little hope for valid conception and justifiable inference where the perceptive power is deficient or has been inadequately applied.

It has taken thousands of years to elaborate the methods of clinical examination which are here demonstrated; what strikes one forcibly is the very large proportion of them which have been worked out in the recent past, the direct consequence of the application of the experimental method to clinical science. The results which have been achieved will surely give us increased confidence in man's powers in medicine. As the percepts which can be gained concerning patients grow ever more numerous and complex and our intellectual grasp of physiological function and pathological disturbance becomes continually greater, who will dare to place a limit to the physician's capacity to understand and to master phenomena? I, for one, am unwilling to set one; on the contrary, the history of medicine, especially in the decades just behind us, gives us every reason for assurance that problems of life and mind, of health and disease, of diagnosis and cure, now so dark and so intricate that in many they awaken only despair, will ultimately be solved by scientific physicians. If the past is, as we think it, an index to the future, we need not hesitate to assert with regard to medicine, that, in time, through the further application of the scientific method, *We shall know; we shall be able to predict; we shall gain the power to control.*

Original Articles.

THE MEDICAL TREATMENT OF GASTRIC ULCER AND HYPERCHLORHYDRIA.*

BY FREDERICK C. SHATTUCK, M.D., BOSTON.

WITHIN the last few years I have modified my treatment of gastric ulcer. For some fifteen years before that it was my rule to starve every case in which the diagnosis was clear, for at least fourteen days if possible. In one case of apparent duodenal ulcer in a man of middle age, seen with Dr. C. E. Stedman, rectal feeding was so well borne that stomach rest was carried on for upwards of thirty days. The symptoms never recurred. The principle is, of course, simply that of rest, peristalsis and acid secretion both ceasing, certainly in great measure, in the empty stomach.

I underwent the treatment myself seven years ago, my fast being limited to thirteen days, as rectal feeding produced so much discomfort that I was allowed to give it up. Several years later more or less constant misery from hyperchlorhydria, without bleeding or any other positive sign of ulceration, drove me again to take advice from my brother, Dr. G. B. Shattuck, and Dr. F. Forchheimer of Cincinnati. The experience gained by following their wise counsel has, I know, been of much service to me, and I think I have been able to make it so to others.

Hyperchlorhydria is very common, greater or less in degree, intermittent, or more or less con-

stant; far more, as I believe, an expression of faulty innervation, the result of worry or fatigue, than of mechanical irritation or stimulation of the mucous membrane. Diagnosis does not need the stomach tube.

The temporary relief of symptoms by food alone in the milder cases, the prompt relief even in severe cases which follow sodic bicarbonate in sufficiently large doses, one or two teaspoonfuls, clinch the diagnosis. Gastric flatulence, more or less general depression, sometimes very great, with sensitiveness to cold, are suggestive symptoms. Pyloric spasm, as characteristic as it is uncomfortable or even painful, — I have known it to start the sweat like angina, — is fortunately not very common. It receives scant or no mention in most of the books, possibly because patients cannot accurately describe it without help. As I have experienced it the sequence of events is as follows:

Usually when comfortable, perhaps asleep, largely irrespective of meal time, an uneasy sensation at the epigastrium suggesting distention of the stomach appears suddenly. This sensation increases in intensity, saliva begins to flow, the face and ears feel flushed, yawning and a feeling approaching nausea are also common. Within one or, at the most, three to five minutes, these symptoms recede again. Wind usually escapes from the stomach upward, and relative, more often absolute, comfort returns. Attacks vary in severity.

Experience with patients leads me to believe that pyloric spasm is more common than mere reading would lead one to expect. I crave your pardon for so far indulging in seeming egotism. It is a safe rule to avoid inflicting one's infirmities on others, — "to suffer and be still." But the physician who suffers from a malady ought to learn something from his personal experience and be willing to sacrifice his privacy for the sake of benefiting others. Hyde Salter, Morrill Wyman, Oertel and Ralph are names which occur to me in this connection.

