ON THE ADVANTAGES OF A TRACE OF ALBUMIN AND A FEW TUBE CASTS IN THE URINE OF CERTAIN MEN ABOVE FIFTY YEARS OF AGE.

BY

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Year by year I see an increasing number of cases which justify the somewhat paradoxical heading of this brief paper. I do not wish to minimize the importance of the information to be obtained by an examination of the urine, but we must ever bear in mind the adage—true to-day as well as in the times of the old "Pisse-Prophets;" urina est meretrix, vel mendax—the urine is a harlot or a liar.

What I wish to emphasize is the importance of basing a judgment less on the urine than on the general condition of the patient. The cases to which I refer are well known to every examiner for life insurance. The successful business or professional man, who lives intensely and strives hard to get wealth or reputation, or both, and who takes plenty of good food three times a day, with two or three
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glasses of spirits, and smokes six or ten cigars, works in blissful ignorance that his bodily mechanism is constructed on much the same principles as a steam engine. In the one, as in the other, fuel, combustion, transformation of energy, and the accumulation of waste materials tell the story of the day’s work. The engineer as a rule understands his machine better, and accommodates the amount of coal burnt to the size of the engine and to the amount of work required. He does not “stoke” No. 15, a small yard engine employed to shunt empty cars, as he would No. 580, the superb machine drawing a limited express. Another important difference is the automatic action of the human engine in getting rid of its ashes and clinkers. The waste-pipes bear the strain of the extra work when the amount of fuel consumed and energy liberated is out of all proportion to the work demanded. No. 15 “stoked” as if it were No. 580, drawing the lightning limited, would go to pieces very rapidly. So it is with our business friend, Mr. Silas Lapham. Careless stoking with high pressure for twenty-five years and bad treatment of his machine mean early degenerations, and his waste-pipes—kidneys—are often the first to show signs of ill usage. Such a man receives a very rude shock when in a polite note the head office of the New York Mutual or Equitable Company declines the extra fifty thousand dollars which he had wished to place upon his life, as the medical examiner reports “a slight trace of albumin and a few tube casts” in the urine. After a period of great distress and worry Mr. Lapham begins to take heart, and on the advice of his family physician remodels his mode
of life. He restricts his appetite, takes a light lunch and a moderate dinner, gives up whiskey and champagne, resigns from six or eight boards, and at fifty starts to live a rational life. Prospectively nothing could have been more advantageous than the discovery in the urine of a trace of albumin and a few tube casts.

Let me give a few illustrations. Throughout the winter of 1880-'81 I repeatedly examined for Dr. R. P. Howard the urine of a very distinguished man in public life in Canada, in whose urine albumin and tube casts had been accidentally discovered, on the occasion of his applying for additional life insurance. At this date the patient was a man of nearly sixty, who had lived a very active life, and who had been very careless in his habits of eating and drinking. I remember well the great anxiety of the patient himself and the distress that was felt at the possibility that the career of so useful a man would be cut short. In the summer of 1881 I went to England on the same steamer with him, and in London I discussed his condition with Sir Andrew Clarke, who took a very sombre view of the case. After a year or more of rest, the patient gradually got over his fright and began to resume work, of which he has in the past twenty years done perhaps quite as much as he did in the previous twenty years. He is still alive—an octogenarian of exceptional vigor.

Many of the most notable cases are those in which the patients have been rejected for life insurance. In the cathedral at Antwerp this summer I was touched on the shoulder and a voice in my ear whispered, "Not dead yet!" On turning I saw a gentle-
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man who came to me on the 30th of January, 1891, at the age of fifty-three, in a condition of great trepidation, having been rejected a few days before for Bright’s disease. He had been a hard worker and a high liver, and had a marked gouty history. In the ten years I have seen him once or twice professionally, and he has tried on several occasions to get additional insurance, but the urine, he tells me, though sometimes free from albumin, has, on centrifugalizing, a few tube casts. He is to-day a vigorous man of sixty-three.

Another interesting patient belonging to the same group of “the rejected of the life insurance companies,” was a prominent politician, aged sixty, whom I saw on April 23, 1893, also much distressed in mind after the discovery of albumin and tube casts in the urine. He had been a very hard worker and a pretty steady drinker to his forty-fifth year, but since that date he has been very temperate. The patient had regarded himself as a very healthy man, and was much shocked to find his application for additional insurance refused. I have seen him at intervals, and while he has retired from active work, he is to-day a very healthy man of sixty-eight.

What I wish to call special attention to is the fact that in men in the fifth and sixth decades albuminuria is by no means infrequent and not always serious. It is probably the expression of presenile changes in the kidneys, the result of arterial degeneration, and is often a renal inadequacy, to use Clarke’s term, not of vital importance. Neither the presence of albumin nor the number and variety of the casts
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have the same value in estimating the character of the disease and the prognosis as other factors.

The points on which one should lay special stress as indicative of serious disease are:

1. Persistent low specific gravity of the urine, 1.008 to 1.012.

2. The state of the heart and arteries. Marked sclerosis of the peripheral arteries, with the apex beat of the heart an inch or two outside the nipple line, and a ringing, highly accentuated aortic second sound.

3. The presence of albuminuric retinitis.

It is not always easy to reach a decision, as there are cases in which the detection of a trace of albumin and a few tube casts first calls attention to the existence of serious organic disease. Two conditions have to be carefully differentiated. First, a primary arteriosclerosis, manifest sometimes as early as the fourth decade, and quite common in this country in men who live at very high tension, and who eat and drink a great deal. It is surprising how often this state is overlooked by the general practitioner. The renal changes are secondary, and are expressed by a transitory albuminuria, a not very low specific gravity of the urine, which is not in very large amount. The kidneys post mortem are often of full size, red and beefy in color, with a patchy, cortical sclerosis.

Secondly, the granular, contracted kidneys. Here the ætiological factors are all-important. The cases, which are less common than the arteriosclerotic variety, are met with in young persons consecutive to scarlet fever and other infectious disorders, in
middle-aged individuals who have had gout, in workers in lead; while in others, in whom no definite factors can be determined, it would seem as if the kidneys had become prematurely aged and hard and fibroid. The cardiovascular changes are very much the same as in the arteriosclerotic group, uraemic symptoms are much more frequent, persistent headache is a notable feature, and retinal changes are very much more common.

Very few of us are made as was the Deacon's masterpiece, the wonderful One Hoss Shay, and lurking somewhere there is a weakest spot, very often in our modern mode of life the kidneys, which, to use the language of the Autocrat's fine poem, may begin to show "a general flavor of mild decay" in the fourth or fifth decade. In very many cases the albumin and the few hyaline casts are simply the expression of this "mild decay" in the kidneys, and not of a condition serious enough to be called Bright's disease. A very important factor, I am sure, is the excessive amount of food eaten. I am much impressed by Aphorism 13 of George Cheyne's Essay on Regimen, so well known to our grandfathers; it is worth quoting, as containing the one important element, I think, in the treatment of the condition of which I am speaking: "Every wise man, after fifty, ought to begin to lessen at least the quantity of his aliment; and if he would continue free of great and dangerous distempers, and preserve his senses and faculties clear to the last, he ought every seven years to go on abating gradually and sensibly, and at last descend out of life as he ascended into it, even into the child's diet."
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In conclusion, let me not be misunderstood. A trace of albumin and a few tube casts are danger signals, the red lights which may mean an open draw-bridge or a wrecked road ahead; but they may be simply warnings to the engineer to “go slow,” that the pace is too rapid for the state of the track, and it is to the latter significance of the “red lights” that I wish to call attention.
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CONGENITAL ABSENCE OF THE ABDOMINAL MUSCLES, WITH DISTENDED AND HYPERTROPHIED URINARY BLADDER.

