The surgeon:

On February 24th, 1898, Charles Brooks Brigham, M.D. performed the first successful total gastrectomy in either of the two american continents, at St. Luke's Hospital in San Francisco. This was the second operation of its kind in the world. George Schlatter had recorded the first in Zurich in October 1897.

Charles Brooks Brigham was born in Boston of a well to do family. He entered the Lawrence Scientific School at Harvard on October 5, 1866 and became a medical student in November, after passing his matriculation there. He was fortunate in having as his teachers some of the great stars of the medical universe of that time — Brown-Sequard, George Shattuck, Henry Bigelow, Oliver Wendell Holmes. A brillant student he was appointed Second House Surgeon at the Boston City Hospital after graduation. A letter from a George Dooley at this time may well illustrate Brigham's hot temper and possible lack of humour which continued throughout most of his life. In it he promises to investigate Brigham's charges "concerning trouble at the hospital, the changing of locks, the existence of police agents and espionage against the medical establishment". Soon thereafter he went to Paris since he spoke and wrote French fluently to spend some time at the Hotel-Dieu on the service of Dr. Maisonneuve, of whom he became a great admirer. Next he enlisted in the Ambulance Internationale de l'Ecole Forestiére, stationed at Nancy, at the outbreak of the Franco-Prussian War, where he was appointed Surgeon-in Chief.

He summarised his memoirs in a book intitled "Quelques cas de Chirurgie avec des réflexions" (1). The german and the french governments awarded him their highest decoration for his services in this respect. He came to San Francisco and was appointed Professor of Orthopedic and Military Surgery at the University of California Medical School in 1874, at which time he also started his private practice. His interests were not restricted to orthopedics as his book of this period 1876 "On Interesting Cases" illustrates (1). He was Chief Surgeon at the French Hospital as well as working at the old Southern Pacific and St. Luke's Hospitals.

He married and had two daughters. His principal hobby was orchid growing and he took trouble to obtain many varieties from all over his country, as well as from France. It is possible he may also have been a taxidermist since, whilst a student at Harvard, he received a present of a collection of African bird skins from a Charles Livingstone, Esq. He died in 1903.

The patient:
Mrs. Lora Maginni was a widow 66 years old. By coincidence both she and the first patient to survive total gastrectomy (Dr. Schlatter’s patient) were Swiss. The complaint which brought her to consult with Dr. Brigham had existed for about a year, but her weight had remained steady. There was no history of bleeding or pain. She had enjoyed robust health up to that time. Examination revealed the presence of a palpable gastric mass.

Operation:

Using ether and chloroform as anaesthesia and with all Listerian precautions, (Fig. 4) the tumour was first explored through a 7.5 cm incision in the mid line and finding that it was confined to the stomach that incision was extended to double its length. Resection was carried out by serial ligation and excision of the gastro-hepatic and greater omenta. Anastomosis could not be formed very easily between the duodenum and the oesophagus so accordingly, Brigham employed the Murphy button technique. The wound was closed without drainage and blood loss was thought to be only six ounces. The excited specimen was 15 cm long on the lesser curvature and 26 cm on the greater — pyloric stenosis due to cancer being present (2). Microscopy done at the time confirmed this and also in 1939 when reviewed by Professor Rheinhart, — the tumour was adenocarcinoma. Her postoperative course was quite remarkable. Within twenty four hours she had passed 20 ozs of urine and within thirty six hours she had passed flatus. Her menu at that time made ours look very humdrum. On one occasion she was able to take a meal of 12 oysters at noon, and on another occasion just before discharge she was able to add to that by having a squab or half a chicken for dinner in addition. Claret was used generously at that time entering the intestinal canal at either end, nor was whiskey neglected. On the ninth post-operative day an attempt was made to dislodge the Murphy button by giving her a drink of olive oil, but, she vomited it, stating that it was not Italian oil. Incidentally, the Murphy button was never passed. A wound abscess had to be drained before her discharge, seven weeks after the operation. Brigham’s final comment in his first communication was that the earthquake at midnight on March 3rd, 1898, did excite her somewhat.

Dr. R. Langley Porter, one of the Surgeons at the original operations later Chancellor of the University of California, interviewed Mrs. Maginni’s daughter in 1939 (4). She had been active until the age of 70, when she took to her bed, where she spent her last remaining days — 10 years to be exact. No sign of recurrence of the tumour was noted at the time of her death. X-ray in 1901 showed a functioning anastomosis with rapid transit time indicative of dumping, but no sign of the Murphy button (Fig. 8).

Brigham’s final remarks illustrate the wisdom and experience of an observant surgeon. He emphasized the state of mind of his patient — she was postmenopausal (a favourable attribute), she enjoyed an even condition of health for many years and was not worried about herself. In fact she never asked about the details of the operation. All she demanded was to be restored to health, as she was, for 14 years — nine years longer than her surgeon. His comment that « many old people can stand (an operation) is truer than is generally supposed » illustrates how sound a clinician he was. Finally he acknowledge his debt to Schlatter, probably through the account of that operation published in the New York Medical Record, December 25th, 1897 (6), but there is no evidence that they ever communicated directly (3). Schlatter in his second article in the Lancet 1898, stated that he had read of Brigham’s achievement (5, 7).

