the effect was not allowed to proceed so far. Both stomachs remained externally entire, but that immersed in the solution of gum and sugar presented, in a distinctly marked manner, evidence of more extensive attack than the other.

Through much subsequent experience I learned that I had in reality been labouring under an exaggerated notion, and that the standard I had taken from the rabbit was unjust in its application to the dog. The result of actual experiment on this animal shows a marked difference in degree of effect produced by the digestive action of the contents of the stomach after death to that which occurs in the rabbit. In the experiments thus performed, the animals have been killed about four or five hours after a meal of animal food. The temperature of the body has then been maintained for five and six hours closely to that belonging to life. Now, at the end of this time, the stomach has only shown signs of more or less digestion of its mucous membrane, a condition that has been about equalled in some of my experiments, where the flow of blood through the stomach has been arrested at a period of digestion, and the animal allowed to live for about five or six hours afterwards. By means of ligatures applied around the pylorus and the end of the œsophagus, and also around the vessels passing between the spleen and greater curvature of the organ, its circulation is with security and facility arrested, and its contents at the same time prevented from escaping. It is in this way that the experiments during life have been all conducted.

In the case of the rabbit, as I have said, I have witnessed digestion of the stomach proceed to the extent of perforation, as the result of stopping the flow of blood through the vessels. The process of digestion, however, being so much influenced by the tempe-

perature, it is necessary to observe, with a small animal like the rabbit, that it is not placed in a cold situation, for the heat to decline after the operation has been performed. Without artificial warmth and during cool weather I have seen the cardiac extremity of the stomach digested away in less than eight hours. In an experiment, however, where artificial warmth was employed, perforation was observed at the end of four hours. The operation was performed four hours after food had been given. The animal was then placed in an atmosphere with the thermometer standing at 92° Fahr. In four hours' time it was killed, and the parts were examined immediately. The stomach throughout was in an advanced state of digestion, and was perforated in one spot of about the size of a shilling.

The contents of the stomach in the rabbit are always observed most powerfully acid, much more so, according to what I have seen, than in the case of the dog. From the nature of the food some acid may be generated in addition to that derived from the blood by secretion. Now, upon the quantity of acid, amongst other circumstances, the energy of the digestive menstruum depends, and, in harmony with this, it can be shown, that if an acid (an acid that is not of a nature to exercise of itself any direct erosive effect) be introduced into the stomach of a dog at a period either of digestion or fasting, and the circulation through the walls of the organ be afterwards stopped, the effect which occurs is even considerably stronger than what has been hitherto referred to in the rabbit. I may mention three experiments in proof of this assertion. The acids employed were purposely selected on account of their non-corrosive properties. In the first, the animal was taken six hours after a full meal of animal food. One fluid ounce of the dilute phosphoric acid of the London Pharmacopœia, mixed with an equal quantity of water, was introduced into the stomach, and the circulation through the organ afterwards, in the usual way, arrested. Death took place during the night, and a large perforation was found in the cardiac extremity of the stomach. In the second, six drachms of the same acid, diluted with an equal quantity of water, were employed, and this time upon an empty stomach. Perforation took place in 2½ hours' time. In the third, 60 grains of citric acid, dissolved in two ounces of water, constituted the acid used, and this time also it was at a period of fasting that the experiment was performed. In four hours death occurred from perforation.

It is thus rendered evident, that all that is wanted in the dog to produce digestive destruction of the stomach when its circulation is arrested, is the presence of a sufficient amount of acid in its interior. With a limited amount of acid the power of the gastric juice soon becomes exhausted, and there being food as well as the stomach to act upon, this exhaustion may occur before any marked attack upon the organ has taken place. With a larger amount of acid, however, the exhaustion does not at this early period arrive, and the stomach continues to be acted upon until a perforation of its coats may be effected.

In striking contrast to the effect above narrated, of introducing a mild acid into the stomach and ligaturing the vessels, are the results I have obtained from introducing the

acid *without the operation* on the vessels. Three experiments were performed, using the same acids, and the same quantities of them, that had been employed before. Ligatures were placed around the end of the œsophagus and the pylorus to secure the retention of the acid in the stomach, care being taken, however, to avoid including the vessels. The circulation was thus left free to exercise its neutralizing influence, whilst, in other respects, the circumstances of the experiment were the same as before. Where one ounce of the dilute phosphoric acid, mixed with an equal quantity of water, was employed, the animal was alive on the following day, and when killed, the stomach was found free from unnatural appearance, with the exception of a number of small ulcerated spots strewed over the internal surface. These did not extend through the mucous membrane, and looked like what might be supposed to result from the action of an irritant. Where the six drachms of dilute phosphoric acid, and the same of water, were used, the animal was also alive on the following day. The mucous membrane of the stomach presented here and there an appearance of congestion, and a few small spots of superficial ulceration towards the pyloric end. The organ was otherwise found in a natural condition. With the 60 grains of citric acid, dissolved in two ounces of water, the animal, from some cause, died during the night. The stomach was found everywhere perfect; and, in this case, was without the slightest appearance of ulceration of its surface. The last dog had been taken at a period of digestion, the other two of fasting.