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In the summer of 1897 a case of remarkable distension of the abdomen was admitted to the wards, with greatly distended bladder, and on my return in September, Dr. Futcher, knowing that I would be interested in it, sent for the child. The accompanying figures, I and II, from photographs, show a very remarkable and unusual pattern of "abdominal tumidity," differing in an interesting way from the picture of the dilated colon in children, and resembling rather that of the ascitic abdomen.

The examination showed that the child had practically no abdominal muscles.

On looking up the literature I can find reports of only two similar cases. In the Clinical Society's Transactions (Vol. 28, 1895), R. W. Parker describes the condition of a newly born infant, weighing five and a half pounds, with a very large, flaccid abdomen, through which the outlines of the intestinal coils could be clearly seen, and the outlines of the abdominal organs easily felt. The abdominal wall was as thin as parchment. Along the middle line, where the rectus muscles should be found, there was little more resistance than over the lateral regions. The oblique and transversalis muscles were apparently quite undeveloped. The umbilicus was not depressed, it was in normal position, but resembled a surface scar. The child died not long after birth. There was no trace of any muscle representing the transversalis abdominis. There was a thin layer of muscular fibres passing
from the cartilages of the ribs to the level of the eighth costal cartilage, where there was the first linea transversa. The body of the muscle was well marked on the right, but on the

left it was but faintly seen. Further down there was the merest trace of muscular fibres, representing the rectus on either side. The most remarkable associated condition in this case
was the enormous hypertrophy of the bladder, which was [331] situated wholly within the abdominal cavity. There was no obstruction anywhere in the urethra or prepuce. The open-

FIG. 2.

ings of the ureters into the bladder were quite free. The [331] ureters and pelves of the kidneys were greatly dilated and hypertrophied.
In 1896, Dr. Leonard Guthrie reported to the Pathological Society of London (Transactions, Vol. 47), the history of a male infant, aged nine weeks, pigeon-breasted, very bony and emaciated, with a greatly distended abdomen. Extending between the pubes and the white, linear cicatrix corresponding to the umbilical scar there was a smooth, elastic tumor, corresponding to a distended gall-bladder. The abdominal walls were excessively thin and loose, and seemed to show the coils of the distended intestines on either side, but post-mortem these coils which looked like the intestines proved to be the enormously dilated and convoluted ureters. The liver, spleen and kidneys could be easily palpated. The child wasted rapidly and died when about ten weeks old. Of the recti only the two upper segments as far as the second linea transversa showed muscular fibres. Below this level no trace of muscle could be discerned. The costal origins of the obliqui and transversales showed muscular structures for about two fingers’ breadth below the ribs. The muscles of the back, of the thorax and of the extremities were well developed. Here again the most remarkable features related to the urinary organs. The bladder reached as high as the scar of the navel, and the walls were a quarter of an inch in thickness. The ureters were dilated to the size of the small intestines of an adult, and were remarkably tortuous. After death they exactly resembled, and at first were taken to be, portions of distended small intestine, as they were thought to be when seen through the weakened abdominal walls during life. The orifices of the ureters into the bladder admitted a blow-pipe. There was no obstruction in the ureters; there was no stricture of the urethra, and no phimosis. The kidneys were not enlarged, but the pelves were dilated. The position of the testes was not stated.

An important point in Dr. Guthrie’s case was that there was no trace of a urachus, and the bladder was closely adherent to the inner surface of the umbilical scar, so much so that it could not be removed without the scar and the adjoining portions of the abdominal skin.

The history of my case is as follows:
Claudius K., aged 6, admitted July 13, 1897, complaining
of stomach trouble, and difficulty in passing the urine. The chest has been deformed, the mother says, since birth.

The family history is good. One other child; well and strong; parents are healthy.

*Personal History.*—The child was well until the second summer, when he had severe stomach trouble. There have been recurrences of these attacks each year. From the account some of them have been gastric attacks, with nausea and vomiting, but others, and apparently the chief troubles, have been with the urine. The spells last four or five weeks, and they have been getting more frequent. In the intervals he is pretty well and strong, and has a large appetite.

His present attack began about a week ago, and he complained of pains in the abdomen and much burning sensation in passing water. He has become very weak; has not had any vomiting. He has had some headache.

The patient was a poorly nourished child, looking anaemic. He complained of much pain, chiefly in the hypogastric and lower umbilical regions. On inspection the condition to be described was noted by Dr. Futcher, but in particular there was a remarkable fulness in the hypogastric and lower umbilical regions, which were occupied by an ovoid mass corresponding to a dilated bladder. The urine which was obtained by catheter was free from albumin, contained a good many leucocytes. The child had a temperature ranging from 99° to 102°. He passed the urine very frequently, an average of from 60 to 70 cc. In the twenty-four hours ending 5.30 on July 13th he passed urine 20 times, a total amount of 1090 cc.; on the 14th he passed urine 18 times, a total amount of 835 cc.; on the 15th he passed urine 15 times, a total of 1060 cc.

The condition was so unusual that on my return in September the case was sent for, and on the 8th I dictated the following note:

In the erect posture the attitude is very remarkable. It is not quite symmetrical, being fuller on the right side than on the left. The navel looks stretched and distended. It is linear, forming a furrow about an inch in length, and below it are furrows in the skin—crow’s feet. Above there is seen
distinctly on either side the attachment of the recti to the sternum and costal margin. The skin over the abdomen is thin; the veins are a little prominent. When he bends back slight movements of the abdominal muscles beneath the skin are seen.

Recumbent.—Belly flattens out in front, extends at the flanks. Coils of intestines can be seen in peristalsis. Extreme relaxation of abdominal walls; no resistance; fingers can be passed everywhere to the spine. Three fingers can be passed under costal margin over liver nearly 6 cm. The edge of the liver can be felt in its whole extent, and the fingers can be thrust almost as far under it. The bladder could be felt as a firm ovoid body, reaching almost to the navel.

Spleen can be felt on deep pressure. Both kidneys can be felt.

He cannot raise himself off the bed without turning over. As he makes the attempt the abdomen is thrust forward and slight contraction is seen of the expanded abdominal muscles and recti.

The deformity of the thorax is very remarkable. Harrison's grooves are unusually marked, corresponding to the 6th costal cartilage. The lower portion of sternum is thrust forward, forming almost a right angle with the xiphoid cartilage. As shown in the photograph it is remarkably prominent, and is fully 3 cm. above the level of the skin in the intercostal furrows.