There are few conditions more gratifying to treat than hyperchlorhydria. An alkali, only palliative in the more severe and persistent cases, is practically curative in those which are more transitory, relieving the distress while the nervous system recovers from its fatigue or otherwise rights itself.

Soda mint tablets, I believe, would be better without the mint, and must be taken by the dozen, save in the mildest degrees. It is therefore better to take plain bicarbonate of soda dissolved in plenty of water.

Magnesia, either in powder form or the so-called milk of magnesia, is excellent if there be constipation. But in the higher degrees of hyperchlorhydria the large quantity of magnesia required as an antacid is apt to act too freely on the bowels.

The diet should largely exclude salt, the source of HCl. Condiments should be absolutely excluded. Milk, pure or in combination, or prepared in various ways, is practically always

* Read before The Massachusetts Medical Society, June 13, 1905.

admissible or even desirable, and I often allow soft boiled, dropped or scrambled eggs unless experience forbids. Meat and even fish are to be temporarily excluded, say for a few weeks, and then permitted only sparingly and tentatively.

Diet and such mode of life as tends to restore a more or less tired nervous system, which is apt to be a causative factor, will generally work a cure without the aid of medicine. In severe cases from one-half to two teaspoonfuls of sub-nitrate of bismuth before meals, seem of distinct benefit, probably acting as a protective coating to the gastric mucous membrane against the food, and thus diminishing the activity and secretion of the peptic glands. In these large doses the drug is not constipating. The microscope shows that the drug has a crystalline formation, which may account for its failure to constipate.

In cases where there is doubt as to whether hyperchlorhydria is complicated by ulcer, the above treatment is applicable, save perhaps that the diet may be made rather more rigid; and this is true also of cases in which ulcer is probable but in which bleeding has never occurred, or at all events has not been recent.

In cases presenting marked and characteristic ulcer pain or coming under treatment just after hemorrhage, it is desirable to give the stomach rest for several days. Morphia is to be given hypodermically in such doses as may be required to allay pain. It may also be given in smaller and repeated doses by mouth absorption either for restlessness or to blunt an appetite which is not then safe to indulge, if circumstances seem to call for it. The drug also quiets peristalsis and diminishes glandular secretion.

After three or four days of exclusive rectal feeding, milk and lime-water, a dram every fifteen minutes, can be given by the stomach with daily increase in the amount, lengthening of the interval, or both. In ten to fourteen days milk toast, junket, rice with cream and sugar, baked potato, macaroni, blanc mange and the like may be added and rectal feeding omitted. I believe in these cases abstinence from meat should be prolonged for at least three months. Food containing starchy things, such as unstrained oat meal, seed fruits and the like, are also to be excluded lest they irritate the raw surface. The principle is simply to select such food as demands the least stomach digestion and to avoid irritation as far as may be. Bismuth is desirable until full and ordinary diet has been resumed, say three to six months. It here serves a double purpose, diminishing secretion and also mechanically protecting the raw surface from both food and such gastric juice as is formed.

The applications of the principles which I have tried to set forth above have given results in every way satisfactory to me, and I think also to my patients who have followed them out. A recent case in point may be briefly sketched here. An athletic young man without antecedent dyspepsia had profuse gastric hemorrhage in November, 1904. About two months later he went to New

York, omitted his bismuth, and ate irregularly and too largely, although he observed qualitative restrictions. After a week or so he began to have severe pain in the pyloric region with tenderness, came home suffering greatly in the cars and went to bed. Pain and localized tenderness were then more or less constant, excited and increased by examination, persisting in spite of the simplest nutriment, requiring from one to three and a half grains of morphia a day for relative relief. He was then put on a forty-eight-hour fast. At the end of this time the pain ceased and convalescence was uninterrupted. He recently came to my office and stated that he should not know that he has a stomach. I believe the persistence in proper diet and bismuth will prevent recurrence, or at least go far to do so. There is, in my opinion, in certain quarters, far too strong a tendency toward operative interference in gastric ulcer. Hyperchlorhydria is a frequent accompaniment of the lesion, if it is not indeed a causative factor. Will operation restore a proper acidity? Will it tend to prevent recurrence? There are other causative factors which are not easy to understand. Why, for instance, does peptic ulcer near the pylorus prefer young women, especially domestics? Why does peptic ulcer prefer the duodenum of men, ten or more years farther advanced in life? Why is peptic ulcer more common in some places than in others, without any notable variation in the customs and mode of life? Why more common in Boston, for instance, than in Baltimore? Whatever the cause or causes of these facts they are not such as the surgeon's knife can remove along with the ulcer or through gastro-enterostomy.