It will be seen how strongly the above results stand in support of the view I have brought forward. The stomach yields to the digestive influence of its contents in one set of experiments, and not in the other, the only difference in the experiments being, that the flow of blood through the vessels of the organ is arrested in the former and allowed to continue in the latter. The circulation being allowed to continue, a check is offered to the penetration of the walls of the stomach by its contents in an acid state, and thus the freedom from attack that occurred. The circulation, on the other hand, being arrested, there is no such neutralizing influence in operation; the acid menstruum, therefore, is able to attack the stomach just as it does the food in its interior.

A mode of experimenting which I am indebted to Dr. SHARPEY for suggesting, likewise gives confirmation to the view I have propounded. If an incision be made into the stomach and a portion of the opposite wall be drawn forward; and then, if a ligature be placed around this so as to stop the circulation of blood through the part, the constricted portion, on being returned and left projecting in the interior of the stomach, will undergo digestion just as if it consisted of a morsel of food. In one experiment the operation was performed on a dog at a period of fasting. Food was given on the following morning, and $7\frac{1}{2}$ hours afterwards the animal was killed. In the act of removing the stomach the parts surrounded by the ligature fell asunder, leaving a large circular opening from $1\frac{1}{2}$ to 2 inches in diameter. There was not a vestige of the constricted mass to be discovered; it had all been digested away. In another experiment some food was in the stomach when the ligature was applied. Although vomiting twice occurred soon after the operation was completed, and death took place in twenty

hours' time without any more food being given, more than half the projecting mass was digested away, as though it had been cleanly sliced off transversely; so that, when the ligature was removed and the stomach spread out, a hole fully an inch in diameter presented itself. As such an effect could not have taken place without the presence of gastric juice, it is to be inferred, that the whole of the contents of the stomach had not been ejected by the vomiting, and that the appearance observed was produced during the first few hours after the operation. At death there was nothing whatever contained in the organ. The special attack upon the most projecting part of the ligatured mass is probably to be explained by the contracted state of the stomach allowing only this portion to fairly present itself as a part of the surface in contact with the contents, as long as any remained. I might bring forward more evidence than the above from my laboratory experience; but these experiments I think suffice to show, that a portion of the stomach, to the exclusion of the rest, may be rendered susceptible of digestion by the removal of the protecting influence I conceive to be afforded by the circulation.

It will naturally be required of me to reconcile the view I have advanced with the effect that was noticed in an early part of this communication as occurring where the living frog's legs and rabbit's ear were introduced through a fistulous opening into the stomach, and submitted to the influence of the digestive menstruum. If the circulation, through its neutralizing power, protect the stomach, why should it not afford equal protection to the tissues of living animals, introduced through a fistulous opening into the digesting organ? I thus state the question openly, because it is one that requires to be openly met.

According to the proposition I have offered the stomach is protected, because the neutralizing power of its circulation is sufficient to overcome the acidity of the gastric juice which is tending to penetrate and attack its texture. Now, this consideration, it will be seen, involves the result in a question of degree of power between two opposing influences. Diminish the neutralizing power of the circulation beyond a certain point, and allow the strength of the digestive liquid to remain the same; theoretically, the result should be in favour of digestion instead of protection; practically, this may be regarded as what happens in the experiments with the frog's legs and rabbit's ear. Allow, on the other hand, the neutralizing power belonging to the circulation of the stomach to remain the same, but increase beyond a certain point the strength of acidity of the digestive liquid; theoretically, digestion of the stomach's parietes would be looked for as the result; practically, it can be shown that this is really what occurs, as will be seen by an experiment to which I shall presently refer.

With the living frog's legs introduced into the digesting dog's stomach, it may be fairly taken that the amount of blood possessed by the frog would be totally inadequate to furnish the required means of resistance to the influence of the acidity of the dog's gastric juice. With the rabbit's ear the vascularity is so much less than that of the parietes of the dog's stomach, that there is nothing, to my own mind, incomprehensible in the fact of the one yielding to, and the other resisting attack. No com-

parison can be drawn between the position of the stomach, and that of the rabbit's ear. The stomach is not only in itself exceedingly vascular, but is entirely surrounded by equally vascular parts. The rabbit's ear is only supplied with blood that reaches it at its base, and, immersed in the stomach, it would lie completely bathed all around by gastric juice.