There is a condition of cryptorchidismus. The testes are not to be felt in the groins.

Remarks.—These cases illustrate a very remarkable form of congenital defect. The deficiency in the abdominal muscles, and the high position of the bladder are associated conditions due to arrest of development. We could not say definitely in my case whether the bladder was adherent to the umbilical scar. Dr. Guthrie regarded the hypertrophy of the bladder and the dilatation of the ureters as secondary, due to the fact that in his case, being firmly connected with the umbilical scar, it was unable to contract downward and to empty itself completely. In its effort to do so it became hyper-
trophied and dilated, and the accumulation of urine caused backward pressure and dilatation of ureters.

In reply to a question, Dr. Bardeen, one of Prof. Mall's associates in the Anatomical Laboratory of the Johns Hopkins University, who has been specially engaged in a study upon the development of the muscles, writes as follows: "Two possibilities suggest themselves to me in the case:

"1. It is possible that the lack of resistance normally met with in the abdominal wall by the bladder at the time the kidneys begin to secrete urine may cause the bladder to expand rather than to empty secretions into the amniotic cavity through the urethra.

"2. Under normal conditions the growth of the abdominal musculature into the membrana reuniens, the early covering of the abdominal cavity, is preceded by the formation of a vascular plexus supplied from above by the internal mammary, from below by the epigastric artery. It is possible that an abnormal arrangement of the blood vessels in the embryo prevented the formation of this plexus, and impeded the growth of the abdominal musculature, and that at the same time circulating disturbances gave rise to the abnormal conditions found in the bladder and ureters."
INTERMITTENT CLAUDICATION.

BY

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In 1877 or 1878, when studying comparative pathology, I went one day to the country with some of the members of the Montreal Veterinary College to see an autopsy on a horse which had had a peculiar form of intermittent lameness. Dr. McEachran said the condition was well recognized, and had been described by the French writers, but it was very obscure. I have forgotten now the details of the autopsy, except that we found verminous aneurisms of many of the mesenteric vessels and of the iliac arteries. At the time I was much interested, and looked up Bouley’s paper on Claudication Intermittente. He described an affection in the horse, in which, after being driven for fifteen or twenty minutes, the animal stopped, one or both of the hind legs got stiff, and soon it was unable to stir. In from half an hour to an hour it recovered and was able to go on comfortably for another fifteen minutes, when the attack recurred. In such cases, post-mortem, the artery of the affected limb was found blocked with a clot, or, when both hind legs have been involved, the abdominal aorta contained thrombi.

The subject was not brought to my attention again until a few years ago, when working at the subject of angina pectoris. I then looked up Charcot’s description of this intermittent claudication in man, and made also the interesting discovery that Allan Burns in his Observations on Some of the Most Frequent and Important Diseases of the Heart, 1809, had given an explanation of this remarkable phenomenon.
One or two of his sentences I may quote: "In health, when we excite the muscular system to more energetic action than usual, we increase the circulation in every part, so that to support this increased action the heart and every other part has its power augmented. If, however, we call into vigorous action a limb round which we have with a moderate degree of tightness applied a ligature, we find that then the member can only support its action for a very short time, for now its supply of energy and its expenditure do not balance each other; consequently, it soon, from a deficiency of nervous influence and arterial blood, fails and sinks into a state of quiescence.” He puts it very tersely when he says, “the supply of energy and expenditure do not balance each other.”

Charcot was the first to describe a condition in man identical with that met with in the horse. His Memoir was presented to the Société de Biologie in 1856, and is also to be found in the Leçons du Mardi, I. One day a patient in the service told him that he was not able to walk for more than a quarter of an hour without being taken with cramps in the legs. After resting a while he would get better, and would be able to resume his walking, and then a crisis recurred. At the autopsy Charcot found a ball encysted in the neighbourhood of the iliac artery, and a traumatic aneurysm which had obliterated the artery in its lower part. The circulation was carried on by collateral channels, which were ample to maintain the nutrition while the patient was quiet, and for a short period during exertion, but after a time, when the limbs were fatigued by the movements, the quantity of blood which reached them was insufficient, causing a relative ischæmia, with tingling, cramps, and impossibility of walking. He refers to the fact that the condition is often preliminary to gangrene, and narrates a case in which a patient with the affection had his leg amputated for gangrene.

Interest has been reawakened in the subject by the very careful studies of Erb (Deutsche Zeitschrift für Nervenheilkunde, 13), in which he has reported twelve cases, and has called attention particularly to its association with arterio-sclerosis and calcification of the arteries of the legs. The whole subject, too, has been reviewed this year (1901) by Goldflam in the Neurologisches Centralblatt, and in this country cases have been reported by Gordon (New York Medical Journal, 1900), and by Riesman (American Medicine, 1901).

Familiar as I had been for years with the disease in the horse and with the early literature on the subject in Burns’ work and with Charcot’s description, I had never recognized the condition clinically until in the patients whose histories I here give.
Case I. Vomiting and pain in abdomen—Pulsating tumor in epigastric region—History of syphilis—General arterio-sclerosis—Wiring and electrolysis of aneurismal sac—Marked improvement—Return in nine months with well marked intermittent claudication.*

W. B., aged 31, from Virginia, came first to the hospital in December, 1899, complaining of vomiting and great pain in the upper abdomen. These symptoms had been present for several months. He had lost in weight and had become very nervous. He had been a healthy fellow, but had had syphilis six or seven years before. The radials were sclerotic, the aortic second sound ringing and accentuated, and in the epigastric region there was a wide area of impulse; on palpation an expansile tumor which could be easily grasped in the hand. I urged him to have the sac wired. To this he consented and went home to settle his affairs. He returned early in January, and Dr. Finnie opened the abdomen and found an aneurism of the abdominal aorta, into which he inserted ten feet of wire, through which he passed an electric current for an hour. The patient did well and returned to his home very greatly benefited, particularly in the relief of the pain. He returned in October, 1900, for examination. He had continued free from pain and vomiting. His general condition was excellent, though he was still nervous and apprehensive. The sac was decidedly smaller and the area of pulsation much less.

He volunteered the statement that there was an additional symptom which had disturbed him not a little; namely, after walking for a certain distance his legs would, as he expressed it, give out completely; so that he could not move another step, and had to sit down. After resting a few minutes he could then go on again. This was more particularly noticeable when he walked on the street. He had to go very slowly and could not go for any distance. There was no paralysis accompanying the loss of ability to walk. He could move his legs, but there was an uncontrollable feeling that he could not take another step. Accompanying this there was a sensation of dead, heavy weight in the legs, but no cramps. Walking about in the house (and in the yard) did not bring on the condition, but he had had it very frequently in the past few months, and he had learned to ward it off by walking very cautiously and slowly and resting at intervals. The femoral arteries and the dorsal arteries of the feet were distinctly sclerotic.