Pyloric stenosis, gastric stasis and dilatation due to the cicatrix of an ulcer are curable only by operation. We know that permanent cure follows purely medical treatment of peptic ulcer in say 50% of the cases. Proof is lacking that surgery can do better. And I personally can see no reason in the nature of things to lead us to believe that it can do better. That an operation can be done with impunity as far as life is concerned does not warrant its performance. Moderate hemorrhage from an ulcer does well under starvation and morphia. So does profuse hemorrhage, oftentimes. It may be a nice question after large or repeated bleeding whether to put salt solution into a vein or under the skin. The slower the circulation the more likely is clotting to occur at the source of bleeding. We have to balance the risk of death from the blood loss which has already taken place against that from the possible starting up of fresh hemorrhage. So delicate may this balance be that error of judgment must sometimes occur. I cannot see much room for surgery in the treatment of ulcer hemorrhage. Mild cases do well without surgery. A severe case would seem to have a better chance without the additional load of an operation. Cases in which pain is so persistent, and hemorrhage so frequent and recurrent in spite of medical treatment, as to justify operation, on the chances as it were, are, as far as my experience

goes, excessively rare. The only case in which I have advised operation for gastric hemorrhage was in a young female domestic. No ulcer was found, the blood coming from the whole mucous membrane. She died.

To sum up, cicatricial contraction at or near the pylorus causing dilatation, and perforation, are the only features of peptic ulcer which seem to me to clearly demand surgical treatment in the present state of knowledge. I therefore prefer that further knowledge on this point be gained on the patients of others rather than on my own.¹

DISCUSSION.

DR. E. G. CUTLER, of Boston: I agree perfectly with what Dr. Shattuck has said, except in a few minor particulars as to the question of diet and alimentation; and as applying to what he said, I will read a few words which I have put together on the subject.

In the first place, one of the essentials of the treatment is rest in bed, and the time ought to be from three to four weeks. The patient may be on the lounge the fourth week, the time that he is there being gradually increased daily, if borne well. The patient may walk about the fourth week, but should rest on the lounge after each chief meal, for a period of one or two weeks longer, when he may go about as usual, but he must not bend forward at work nor exert pressure on the epigastrium for months.

As to diet, I agree with Dr. Shattuck very nearly. I should say, however, that the first week the diet should be largely milk, beginning with small doses every hour, with water as a beverage, up to two or three pints, the amount of milk and times of taking it being gradually increased until six ounces are taken every two hours. The second week, if nausea and pain or discomfort are gone, some of the cereal preparations, well-cooked wheat, or strained barley or oatmeal, or somatose may be added to the milk. The third week the white of egg, and finally the whole egg may be added to the milk and cereal. The fourth week boiled chicken, broiled sweetbread, baked potato, and bread and milk are added. After this the ordinary diet can be taken, except that no raw fruits, pastry, salads, or coarse vegetables, and I should add beef, should be taken for months, or perhaps for several years. I believe that broths and soups had better be omitted until the patient is well, as they tend to increase the HCl production. It is my opinion that the majority of patients do better by giving exclusive rectal alimentation the first one or two days. A few years ago I advised giving this alimentation for a longer period. It seems to me, however, that you do all you want in two days, or at the most three days, and when six ounces of milk are being taken at a time, the enemata may be omitted. The enema consists of raw milk, six ounces, one or two raw eggs and half a dram

of salt. The enema to be given once in six hours, and one cleansing enema a day to be used.