Among several offers of publication, Brigham accepted the one given by...
George Shattuck, editor of the Boston Medical and Surgical Journal and his former professor of medicine. There were several claimants in the correspondance column of that journal, mostly from New York, who stated that they had already performed total gastrectomies but Brigham did not accept any of these. He did recognize, however, a claim of Dr. Childs McDonald, formerly of Edinburgh who recorded a case done in San Francisco in 1898 (8). The newspaper reports of that case stated that « the surgeons considered it a wast of time to regulate the patient's (a Patriti diet) after he had passed beyond their care, so that Patriti now eats and drinks what his own will dictates and for months he has waxed fat on the productions of the San Franciscan Italian Colony »(9). It is amazing there is no reference in the St. Luke's Hospital Annual Reports to this operation. The 1900 report mentions two cases of pyloric carcinoma operated upon in the previous two years, one female and one survivor (10). Furthermore, Brigham never informed the Monteagle family (11) who were essentially St. Luke's Hospital, of his performance and of its importance.

Discussion:

What Schlatter's and Brigham's operations illustrate is more than technical prowess. Like Christiaan Barnard, good fortune, in several respects, obliged them. In the first case, Carl Schlatter was able to get the opportunity to operate, since his chef de clinique, professor Kroenlein was on vacation. Brigham was even more lucky in that his patient had a biologically indolent type of adenocarcinoma. Merrem in 1811 (12) showed that partial gastrectomy (pylorectomy with gastro-duodenostomy) was possible in dogs, without adverse effect on their digestion or health. Another seventy years were to elapse, however, before the first two successful human cases were carried out by Billroth and Woelfler. F.A. Southam at the Manchester Royal Infirmary in 1882 and Sydney Jones in St. Thomas Hospital, London, were amongst the first English surgeons to perform this operation (13). By that time 12 operations had been done in France and Germany, 11 for carcinoma and 1 for a perforated ulcer (14). The principal credit for successful anastomosis technique belongs to Czerny, Billroth's pupil. Once the operation began to become feasible other lesser procedures such as Loreta's digital dilatation of the pylorus fell out of fashion but it had to wait until the time of Moynihan (1903 et seq.) (15) before the operation of partial gastrectomy was put on a really scientific basis. An interesting reason why continental surgeons were more emboldened to advance abdominal surgery was their tremendous speed, probably obtained as a result of their experimental training, a possibility not available in Britain. Woelfler (1894) performed the first gastro-gastrostomy for leather-bottle stomach in 15 minutes.

Conor of Cincinnati in 1883 (16) performed the first recorded total gastrectomy but the patient died on the table. Between 1897 and 1899, there were four successful operations (16, 17). Schlatter's patient survived for fourteen months. Brigham's (survived) for 14 years. The official medical reaction to these achievements was guarded. The Lancet declared « the cases where this operation is permissible are very few in number » (18). The writer also speculated on the development of gastric metaplasia at the site of anastomosis. In 1903, Moynihan reviewed all published cases — 16, plus 3 unpublished ones of Mickulicz. There were only 6 deaths — a record to stand for many years. He added his own first attempt but he lost the patient. On the following year he too had a successful case. He concluded « complete extirpation of the stomach is therefore not merely a piece of brilliant surgical gymnastics. The operation has its place in surgery ». Prefacing Schlatter's article, Vent (19) remarks « How long can she (Schlatter's patient) survive the non-existence of
gastric digestion? Who can tell? Clinical observation sometimes disturbs our most cherished school-taught physiological dogmas.

Ogata of Leipzig was the first show by duodenal feeding that a dog was able to maintain it weight without the action of any gastric juice. He concluded the digestive functions of the stomach were shared by other areas of the gut (14). Pachon and Carvallo, 1893 (14), found that gastrectomised cats were able to vomit — the first time that the presence of the stomach was shown to be un-necessary for this to occur. The Lancet editorialized in 1898 that « the result of this operation has been to lower the importance of the stomach as a digestive organ, to define it as a food reservoir (Childs McDonald’s human “larder”) and as a regulator of temperature and to take it from the category of vital organs »(20). The relative importance of the stomach in digestion had been a cause of battle amongst investigators throughout the previous century.

It was after the discovery of Saliva, pancreatic juice, Peyer’s patches and Brunner’s glands that the primary role of gastric digestion was first challenged. But the work of Reaumur and Borelli eventually restored gastric digestion to a prime place by the end of the 18th century.

Survival of Brigham’s and Schlatter’s patients without a stomach threw great doubt on the primacy of these functions. The other question raised at the time was « Does hydrochloric acid influence the decomposition of intestinal contents? » Measurement of the output of indoxyl and skatoxyl in the agastric subject by Schlatter showed the output to be unaltered. He also showed that positive nitrogen balance could be maintained and that the stomach was unnecessary for absorption of nitrogen break-down products, nor had total gastrectomy any effect on transit time using Huckleberries as a marker. Despite this, Schlatter (21) was cautious in his final assessment: « It is true modern physiological research no longer vouchsafes to the stomach its old role as chief organ of the digestive apparatus, nevertheless its importance in chemical as well as in physical aspects should not be underestimated. It is still a question whether the human organism can long survive the total elimination of all gastric activity. » A very prescient judgement: the intrinsic factor and the other gastric hormones were not to be demonstrated until more than 29 years were to elapse. Although the stimulus to innovate had its origin in Europe, Brigham’s and Childs McDonald operations, performed in San Francisco, were harbingers of what was yet to come. The giants of the profession were to be surgeons and physiologists and the next century was to be theirs — and principally in the Americas.

REFERENCES

5. SCHLATTER C. — Lancet, 1898 ; 1 : 141.
11. Personal communication Mrs. Monteagle.
15. MOYNIHAN B. A. — B.M.J., 1903: 14588