* As I look over this paper for the press this patient has been readmitted to the hospital (January, 1902). He has remained very well since the operation two years years ago. The aneurism can be felt. It is hard and firm. He has no pain, but is still very neurasthenic. He has not had the intermittent claudication for nearly a year.
In aneurism of the abdominal aorta the condition is the same as that which produces the intermittent claudication in the horse, and one can readily understand how, as Allan Burns expressed it, the supply of energy and expenditure did not balance each other. In fact, it is surprising that lameness is not more common in such cases.

The following case is a typical illustration of the more frequent cause; namely, general arterio-sclerosis. The patient had, moreover, the associated vaso-motor and nervous disturbances which are not uncommon with disease of the arteries of the extremities.

Case II. Mitral stenosis—General arterio-sclerosis—Attacks of intermittent lameness with numbness and tingling in the feet and marked vaso-motor disturbances—Absence of pulsation in the dorsal arteries of the feet.

Mrs. W., aged 55, admitted June 7th, 1900, complaining of pains in the right leg, difficulty in walking, and heart trouble. There was nothing of any special moment in her family history. Her mother died of tuberculosis, and probably one sister. She had had the usual diseases of childhood, and had acute articular rheumatism at sixteen. She had had seven children and five miscarriages. The last child was born seven years ago. She had always enjoyed good health, and had had no serious illnesses. She said, however, that she had had heart trouble all her life, and occasional attacks of shortness of breath.

Present Illness. While at Baden last August she went out for a walk after eating a very hearty dinner, and after going a little distance from the hotel she lost control of her legs. There was no pain, but they simply refused to carry her, and she had to be carried back to the hotel. There was no loss of consciousness. She was very much alarmed about herself, and she was given aromatic spirits of ammonia, which made her very nauseated, and a little while later she vomited. The following day she felt well enough to leave Baden. Prior to this time she had begun to suffer a good deal with dyspnœa on exertion. She stood the journey back to this country very well, and remained quite well until about six weeks ago. Walking rapidly one day to the boat at Norfolk, she got somewhat out of breath. She got on the boat all right, and felt quite well until she reached Fortress Monroe, when she found on attempting to get up she was unable to walk. She had at this time a feeling of pins and needles in her feet, chiefly in the right foot. There was no difference in the color, and no swelling. About three weeks ago it was noticed for the first time that the right foot and leg were slightly blue, and she has had a good deal of pain in this foot and leg, sometimes sufficient to require
morphia. For the greater part of the time since the attack she has been in bed. On attempting to move about the legs give way. The pain in the right leg is much intensified if the foot hangs down. She has been very much worried and disturbed about herself, but her general health has been pretty good. She does not think she has been more short of breath of late. She has had a little palpitation and pain about the heart. The dyspnœa is altogether on exertion.

Present Condition. The patient was a medium sized woman, quite stout and looked nervous. The tongue was clean. She gave a very good account of her history and condition. The radial pulse was regular, 96, vessel wall not sclerotic. No sclerosis of the temporal arteries. The pupils were equal, and reacted to light and on accommodation.

Heart. Point of maximum impulse was visible in the fifth interspace about the nipple line. There was an exaggerated systolic impulse on palpation; no definite thrill. On auscultation there was an extremely sharp, flapping first sound at the apex, almost amphoric in tone, and preceded by a short, rumbling murmur. There was a soft systolic bruit at the aortic area, and the second pulmonic sound was loudly accentuated.

The abdomen was not swollen; liver and spleen not enlarged.

Legs. Both could be moved freely in bed. Power of movement of right toes and ankle slightly impaired. The right leg looked cyanosed from the knee down. There was no oedema. It was extremely tender to the touch. The right calf measured the same as the left—31\(\frac{1}{2}\) cm. Left leg and foot normal in size and color, and not tender to the touch. Both feet felt cold, the right more so than the left, and she complained very much of the numbness in them. There was no pulsation to be felt in the dorsal artery of the right foot, nor in the right popliteal artery. Slight pulsation to be felt in the femoral artery. No pulsation in the dorsalis pedis or popliteal arteries of the left leg. Pulsation in the left femoral was well felt. Pulsation in the external iliacs could be just felt. There were no patellar reflexes in either leg, and the plantar reflexes were very difficult to obtain as she winced so much from tenderness of the soles.

The patient had warmth applied to the legs, careful friction, and she did remarkably well. On the 11th there was no cyanosis in either the leg or foot. It was still cooler to the touch and tender. No pulsation could be felt in the femoral artery.

I heard subsequently from this patient's daughter that she died a month or two after leaving the hospital.

This case illustrated the good effects of careful treatment as recom-
mended by Erb. With rest in bed, warmth to the legs and careful friction she improved very much. She received great benefit too from the use of full doses of nitroglycerine.

A word as to the name. I think it is very much better to use the term intermittent claudication, though it does not specify the etiology. It expresses well the most characteristic feature of the complaint. Erb’s term, intermittirendes Hinken, is simply the German equivalent. Other terms have been used, such as angio-sclerotic intermittent dysbasia by Charcot, intermittent muscle paresis by Erb, and angio-sclerotic paroxysmal myasthenia by Higier, the author of a long article on this subject in Deutsche Zeitschrift für Nervenheilkunde, July, 1901. As shown in the horse and in the first case which I here report, the affection is not always due to simple arterio-sclerosis, but may be due to aneurism, as in Charcot’s case and as in the rule in the horse. Oppenheim has reported instances in nervous individuals in which the condition seems to depend upon vaso-motor disturbances.
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ON THE DIAGNOSIS OF BILATERAL CYSTIC KIDNEY.

BY

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The condition of bilateral cystic kidney is more often recognized at autopsy or discovered by the surgeon than diagnosed during life by the physician. In Montreal and Philadelphia I had dissected four cases of the kind in children or in adults, and it always seemed to me that the cases presented clinical features distinctive enough to enable one to make the diagnosis during life. Yet this, I believe, is very seldom done. Of the two cases which have been in my wards in the Johns Hopkins Hospital, in one the diagnosis was easily made.

CASE I.—A. W. N., male, aged 59, admitted October 3, 1893, with dyspnea. He had been a hard worker, with no history of any special excesses. He had been ill on and off for 10 years, chiefly with dyspnea and recurring attacks of shortness of breath. These had increased of late very rapidly, so that he had become incapacitated for work.

On admission he was orthopneic and cyanosed, with a rapid, feeble pulse. The heart was dilated and the impulse feeble and diffuse. On auscultation there was a gallop rhythm, but no murmur. There was marked sclerosis of the superficial vessels, and the case was thought to be one of general arteriosclerosis with secondary hypertrophy and dilation of the heart. The abdomen was enlarged and tense. The liver was greatly enlarged, reaching nearly to the navel. The spleen could not be felt. There was no note whether or not the kidneys were palpable. The abdomen was so distended and the liver was so large that it is quite possible they might not have been felt. The urine had a specific gravity of 1,016, a slight trace of albumin, and numerous granular casts; no blood. He had no history of hematuria.