From the experiments I have mentioned it has been seen, that the introduction of a moderately strong acid liquid into the stomach leads to the production of a solvent effect on the organ when its circulation is stopped, which does not occur when the circulation is allowed to remain free. Now, if the strength of the acid be increased, the stomach shows itself to be susceptible of attack, although the circulation may have been left undisturbed. In an experiment upon a dog whilst fasting, I introduced 3 ounces of a liquid, consisting of 3 drachms of muriatic acid and the remainder of water, into the stomach, and afterwards ligatured the end of the œsophagus and pylorus without including the vessels. In one hour and forty minutes death took place, and, on the parts being examined immediately, perforation was found, with an escape of the contents of the stomach into the peritoneal cavity. The interior of the stomach throughout had undergone an extensive dissolution; and in the neighbourhood of the perforation, which was at the cardiac extremity, the texture presented quite a gelatinized appearance. This result was evidently the effect of digestion; for the acid, at the strength it was employed (one part in eight), does not possess such physical corrosive properties. A considerable escape of blood had taken place from the stomach during its attack; and it may be reverted to, in connexion with this, that there was also a considerable amount of hemorrhage observed from the rabbit's ear, whilst being attacked in the stomach of the dog. I take it, in the above experiment, that the height of acidity in the stomach was very much too great for the neutralizing capacity of the circulation: and thus, the rapid progress of digestive solution.

There is one more point that remains to receive consideration. It would be incompatible with my view, that a living organism could exist *in a free state* in the stomach, whilst digestion is going on, without being attacked; unless this organism should consist of, or be protected by, an indigestible material. It is well known, however, that larvæ of the *Æstrus* inhabit the stomach of the horse, but it will be found that they live with their heads firmly attached to, and buried in, the mucous membrane; indeed, there is sometimes quite a honeycomb arrangement in which the greater portion of the animal can be lodged. Living upon the juices of the animal these larvæ infest, they become more or less, as it were, a part and parcel of the stomach's parietes. It is further to be remarked, that the principle (chitine), which forms the basis of the tunic of insects, is of an exceedingly indigestible character. By Professor SIMONDS I have been informed of an entozoon (a species of *Filaria*) which he has found in the last stomach of the sheep; but this parasite also lives firmly attached to the mucous membrane, and in connexion with the juices of the animal it infests. I have not been able to learn, that any example can be brought forward of life being carried on, under isolated circum-

stances, in a digestible organism placed in the interior of an actively digesting stomach. The older physiologists found, in their early experiments on digestion, that such animals as leeches and earthworms, placed in perforated metal spheres, and introduced in a living state into the digesting stomach, were attacked, just as if they had consisted of ordinary food.

The following *résumé* may be taken as representating the main points of what has been adduced in this communication:—

That HUNTER'S suggestion of the "living principle" forming the source of protection to the stomach from being digested by its own secretion during life, is negatived by CLAUDE BERNARD'S discovery, that parts of living animals introduced through a fistulous opening into the digesting stomach, are observed to undergo digestion like its other contents.

That the epithelial layer, also, with its capacity for constant renewal, does not furnish the explanation required, is proved by the experimental evidence brought forward, showing, that a patch of mucous membrane may be removed, and digestion still be carried on, without the denuded part being digested.

That in default of the sufficiency of these suggestions, the view I have been led to entertain refers the immunity enjoyed by the stomach from being digested during life, to the influence of an alkaline circulation. Acidity is necessary for digestion, and alkalinity is a constant character of the blood. Whilst the walls of the stomach, therefore, are permeated by a current of blood, an opposing influence is offered to digestive attack. Death taking place, there is no longer a circulation of alkaline fluid to exert a neutralizing effect on the acidity of the gastric juice tending to penetrate and attack the organ: the consequence is, that digestion now proceeds, according to the nature of the circumstances that prevail.

That this view is supported by experimental evidence of the following description:—

By ligaturing the vessels of the stomach so as to arrest the flow of blood through the organ, it is rendered susceptible of attack by its contents during life in like manner as after death.

In the rabbit, digestion of the stomach has been thus observed to proceed to the extent of perforation.

In the dog, the action has not been witnessed to proceed beyond a solution of the mucous layer.

Upon introducing, however, into the stomach of the dog, previous to ligaturing the vessels, a moderate quantity of a dilute acid—mineral or vegetable—a perforation of the organ in each of the three experiments performed has ensued.

The introduction of the same acids, similarly diluted, and in like amounts, without the operation of ligaturing the vessels, so that the circulation has been left free, has not occasioned any digestive attack.

By pinching up and ligaturing a portion of the walls of the stomach so as to

leave a constricted mass projecting into the cavity of the organ, this has been found to undergo digestion like a morsel of food.

That the attack upon the living frog's legs and rabbit's ear introduced into the digesting stomach of a dog need not be looked upon as forming any valid objection to the view propounded. The explanation is one that involves the result in a question of degree of power between two opposing influences. Because, through degree of vascularity, the neutralizing power of the circulation is sufficient to hold in check the solvent action of the gastric juice in the case of the walls of the stomach, it does not follow that it should similarly be sufficient to do so in the case of the legs of a frog or the ear of a rabbit. The circumstances are far from identical in the two cases; and, in support of what has been stated, it can be shown by experiment that even with the stomach itself, by increasing the acidity of its contents beyond a certain point, *its* circulation is no longer adequate to enable it to resist digestion.

That the capacity of a living and digestible organism to exist in an isolated state in the interior of the digesting stomach would be incompatible with the view that has been announced. Instances can be brought forward of animals inhabiting the stomach, but they do not form examples of the above description.