Bismuth, in some cases where the pain is persistent, or tenderness present, is advisable, given as indicated by Dr. Shattuck. Another thing which I find of service is olive oil (advised by Conheim), one-half ounce daily, in the morning, and one to two teaspoonfuls in the middle of the day and the evening, it being very effective in acidity and pain. Time and again I have given that, with no other treatment except care in diet, in patients with gastric ulcer, and time after time the symptoms have disappeared without further trouble. I also frequently use twenty grains of Carlsbad Sprudel Salts in a little water before each meal. It seems to me to diminish the acidity.

The milk diet should be kept up as long as the Boas examination of the feces reveals occult hemorrhage (guaiac and aloin tests). I have also obtained good results from iron in some form, beginning at about the end of the third week of routine treatment.

For hemorrhage, it has seemed to me that I got more good following out the treatment of Einhorn, who recommends using a syringeful of adrenalin chloride, 1-2000, twice daily, or giving 15 drops of the same solution by mouth, three times daily. I have used this only two or three times, but it seems to be of distinct value. In cases of great weakness infusions of normal salt may be used. Profuse hemorrhage recurring at short intervals, or frequent small hemorrhages, I believe demand surgical interference. I also believe that persistent pain after taking food, and tenderness of the epigastrium, which does not yield, to the treatment of rest and diet in three weeks' time, should be turned over to the surgeon.

In looking over my figures, I find that I have had sixty-five cases of gastric ulcer where the diagnosis seemed to be very certain, and where good records were kept, and of that number sixty-one were of the class that perform arduous labor, and four were not; three were doctors who were in the very best of circumstances, and one was a lady patient who was equally well placed. So far as the nationality was concerned, eighteen were Irish, one German, ten Canadian, twenty-nine born in America, nineteen of whom were of foreign parentage, three English, two Swedish, two from Scotland, and one not given.

As far as results were concerned, five died; there were twenty-seven who were apparently what you would call well when leaving the hospital; four were improved; two much improved; and two not improved at all. I tried to keep trace of these people by postal cards, etc., but as they belonged to a class that is more or less floating and unstable, this was very unsatisfactory. Some weeks ago I wrote letters to every person on this list, known to be living, and got only six answers. Thirty-five letters were written, the dead-letter office brought back ten of them, six answered, and the others, presumably, did not take the trouble to answer, or else they got lost in some way. One replied by postal

¹ For an excellent analytical study of the Surgery of Gastric Ulcer, see Sears, BOSTON MEDICAL AND SURGICAL JOURNAL, March 30, 1905.

card, as follows: "I remained well for two and two-thirds years, then I had one slight attack last December (1904)." Another answered: "I remained well up to March, 1905." (That was when I last heard from that patient, and covered a period of five years.) There was one case of hour-glass stomach, which was operated upon, and the patient remained well up to nineteen months after the operation, and the understanding was that we should be informed if anything happened, and as nothing has been heard since then, the patient is probably well. One case where gastrotomy was performed has remained perfectly well for two years. Another case which was operated upon, I saw about a year ago. This was one of the cases which left the hospital as "unimproved." He said he had more or less bad symptoms for seven months, when he was operated upon at the Carney Hospital by Dr. Munro, on Jan. 7, and on March 13 he was very much improved.

The trouble with all statistics, as far as gastric ulcer is concerned, is this, — that the cases occur amongst a class of people who are rather floating in their residence, and relatively irresponsible, and we cannot carry out what we would like. They do not obey directions very well, unless under observation in the hospital, and are therefore unsatisfactory to treat outside.