For a week he remained in very much the same condition, with a marked gallop rhythm and shortness of breath, and signs of beginning effusion in the chest and abdomen. On the thirteenth he died suddenly.

Autopsy, No. 461.—There were found marked hypertrophy and dilation of the heart, general arteriosclerosis and emphysema. The kidneys were greatly enlarged, measuring 21 by 11 cm. They were universally cystic, the cysts ranging in size from a pea to an egg, containing clear yellow, and in some places turbid, material. There was no dilation in either pelvis, and the ureters were normal.

CASE II.—Florence S., aged 28 (Med. No. 9,479), admitted
January 21. Her parents were dead. She had one sister and two brothers, living and well. She had one sister, aged 30, who had had, so the doctor said, hemorrhages from the kidney. There was no history of tuberculosis in the family.

She had never had any serious illness. Nine years before she had chills and fever for a couple of weeks. She had always enjoyed good health. For three or four years she had been troubled with headaches, chiefly frontal. Once she had bleeding from the nose. She had had no shortness of breath. As a child and young girl, she took part in games without any trouble. Appetite and digestion had been very good. The abdomen had never been swollen. She did not have to rise at night to micturate; no increase in frequency during the day. Her menstruation had been regular. She had always had a somewhat sallow complexion.

Present Illness.—About a year ago patient noticed that for nearly a week the urine was of a blood-red color. There was no pain, no fever, no chills. She did not go to bed, and did not stop work. She had no further trouble until Monday, December 6, when at 10 p.m. she had a severe attack of pain in the right side, which was very sharp, and lasted until 3 o'clock the next day. She did not have a chill, and does not think she was feverish. The doctor thought she was passing a gallstone. The day previous to this attack she noticed that the urine was bloody; and it remained so for nearly two weeks. She did not notice that there were any clots in the urine. She remained in bed for nearly three weeks on account of the prostration and weakness following the loss of blood. The pain in the left side persisted at intervals, coming on in paroxysms. She thinks she was yellow for some days at this time. On December 6, she noticed for the first time that there was some distention of the abdomen, and she thinks that for some time she had felt the waistband to be tight. Since the attack there had been increasing frequency in micturition during the day, sometimes every hour and a half. She did not think that she passed more urine at one time than at another. She had not had headaches for nearly a month before the attack. When the pain was very severe she had vomiting with it. The week after she got out of bed, she noticed that her feet were a little swollen, and that the eyelids were puffy. The bowels had been regular.

Condition on Admission.—She was a healthy looking, well nourished woman, skin rather sallow, mucous membranes a little pale, no edema. The pupils were equal. The pulse was 76, of good volume, tension plus. The radials and temporals were sclerotic. The thorax was well formed, expansion good; the lower left axillary region appeared fuller than the right.

There was slight general pulsation over precordia. In fifth interspace the impulse could be felt in the anterior axillary line. The point of maximum impulse was in the fourth interspace, 9 cm. from the midsternal line. The relative cardiac dulness began at the upper margin of the third rib, did not pass to right of midsternal line, and at the fourth rib extended 8½ cm. from the midsternal line. There was a soft systolic murmur at the apex. The second sound was sharply accentuated. The diastolic shock was well felt.

Abdomen.—The skin of the lower part of the thorax and abdomen generally was decidedly more pigmented than the other parts of the body. There was fulness in both flanks, more in the right than in the left. The respiratory movements were slightly diminished; no peristalsis. The right flank was
occupied by a large tumor which could be grasped between the hands, and which descended slightly with deep inspiration. It was a little irregular on the surface, not at all sensitive. In the left flank a second tumor could be made out, feeling rather larger and fuller than the one in the right. It reached a point 3½ cm. to the left of the middle line, and below to about 3 cm. above the crest of the ilium. It was irregular, and presented numerous nodular bodies on the surface. It felt much more superficial than the tumor on the right side. It descended very slightly with inspiration. The percussion note over both tumors had a dull tympany. Both tumors became much more prominent and could be much more readily felt when the patient assumed the knee- chest position. The spleen was not palpable. The liver flatness began on the middle of the sixth rib in the parasternal line, and extended to the costal border. The gallbladder could not be felt.

_Blood._—Red blood-corpuscles, 2,400,000; hemoglobin, 40%; leukocytes 6,000.

_Urine._—On admission 900 cc., straw-colored, specific gravity 1,007, distinctly acid, slight trace of albumin; the catheterized specimen after centrifugalization showed a few red blood-corpuscles, no casts. Urea, 7.2 grams. A daily analysis was made of the urine during her stay in hospital. The specific gravity was persistently low. In the 19 examinations of the urine made during her stay, in only one did the specific gravity reach 1,009, usually it was 1,007 and 1,008. There was always a slight trace of albumin, and as a rule a few red blood-corpuscles. Once, on February 6, a hyaline cast was seen. An exceedingly interesting point was that on February 5, cholesterol crystals were seen in the urine. The amount of urine rarely reached above one liter; on February 2, she passed three liters. The urea ranged from between 5 and 6 grams the lowest, to 19 grams the highest. She had no fever.

A diagnosis of bilateral cystic kidney was made on the basis of the presence of the tumors in the flanks, recurring hematuria, with the cardiovascular and urinary changes of a sclerosis of the kidneys. The patient left the hospital February 11, 1899, feeling very comfortable.

She was readmitted on February 27, 1900, in a condition of urgent dyspnea. From her friends it was learned that she had remained well and had been at work. She had at times passed bloody urine. For four days she had only been able to speak in a whisper, and had great difficulty in getting her breath. She said that it hurt her when she swallowed, and the trouble was altogether in the throat. She had frequently had attacks of vomiting, and on the morning of admission spat up thick blood clots. She had no fever, no chills.

The patient was in great distress, and it was rather difficult to get an answer. When admitted she was breathing 20 to the minute, very labored and loud and noisy. The ake nasi were dilated, and all the accessory muscles of respiration were in action. The heart's impulse was visible and forcible. She had a very bad night and became cyanosed. The thorax was clear. There was nothing to be seen on careful examination. Examination of the throat showed a few small patches of exudate, but there were no diphtheria bacilli in smears, and subsequently none grew on the cultures. At 6 p. m., on February 28, she became so cyanosed, and there was such distress that Dr. Baer performed tracheotomy. The difficulty in respiration was not at all relieved; the respirations were as full and labored,
and there was the same retraction of the lower sternum and interspaces. The tube was perfectly clear, and a large volume of air passed in and out, apparently without obstruction. As it was thought that possibly she might have laryngeal diphtheria, antitoxin had previously been given.

She sank gradually and died at 5 a.m. on March 1. The urine examined during this admission showed a specific gravity of 1.013, many red blood-corpuscles, no casts, urea 3 grams to the liter. The examination of the abdomen showed the presence of 2 large tumor masses, and Dr. Futcher thought that the left had increased in size, and in comparison with the charts previously made it evidently had increased a good deal.

Autopsy No. 1,498, performed by Dr. McCallum: Before opening the abdomen a mass was felt on the left side extending to the level of the crest of the ilium, and centrally to within 2 fingers' breadth of the navel. On the right side the mass was not so large, but it could be felt in the right hypochondriac and in the right epigastric region.

