

# GASTRIC JUICE

Elixir of Democracy

By ARTHUR L. MURPHY

**S**TARK amongst the pink, velvety folds of many a stomach, or on the nearby paler silken lining of the duodenum, its edges crater-like, its base dank grey, lies a peptic ulcer. In our mid-twentieth century this degenerate spot is becoming, to more and more, a badge of progress.

Infrequently, it kills, through peritonitis, or haemorrhage. Always it nags at digestion and cerebration alike. It is a chronic, gnawing, burning, painful nagger, giving such scant peace to mind or body, night or day, that the word *dyspeptic* has warped from its prime Greek connotation to embrace mood as well as food.

Where were beginnings? Did it lie in wait for Adam and Eve beyond the gates of Eden, with the myriad other enemies of air, earth and water, to prove them mortal? In that cold wilderness must have been the bacteria of a thousand diseases, all the traumatic risks of an unconquered world, the potentialities for the genetic harbingers of cancer. But not the broadest reader of Genesis can find there a peptic ulcer. As though the Creator had been too lenient, this is a private devil man has created for himself, unaided, to suffer by.

To learn its origin, then, we might go to the physician who with trained question and examination draws from his patient the ulcer picture, diagnoses it, and with diet, pills and wise words lulls it into painless somnolence. Or the roentgenologist with his screen of vital shadows where he watches the stomach in spasm and protest against this vilification. Or the biochemist who with far ranging tests and experiments has come to know well this first organ of digestion in all its phases. The pathologist can add to our knowledge with microscopic eyes. So can the epidemiologist as he gathers statistics of occurrence from all over the globe, pointing to ulcer trends among different races and creeds, among the more herbivorous or carnivorous, in varying age groups, and between sexes. From the highest levels of the brain the psychologist may pluck a handful of factors. Last, often, to see the patient, but first to see the ulcer, is the surgeon. As with practised hand and sometimes sweaty brow, he looks into its ugly living depths, what does he learn there?

None of these, skilled in laboratory and clinical observation, can find within the confines of his own field the cause of

peptic ulcer. It may be that too long and dispassionate a study has chilled the revelations of science. It may be that only in a philosophical contemplation of all humanity can the answer be found. But modern medicine sprang from the loins of philosophy. Conceived in the Temple of Aesculapius, with Hippocrates, the pupil of Aristotle, its father, reared on a mixed pabulum of induction and deduction in better proportion than that of any other human effort, good Medicine is art, science and philosophy in one, a learned trinity. Then if cause there be for man's ulcer, and cause there must be, Medicine is best qualified to find it. Let us draw from the knowledge of anatomist, physiologist, surgeon and the others, what seems pertinent.

We know that ulcers form, most often, about the lower end of the stomach and the first part of the duodenum into which it discharges its partly digested food bolus. This is the most dependent part of stomach. To it gravitates whatever the stomach contains. If there be no food in it, the gastric secretion puddles here, and when profuse, flows over into the duodenum. Gastric fluid is largely hydrochloric acid. It acts as one of the simpler digestants, preparing the food for more complex processes in the small intestines, of which the duodenum is the first section. Midway in this piece of vital tubing open the ducts of pancreas and liver, secreting alkaline digestive juices. These neutralize the acid, but the upper part of the duodenum is inevitably exposed to it in less buffered form. It is a sound assumption that hydrochloric acid produces the erosion of gastric or duodenal mucosa which is an ulcer.

The stomach does not secrete acid alone. The action of no organ in man is as simple as that. Pepsin, secretin, lysozyme and many more hormones and enzymes are there. But while discovery and study of all now known and yet to be known may well lead to a way of preventing ulcer formation, they are not basic in ulcer production. Hence it is enough to consider acid alone in this part of our study.

The fact that acid, which bathes the whole stomach lining to some degree, commonly causes ulceration only at the lower end, is not well enough accounted for by gravity alone. A study of the blood supply yields another reason. In the lower portion of the stomach it is less abundant, and composed in part of end arteries, blood bearing vessels that do not join freely with their fellows and hence, under abnormal conditions, are liable to become plugged with clotted blood. A mucous

lining, congested by a poor blood flow, is a more ready prey to the eroding action of hydrochloric acid.

The susceptibility of the duodenal mucous membrane is easily understood. It is paler, more delicate, and not designed to resist acid as is the stomach's. That the acid reaches it in undiluted form is another problem.

Obviously, if hydrochloric acid and a universal, anatomical deficiency in blood supply were the only requirements for a stomach ulcer, everybody would have one. Fortunately, there are three other factors—an abnormal amount of acid, an abnormally high concentration of acid, and an associated hyperactivity of the stomach muscles which breaks down the resistance of the valve at the stomach's end, sending great splashes of the irritating fluid into the duodenum.