DR. M. P. SMITHWICK, of Boston: In regard to this paper, I looked forward to it with great pleasure and listened to it with great interest, and as far as local medicinal treatment goes, would give just about what Dr. Shattuck believes in giving. But my belief is that the following statements in regard to hyperchlorhydria, or in regard to hyperacidity, in which hydrochloric acid is increased although associated with other acids, are facts:

First: It is fundamentally a neurosis; it may not be a single neurosis, but a combination of neuroses. Hyperesthesia is always present and clinically is often mistaken for hyperacidity. I see no reason why a hyperchlorhydric stomach, for instance, with a diminished motility, and perhaps altered blood supply, where for hours fermentation goes on and which is filled with bacteria, should have a normal lining. Different grades of gastric catarrh are often present in hyperchlorhydric cases, but improvement in the former is followed by increase of the latter. Increase or decrease of glandular elements reported may result from nervous influences, as has been suggested, for ulcer, the latter being possibly due to a so-called ganioneurosis or trophoneurosis.

Second: Clinically, hyperacidity is often with difficulty distinguished from gastric ulcer, and should suggest its possible presence. In thirteen cases that I have examined while ulceration was active, acidity was increased in two, high in one and always less than average in ten. Successive examinations showed marked variation in acidity, all specimens being obtained one hour after the Ewald test meal. One of my cases, a trained nurse, with an ulcer in the pyloric ring, demonstrated at operation, vomited after one or more

meals daily for ten years, never experienced pain until a few months before operation, and never noticed blood in vomitus. Another case, with a large chronic ulcer near the pylorus, demonstrated at operation, had never vomited or experienced pain, except heart-burn. Stasis had been demonstrated by another physician two years before operation, and, judging from the history, had caused symptoms four or five years. The diagnosis was made a year before operation. The pain and tenderness in hyperacidity are usually less localized than in ulcer, and usually the first is eased by food, but the most careful study clinically and the most careful search for blood in gastric contents and feces may leave us in doubt. Every one of large experience has had such doubt suddenly cleared up by hemorrhage or perforation. The lesson is to treat doubtful cases as ulcer. Cases of so-called latent ulcer may be rare, but atypical ones are common.

Third: Clinically, hyperacidity usually precedes ulcer, and, indeed, usually succeeds it also.

Fourth: If we were to examine normal people we would find that there is a decided variation in the acidity from time to time, and if we examine neurasthenics or neurotics, we find still greater variations.

The suggestion I would make for the treatment of these cases is treatment of the underlying neurasthenic or neurotic condition. What is needed is to stop getting exacerbations of acidity, and if we can do this the symptoms usually decrease, and the patient can be changed over from a case of gastric neurosis to an ordinary neurasthenic or neurotic. Then he can live in comparative comfort, and in years he may become a comparatively normal individual.

In regard to the treatment of gastric ulcer, I hesitate to say anything, after those of so much greater experience; but I will say that my experience leads me to advocate at least ten days' rectal alimentation, and when food is given by mouth, to prefer milk pancreatized until decidedly bitter. Liquids should be continued several weeks and resumed as soon as gastric distress returns. Absolute rest three weeks.

In the diagnosis and treatment of gastric ulcer the stomach tube should be used only when necessary. Perforated gastric ulcers or those causing a degree of stenosis of the stomach incompatible with nutrition, belong to the surgeon. Excision of the ulcer is a rational procedure, and is the only one that can ever permanently displace medical treatment. The time may come when medical treatment of chronic ulcer will be persisted in only after exploration has shown excision to be impracticable. Mutilating operations, as pylorotomy and gastro-enterotomy, can never be operations of choice.

I would like to say one thing before I leave the subject, and that is, in the study of a digestive neurosis we should search for the cause. If it can be removed we may hope for a cure. Treatment of the local conditions is often necessary, but is only palliative. And here I want to speak of the cases of two young neurotic girls with

strong maternal instincts. After marriage the first trouble was double gonorrheal tubes, the next was removal of these tubes, and the next was severe hyperchlorhydria which has resisted all treatment, and which will probably continue to resist treatment for some time to come. Scleratus will not cure such cases as these until there has been sufficient time elapse for them to regain nervous equilibrium and to see a baby without envy, and sufficient time for them to learn that other women have their troubles.

In the majority of cases you will find that there are nervous causes; and, fortunately, they can be removed occasionally. More frequently the sufferer can only be helped to a less depressing outlook.