The abdomen was opened with a crucial incision. The stomach was vertically placed and the lesser curvature made an acute angle reaching nearly as low as the navel. The edge of the left lobe of the liver reached 8 cm. below the costal margin. The cecum bulged in the right iliac fossa. The transverse colon was below the level of the navel, and had a pear-shaped fold reaching to the pubes. Neither kidney could be seen. On lifting the splenic flexure of the colon an enormous cystic kidney was seen. The cysts were plainly seen through the peritoneum. On the right side the hepatic flexure of the colon turned directly over the kidney and was attached to the duodenum. When the intestines were turned to the right the lower end of the left kidney was seen to extend to within 3 cm. of the promontory of the sacrum. The relations of the duodenum to the kidneys were interesting. On the right the first portion of the duodenum lay directly upon the cystic kidney. The terminal portion of the duodenum was in direct contact with the left kidney for 6 cm.

The left kidney was 22.5 cm. long by 9.5 cm. wide, and reached above to the sixth interspace in the mammary line. The pancreas lay directly over it for most of its length. The spleen was above it, but was not adherent. The organ consisted of a congeries of cysts, some with clear, others with dark-colored contents. It weighed 1,400 grams. The ureter was normal. The upper end was formed of one large cyst nearly 9 cm. in diameter.

The right kidney was 16 by 9.5 cm. and reached upward to the level of the seventh interspace in the nipple line. It weighed only 950 grams. It had the same contents. The mucosa of the pelvis and ureters was normal.

There was marked hypertrophy of the heart and general arteriosclerosis.

These two cases illustrate very well the general features of polycystic kidney, and one of them the facility with which the diagnosis can be made in the presence of a characteristic combination of symptoms. These are: First, the presence of bilateral tumors in the flanks. Polycystic kidney is rarely unilateral. Of the 88 cases collected by James Ritchie (Laboratory Reports,
Royal College of Physicians, Vol. IV), in all of the cases except two both kidneys were involved. Of the 62 cases tabulated by Lejars only one was unilateral. The tumors are often unequal in size, as in Case II here reported. There is no difficulty in recognizing that the tumors are renal. In Florence S. the tumors could be readily grasped bimanually, and the situation and mobility left no question at all that they were enlarged kidneys. This circumstance alone should at once arouse suspicion, as other forms of bilateral renal tumor are excessively rare.

Secondly, the cardiovascular changes of interstitial nephritis. In Case II these were very pronounced—the sclerosis of the arteries, the dislocation of the apex beat to the left and the accentuation of the aortic second sound.

Thirdly, the condition of the urine, which is that of advanced interstitial nephritis. In Case II it was very characteristic—the low specific gravity, the slight trace of albumin, a few red blood-corpuscles and scanty tube-casts. An exceedingly interesting feature in her case, which I do not see mentioned, was the presence of cholesterol crystals in the urine.

Fourthly, hematuria, which in Case II had recurred in attacks for more than a year. It was present in 19 out of 78 cases (Morris). It may recur in paroxysms, as in Case II, and be associated with much pain.

While the local symptoms, such as pain and tumor, may be well marked, it is the cardiovascular, gastric and pulmonary features of interstitial nephritis which attract attention. That the diagnosis has been made so rarely, in only 5 out of 62 cases, according to Lejars (quoted by Morris) is owing to the fact that the patients are seen (as was Case I) with signs of cardiac insufficiency and dyspnea, and no attention is directed to the kidneys; or they are attacked with sudden coma or uremia. Once the attention of the physician is called to the characteristic combination of symptoms, the diagnosis is very readily made.

In these operative days the question of diagnosis has a very practical aspect. At a medical society I saw a surgeon exhibit a very large cystic kidney, which he had just removed. I asked whether the other kidney had been examined, as the condition was almost always bilateral, and he replied that he had not had his attention called to it. The patient died in a few days with symptoms of uremia. As a rule, in polycystic disease
operation is contraindicated, since removal of one kidney simply takes away one-half of the already reduced kidney tissue available for excretory purposes. Even in unilateral cases it is stated that the remaining kidney may become cystic after a few months. Mr. Henry Morris, in his recent treatise on *Surgical Diseases of the Kidney and Ureter*, states that he has operated on three cases of unilateral disease, and in two of them the patients were alive and well several years after, and he states that “when the opposite kidney has been ascertained, either by inspection or palpation, to be unaffected, we are not justified, in my opinion, in refusing a patient the relief from severe pain or hemorrhage, or from the dangers of infection from suppuration of the cysts, which nephrectomy affords.”
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ON AMEBIC ABSCESS OF THE LIVER.

BY

WILLIAM OSLER, M.D.,
OF BALTIMORE.

FROM
THE MEDICAL NEWS,
NEW YORK,
APRIL 12, 1902.
ON AMEBIC ABSCESS OF THE LIVER.¹

BY WILLIAM OSLER, M.D.,
OF BALTIMORE;
PROFESSOR OF MEDICINE, JOHNS HOPKINS UNIVERSITY.

By far the most frequent form of abscess of the liver met with in this locality is that which is secondary to the amebic dysentery of which it is by far the most frequent and serious complication. The relative frequency may be judged from the fact that of some 93 cases of amebic dysentery which have been admitted to the wards, abscess of the liver occurred in 23 as a complication. Naturally this very high percentage is owing to the fact that only the more serious cases are admitted, and a considerable number of these, of course, come into the hospital for the hepatic symptoms and not for the dysentery.

Within the past three or four months we have had a rather unusual series of five (possibly six) cases, illustrating many interesting points in the clinical history of abscess of the liver. You have had many opportunities of studying these cases, and I purpose this morning to review their histories in order that I may impress upon you the chief features.


The patient, Thos. E., aged thirty-two years,
admitted Oct. 18, 1901, had been a healthy man, with a good history. He had not had dysentery. He entered the hospital complaining of pain in the right side below the ribs. His illness had begun four weeks before admission with a chill, followed four days later by pain in the right side, not severe enough to make him take to bed. This pain had gradually increased, and was most intense beneath the lower ribs on the right side; it was especially severe after eating and frequently radiated to the shoulder. Shortly after the onset of his illness he began to notice that he passed mucus in the stools, but there was no blood, and he had only one or two movements in the twenty-four hours. He had several slight night-sweats; no chills, no jaundice. His appetite and digestion were good, and the patient felt well except for the pain and a sense of weakness. One remarkable feature in his case was the diffuse cyanosis, a general blueness of his face and hands which he had noted about two weeks after the onset of his illness. On admission this lividity was very striking. On the right side over the sixth and seventh ribs there was a swelling between the parasternal and midaxillary lines. There was no redness and no heat over it. There was tenderness on light palpation, and on deep palpation it gave a boggy sensation. The right costal margin was a little more prominent than the left, and the right rectus was held a little tense. The liver flatness began at the fifth rib and extended two centimeters below the costal border. The edge could not be felt. The spleen was not palpable. Examination of the other organs was negative. The stools showed no amebæ. The leucocytes were 6,825 per cubic millimeter. An extraordinary feature was the general diffuse cyanosis. He constantly looked as if he had just come out of a cold tub. The
hand forcibly pressed upon the skin of the chest or back left an area of anemia which was very slowly obliterated. His temperature was normal. He was under observation until November 11th, and, with the exception of the swelling over the sixth and seventh ribs and a slight pain, there were no symptoms. The liver was not enlarged and there was no tenderness on deep pressure over the liver, either in the axillary region or at the tip of the tenth rib. The intercostal