It requires only simple animal experimentation to show that both the production of acid and the movements of the stomach are controlled by impulses coming down the vagus nerves. These, by the way, on their passage through chest, to stomach, give off branches to the coronary vessels of the heart. The vagi are a part of the autonomic nervous system. As distinguished from the central nervous system and brain, this is a simple, elemental chain to look after the vital processes of the body, digestion, respiration, blood flow, gland secretion and so on, while the brain concerns itself with conscious effort in work and play. As its name proclaims, it is autonomous, but it is linked to the central nervous system by many branches. Most recent of these to be discovered are branches running from the highest, psychic centres of the fore-brain directly to the centres, in the brain's base, of the vagus nerves.

Abnormal impulses, coursing down the vagi, set up a chain of pathological changes to produce the peptic ulcer. Although there may be many intermediate stages and other contributing factors, these seem basic. Anatomy, physiology and pathology have served us so far. Let us turn to epidemiology.

The simple observation that man feels best with the vibrant tang of spring air in his nostrils, that a grey November rain dampens spirit with body could be expanded into volumes on man's variations by climate and geography. No doubt, it has been. Differences in Negro, Chinese and Caucasian, go deeper than skin tint or the breadth of a nostril. There is no brown pigment in the Negro's stomach, yet it is less susceptible to ulceration. Peptic ulcer is common to the Chinese coolie and

his millions of malnourished brethren, but this would seem to be a dietetic problem. Among the higher educated, more prosperous Chinese the peptic ulcer rate is low. Whereas with our people it is greatest in this group.

If on the globe we draw a line, beginning at the Caspian Sea, following roughly the southern limits of the Iron Curtain bearing through northern France and Spain, and in the western hemisphere, passing through the southern United States we have divided Caucasians, in their tendency to ulcer. Through France and Spain the line indicates not a division of their peoples, but an intermediate position between north and south.

South of the line are men of darker skin, less emotional restraint, and fewer ulcers. North are men of pale skin, men amongst whom emotional restraint is looked upon as the outstanding attribute of manliness, men with an ulcer rate estimated at ten per cent of their population.

Our use of the word *man* in considering ulcers is more than a terminological convenience. As compared with his more frail counterpart, he is the victim, in a proportion of four to one.

For this there are three reasons. Best expressed from the feminine side, they are biological, physiological and philosophical, or, perhaps, spiritual. As the bearer of children, woman's natural urge is for stability and security. A place to rear her brood with a roof above, ample food and safety from danger—these are her instinctive demands. Hers is not the road to adventure where lie the greater risks and emotional stresses. Her frontal brain has less cause to seethe in waves that overflow down the vagi to the stomach. And if, through the thousand petty annoyances of her day, or the bigger stresses of a more worldly (perhaps less worthy) career, her emotional centres do bubble, she has other nerve pathways in her autonomic system, better developed than those of man. Among them are those to her tear ducts.

Long before psychology was a science, people who knew that shellfish were safe to eat in months with an R (a fact recently established by biology after arduous research) knew, too, that the best release from the nervous tension of trouble was a good cry. Brain waves behave like any other form of energy; they cannot be everywhere at once. As the lacrymal glands are in flood the gastric secretions ebb, and the stomach is safe.

When Nelson lay stricken on the Victory at Trafalgar and whispered his last words, "Kiss me, Hardy!" he was showing

an emotion the English sailor of today would fear to admit. Pride in stoicism, always an attribute of the Nordic, has been fostered more and more through the past century by men of fashion. Woman, who usually leads in matters of style, has more fully retained this emotional outlet, to the betterment of her digestion.

It is, however, her philosophy that best protects woman's gastric mucosa against ulceration. In things worldly, she is less demanding. She is keener to assess the essences of happiness, to see that they are not formed of material wealth or fame, not won by driving acquisitiveness. Since happiness is her great earthly aim, she is not plagued by the nagging, restless ambitions of man. Always, too, she walks closer to that mysterious veil that divides mortal and immortal. Whether she be conscious of faint rustlings from beyond, or whether her spirit is warmed in its nearness, she has an inherent confidence in a future life toward which, she knows, the most brilliant materialistic surge advances her not an iota. Her life's plan, then, is drawn more from instinct than reason; more from the spiritual than the rational. Her gastric acid laps at its mucosa as a windless lake on a summer night, gentle, soothing.