My last and most earnest word will be in regard to prophylaxis. When the parent brings us a child exhibiting neurotic tendencies we should do more than prescribe symptomatic treatment, — we should strive to convince the parent that proper environment and education are the best antidotes for bad inherited tendencies. If the physician does his duty, the formative years in such cases will be dominated less frequently by family tradition, paternal ambition, and chance.

Medical Progress.

REPORT OF PROGRESS IN ORTHOPEDIC SURGERY.

BY A. H. BRADFORD, M.D., BOSTON.

ARTHROPLASTY, CLINICAL AND EXPERIMENTAL.

ONE of the most brilliant contributions to orthopedic surgery comes from the hands of Dr. Murphy,¹ of Chicago, who reported a successful case of operation for ankylosis of the hip joint treated by arthroplasty, or the interposition of a flap of fascia lata between the head and acetabulum which had become ankylosed after injury. A year after the operation there was complete function of the joint and normal motion. The method has been applied also at the knee joint by Dr. Murphy with success. Previous attempts of this method at the knee joint have met with but little success. These failures, in the opinion of Dr. Murphy, have been due to insufficient or defective excision of the synovial membrane, capsule and ligament; insufficient interposition of fat and aponeurosis, or of fat and muscle, between the separated bony surfaces; infection, and sensitiveness to pain on motion after operation.

Dr. Murphy believes that where osseous union has existed it is important to disconnect the bones in as nearly their normal line of union as possible. This is best done by a narrow chisel. In the shoulder and hip a chisel can be used to separate the bones so as to outline the line of fracture in such a way as to secure the normal formation of head and cavity as far as possible.

¹ Transactions of the American Surgical Association, vol. xxii, 1904; Journ. Am. Med. Assn., May 20, 1905.

All bony prominences should be removed, like the coronoid process or the olecranon process. The soft parts should be liberated thoroughly. The muscular aponeurosis with fat, Dr. Murphy thinks, makes the best interposed tissue. If aponeurosis cannot be found, muscle and some fatty tissue should be substituted.

The development of a hydroma from pressure of fatty tissue should be the uniform result. If there is muscular contraction it should be overcome by Buck's extension.

In the operation upon the hip a U-shaped incision was made five inches wide, with its base upwards, beginning four inches above the trochanter and extending downward two inches. The trochanter was exactly in the center of the U. The incision was made through the skin, superficial fat and fascia lata, and these tissues were dissected upward as one flap.

A long, curved needle threaded with heavy silk was passed around the base of the trochanter, beneath the muscles attached to it, and by means of this carrier a chain-saw was brought into position. The trochanter was sawed off and retracted upwards. The capsule of the joint was next incised and separated from the ilium all the way round. The attachment of the gluteus maximus was not disturbed.

The bony tissue filling the acetabulum was chiseled free from the latter by following round its margin with a carpenter's curved chisel an inch and one half in diameter. The chisel each time was driven in obliquely towards the fossa acetabula, the object of this being to make the new femoral head as nearly spherical as possible. When the chiseling process was completed the new head was entirely separated from the sides of the acetabulum, and was attached only at the bottom by a narrow bridge of bone. This bridge was fractured by forcible abduction of the limb, after which the head was dislocated from the cavity by external rotation of the thigh.

The shape and contour were almost exactly those of a normal femoral head. The bony projections were removed by a bone-cutting forceps. The fascia lata which formed a part of the original U-shaped flap was now dissected away from the subcutaneous fat tissue down to its base, while the vessels entered to supply it with blood. The flap of fascia was then drawn down under the head of the femur, and carefully fitted into the acetabular cavity to form a complete lining. The under surface of the flap one half an inch from the edge was sutured to the joint capsule with interrupted catgut suture.

The head of the femur was returned to its normal position. The free border of the flap was now sutured with interrupted catgut suture, and the capsule attached to the neck of the femur.

The flap was large enough to cover the head completely, and to come on to the neck without tension. The great trochanter was brought down to its normal position, and accurately secured. The skin flap was replaced. The limb was placed in a plaster cast after stretching.