Chart 1. Cyrtometric tracing in Case III., showing the enlargement of the right half of the thorax.

spaces on this side were not obliterated. The swelling persisted, but did not increase. It was particularly to be noted that his temperature was normal; he had no chills; there was no leucocytosis. On the night of November 6th he had a heavy sweat. I discussed the case frequently with Dr. Halsted, and I must say we could not arrive at a positive diagnosis. I inclined to the
view that he had necrosis of the ribs from some cause, and, though the diagnosis of abscess of the liver was suggested, the negative character of the symptoms rather pointed against it. The leucocytosis on the 7th rose to 11,000, and he was transferred to the surgical side.

On the 11th Dr. Halsted operated, and found that there was only an area of infiltrated tissue over the region of the swelling; there was no necrosis of the ribs, but there was a remarkable tag of adhesions passing between the surface of the liver and the chest-wall, corresponding to the area of swelling over the ribs. At operation the surface of the liver looked quite normal, but as it felt a little boggy in places it was aspirated and pus was found. The abscess cavity was then very freely opened and drained. Numerous active amebæ were found in the pus. The patient is now convalescent and will get perfectly well.


Amelia B., aged sixty-four years, admitted November 11th, complaining of pain in the right side. For many years she had had dyspepsia and had been very nervous. For two years she had been losing in weight. Her present illness began thirteen weeks before admission, with a sudden severe pain in the right side, which lasted for two days and then subsided; she has had it at intervals ever since, particularly with nocturnal exacerbations; it is usually in the lower part of the right side and radiates to the front of the
abdomen, never to the shoulder. She has had frequent attacks of vomiting, particularly at night when the pain is worse. The bowels have been constipated, except at the onset of the illness, when she passed a little blood in the stools. She has grown progressively weaker and has lost in weight. During the past few weeks she has become slightly jaundiced. The abdomen was full and large; there was tenderness below the right costal border; no special tenderness over the gall-bladder, but deep under the costal margin there was a firm hard mass to be felt, which descended with inspiration. The edge of the liver could be felt all along the costal border. She

Chart 2. Showing the upward enlargement of right lobe in Case III.
had no fever and the leucocyte-count was only 10,000. The stools were clay-colored. They were not examined at the time for amebæ, as there was no suspicion of abscess. She remained in the hospital two weeks and improved very much; she was afebrile throughout and was discharged very much better on November 26th.

She returned on December 30th, complaining of a great increase in the pain in the side, particularly on movement. She had a great deal of nausea, vomiting and insomnia. She was sallow, but not jaundiced. The edge of the liver could be felt three finger-breadths below the costal border, and there was irregularity of the

Chart 3. Showing the high limit of liver dulness in Case III.
edge. During the month she was under observation she had slight fever, ranging occasionally to 101° F.; usually it was not above 99° F. She had no chills, no diarrhea; the stools were clay-colored; no bloody mucus. There was a trace of bile in the urine. The leucocytes were only 8,800. The liver gradually increased in size. The abdomen was difficult to palpate, as it was full and large, but a nodular mass was made out below the right costal border. The liver flatness began at the fifth interspace, and gradually, as the liver increased, extended almost to the navel. The pain in this case was peculiar. Any movement caused it, and the patient suffered a great deal at night. She gradually grew weaker and died on February 2d.

The autopsy showed a large, solitary abscess of the right lobe of the liver. There was no ulceration in the intestines. At the time of the post-mortem, amebae were not found in the superficial examination of the pus, but later they were seen in large numbers in a section of the wall of the liver abscess. We had no suspicion whatever in this case of the existence of abscess of the liver. I thought that possibly it was a case of gall-stones with cancer, as the pain came on so suddenly, but, while no definite diagnosis was reached, strong suspicion was entertained that it was cancer of the liver. The organ increased rapidly in size. There were no chills, no sweats and no leucocytosis, and the pain was not greater than one sees sometimes in rapidly-growing carcinoma.


Joseph S., aged twenty-nine years, admitted December 9, 1901, complaining of trouble in the abdomen. He had been a healthy man, an Austrian, who had lived in this country for seven years. He had been a sailor and had been on repeated cruises. He had not been out of Maryland for four years. Five months ago he had had a severe attack of dysentery which was very severe for three or four days and had continued ever since. He was treated in Brooklyn, N. Y., for typhomalaria, and subsequently, by another doctor, for spinal disease. He had been getting progressively weaker. His dysentery improved and for some time he was constipated. Two weeks ago he began again to have diarrhea and passed some mucus. He had had no chills.

On admission the patient looked ill and pale. His temperature was normal, but rose to 101.5° F. in the evening. The thorax was asymmetrical, bulging on the lower right side, as shown very well in the accompanying cyrtoometric tracing (Chart I.). The liver was enlarged and there was a marked fulness in the epigastric and right hypochondriac regions. There was nowhere any tenderness. The liver could be seen descending with inspiration. Charts II. and III. (outlined by Dr. McCrae) show very well the interesting increase in the area of liver flatness. The measurements were 17 cm. in the nipple line, 16½ cm. in the parasternal line, 16 cm. in the mid-axillary line. The left limit of liver flatness was somewhat doubtful. One point of very great interest was a very definite Litten’s diaphragm phenomenon in the fifth interspace. Never do I remember having seen the diaphragm phenomenon so high, and it was almost evident from it alone that the bulging and fulness were not due
to empyema. In the mucus of the soft stools amebae coli were found.

On the following day the patient was aspirated and a creamy, glutinous pus obtained, chiefly made up of granular débris and a few cells looking not unlike liver cells. No amebae were found in it. In this case too the leucocytes on the 9th were only 9,000, and on the 10th practically the same, red blood corpuscles 4,500,000, hemoglobin 51. He had not a particularly septic look, nor was he jaundiced. The patient was urged to have an operation, but he refused and went home. There was nothing of special moment in the urine. His temperature ranged from 97.5 to 101.5° F. At his home the abscess ruptured into the lung and he spat up a large quantity of pus. He grew progressively weaker and died about February 5th.

In this case the history of dysentery and the patient's condition on inspection were almost sufficient in themselves to make the diagnosis. The high situation of the diaphragm phenomenon was a most interesting feature.


Jos. K., aged forty years, admitted December 4, 1901, complaining of pain in the right side and fever. He was a Pole, did not speak English, and the history was difficult to obtain.