We can now make a sketch of the typical ulcer victim. He is a male, between twenty and forty—the decades in which ambition and acid burn strongest. He is a Nordic, clever, well educated, emotionally restrained and proud of it. Originally an introvert, he may still be; or, through the exigencies of his self-chosen dynamic role in life, he may have become the most brash of extroverts—superficially at least. Deep within him is a turmoil of uncertainties to keep him restless, active, progressive. Most of the world's brilliant advances have been made by him, advances which others of greater stability and less imagination have solidified and directed for our use. Because he is rarely the boss. He is the jackal to some more powerful, ruling lion. He is the Cassius of "lean and hungry look\*" to Shakespeare's Julius Ceasar. Hyperactive are the frontal lobes of his brain, seat of his desires, ambitions and plannings. Hyperactive, too, with chemical messages, must be those tiny nerve filaments running from them to the brain centres of the vagus nerves, messages which so irritate them that, in turn, they send off others to the stomach ordering generalized activity as if in preparation for a great feast which does not come.

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\*("He thinks too much: such men are dangerous.")

Seeing the man around the ulcer, thus, treatment becomes obvious. The physician may prescribe soft pap-like goods for him, to nourish, without stimulating the flow of digestive acid. These he supplements with alkaline powders, to neutralize such acids as form anyway, and with sedatives to quell stomach contraction. Lastly, and most important, he adds advice: ample sleep, rest, freedom from strain, avoidance of worry.

Under such a regime unflinchingly followed, most ulcers will heal. But what of the owners? Without red meat, and with the mental pap of sedation and stagnation, what of the super-sonic jet engine, the dashing concerto, the cancer cure, the new atomic bomb refinement the world is waiting for? Human progress must not be arrested by inanition, bodily or cerebral. So sometimes the surgeon is called.

The surgeon may cut the vagus nerves as they pass through the chest to the stomach. Since this produces some gastric paralysis, as well as freeing the stomach of the urge to secrete acid with every passing emotional surge, he makes a new dependent opening into the stomach permitting gravity to do the work of the paralyzed muscles. This operation is relatively new, not yet completely proven, and suitable for certain cases only. He is thus more likely to do a partial gastrectomy. In this he takes out a large part, three quarters or more, of the acid secreting portion of the stomach, being sure to remove every fragment of the lower end which forms the acid-stimulating hormone. If possible he will remove the ulcer as well. But this is not essential. After operation it will heal. This operation once carried a high mortality and, because enough stomach was often not removed, it was sometimes followed by recurrent ulceration. With today's surgical attainments and with a better understanding of the desired objectives, it is a safe and satisfactory procedure. To his convalescent patient the surgeon can offer freedom to work, fuss and worry as he will, without gastric distress. Perhaps the same emotional stimuli will course down the vagi. It is conceivable that they may do to the coronary vessels of the heart what they were wont to do to arteries of the stomach, and produce coronary thrombosis. But that is another problem.

Diet, vagus section or gastric resection—each is a compromise treatment; none is basic. Ideal medicine calls for therapy that really removes the cause of disease. Obviously with our present concept of the aetiology of ulcer, this means attacking the brain, where the ulcer has its origin. Many mental diseases are cured by sectioning nervous pathways in

the forebrain and thus cutting off from the main motor and "thinking" centres the emotional influences which arise in the frontal lobes. Patients so treated undergo marked personality changes. From introverts they become complete extroverts. They are capable of efficient mental work and, in most cases, lose their trouble-making ambition. They are happy to live from day to day, free of worry and all creative urge. No complete study has been made, but a superficial survey suggests that such pre-frontal lobotomy patients never develop peptic ulcers. Would it be immoral, or a scientific heresy to suggest that some similar procedure be offered to ulcer victims as the ideal cure?

Before drawing a conclusion let us look again at the typical ulcer sufferer—a young Nordic, creative, ambitious. Every visible attribute that makes him a potential ulcer subject makes him first, an individualist. He is the modern descendant of those Nordics who, centuries ago, peopled Greece and made democracy. Just as by nature he is an individualist, so too, he is a democrat. Let us not misunderstand. He is not a party man, not a demagogue. If the government be good, and stable, he will probably be against it, in a quiet sort of way. The individualist fathered democracy yet, in normal times, he is a poor democrat. But threaten his way of life, his freedom to think, work, worship, even have ulcers, and he will fight to his last drop of blood, his last minim of gastric juice, for his faith.

Our world is divided between two ideologies. We can be sure that as mass indoctrination proceeds behind the Iron Curtain and the party demands of stolid obedience and approbation amongst the Soviet people become universally accepted, their peptic ulcer rate will sink almost to zero, (if they be adequately fed). Might this not be as logical a means of wiping out the disease as operating on the brain with a scalpel?

No! To preserve our freedoms and our democracy demands the preservation, as well, of our ulcer temperament and, secondarily, of our ulcers. Physicians and surgeons must do as best they can with local therapy and leave the idealism of basic cures for other conditions. They have done rather well, and will do better, through the years. Meanwhile, let the gastric juices flow and sear. Let them gnaw at body and mind as long as there be need of earthly accomplishment. Rather than a man-made penance they may be of the Divine plan, a liquid fire to give initiative and drive, to purge doubt from the eyes of the mind and leave clarity, an elixir of truth.