His present illness had begun two weeks before admission with a severe pain in the right side, which was exaggerated as the patient drew a deep breath. He had had no definite chills, but did have chilly sensations. He had had marked
cough from the onset and spat up blood once during the first week. He had had no sweats. The bowels had been regular.

On admission the patient looked ill, had a sal­low, gray, septic appearance, and was somewhat cyanosed. Respiration was increased. He had a full, emphysematous chest. On the right side there was flatness to the fourth rib with distant breath sounds and diminished vocal fremitus. When sitting up the flatness reached to the lower border of the third rib. Over the dull area there were diminished vocal fremitus and distant breath sounds. The heart impulse could not be local­ized. The abdomen was full, particularly in the epigastric region. The edge of the liver could be felt 4.5 cm. below the costal border. There was a leucocytosis of 22,800. The temperature range for the first few days was between 100 and 104.5° F. A needle was inserted in the sixth left interspace in the mid-axillary line and pus was ob­tained. The patient was transferred at once to the surgical side.

The eighth rib was resected and when the pleural cavity was opened it was found normal. The wound in the pleura was then closed, and the follow­ing day a large abscess of the liver was evacu­ated through an incision in the diaphragm. Amebae in abundance were found in the pus. The patient died on the 9th.

The autopsy showed multiple abscesses of the liver and small ulcers in the colon. The case was a hopeless one for surgery. There were numerous large abscesses, and it would not have been possible to reach them by any surgical procedure.

Case V.—Clinical Summary. Five months be­fore admission an attack of dysentery. Subse­quently an illness supposed to be typhoid fever with irregular temperature and night sweats.
Sudden attack of coughing in which he spat up large quantities of pus of a reddish-brown color. Signs of a hepato-pulmonary abscess. Amebæ in the pus. Patient recovering.

J. H. B., of Virginia, colored, aged forty-six years, admitted January 23, 1902, complaining of weakness. During last September and October he had an attack which was supposed to be typhoid fever. He had diarrhea for three or four days with mucus and blood in the stools, which were from three to seven in the day. A number of people in his neighborhood had attacks of the same character. On September 18 he had an attack of cramps in the stomach, headache, fever and pain in the right side. After this he was ill for three weeks with what the doctor called typhoid fever. Then he had irregular fever for several weeks with severe night-sweats. On November 9, during the night, he had an attack of coughing of great severity, during which he spat up a large quantity of blood and pus. The attacks of coughing have persisted ever since and every morning he coughs up reddish-brown mucus. He has had no pain since November 9, but has been growing weaker.

On admission he was looking fairly robust; there was a bulging in the right lower thorax, especially behind and in the flanks, and there was a little fulness at the right costal border. There was flatness in the right side beginning at the fourth rib and extending into the axilla and as high behind as the lower half of the scapula. The breath sounds were suppressed. Just beyond the posterior axillary line there was a region in which large gurgling râles were heard when he coughed and there was a friction sound in the right axilla. The edge of the liver was not palpable. There was no blood and no mucus in the stools and nothing was found on passing the rec-
tal tube. He had a leucocytosis of nearly 15,000 and a decided anemia, the red blood corpuscles numbering only a little over 2,500,000.

When I saw this patient a few days after his admission I was at once struck by the character of the sputum, which looked very much like that which we have learned to recognize as almost characteristic of liver abscess discharging through the lung. No amebae, however, had been found in it. On the 24th, Dr. Warfield inserted a needle deep between the eighth and ninth ribs in the posterior axillary lines and drew off a brownish-red, very grumous-looking pus which contained motile amebæ.

As we had several cases in which the abscess had been discharged through the lung and the patients had made a good recovery, we thought it best to wait a few weeks before operating. He is now very much better. His expectoration has diminished, his cough is not nearly so severe, his temperature is normal, and he is gaining in weight. The right side of the chest has become flattened, there is less expansion and the intercostal spaces are very much narrowed. There is flatness to the fourth rib. There is everywhere feeble breathing over the dull region, and on coughing one can hear medium-sized râles.

I may briefly refer to a case at present in the private ward, which I have been seeing at intervals with Dr. Thayer—a man from Norfolk, who has had recurring attacks of amebic dysentery for the past six or eight months. He came into the hospital in a condition of great emaciation, with very frequent evacuations, and for some weeks we were very doubtful about his recovery. With careful irrigations and dieting he began to improve, and early in February the dysentery seemed to be cured entirely. He improved in color and altogether has done remarkably well.
For between two and three weeks he has had persistent pain in the right side, far back under the edge of the ribs, and the liver has been increasing in size, so that it is now three fingerbreaths below the costal margin. He has a little fever every evening, up to 100° F., a slight leucocytosis and every night a sweat, but he is gaining in weight, and during the past week he gained some two or three pounds. The question is whether he, too, has not an abscess of the liver.¹

Several points are illustrated in these five cases. Latency.—In Case I. the abscess was not large and the features of the case were singularly negative, there being absence of fever, of chills, of sweats and of leucocytosis, until just before the operation. There were, however, two features worthy of special comment, viz., the remarkable diffuse cyanosis, for which I cannot offer any satisfactory explanation, and the localized swelling above the right costal border, which is sometimes seen in abscess of the liver which approaches the surface and is preparing to perforate. At operation, however, this was found to be associated with a group of adhesions between the liver and the costal margin, but there was no necrosis and no sign of the abscesses actually pointing in this situation.

The Liability to Error in Diagnosis.—I must say Case II. was what Niemeyer used to call "a mortifying postmortem disclosure." A few days after her admission the patient was seen with a view to the possibility of surgical interference, but the symptoms seemed to point so strongly to malignant disease that we did not think it worth

¹After the delivery of the lecture this patient's liver increased in size, the bulging in the right flank became more marked, and on March 8th Dr. Finney operated and evacuated an enormous abscess. A point of very great interest in this case is the fact that there was progressive increase in weight and the general condition was good. He had been sitting up and looked well.
while to put her to the trouble of an exploratory operation. As the specimen showed, operation might have done good, as the abscess could have been easily evacuated. Such a case makes one strongly in favor of the exploratory incision for diagnostic purposes.

Case IV. illustrates one of the commonest errors in diagnosis, the mistaking of a large abscess projecting upward into the lung for empyema; nor is the diagnosis always cleared up by the exploratory needle. Large abscesses toward the surface of the right lobe pass high into the pleura in the direction of least resistance and the features may simulate closely those of a right-sided exudate.

Case V. as seen to-day would be readily taken for a case of empyema which had perforated into the lung and was healing, but the character of the attack following dysentery, the sudden expectoration of the anchovy-sauce-like pus and the presence of amebae were sufficient to settle the diagnosis.

Leucocytosis in Abscess of the Liver.—A point of very considerable interest is the question of leucocytosis in amebic abscess of the liver. From the history of these cases and of others, too, some of the statements on this point need revision. In Case I., on admission, the leucocytes were only 6,000 per cubic millimeter and only once rose to 11,000. In Case II. the leucocytes were only between 8,000 and 10,000 per cubic millimeter. In Case III. they were only 9,000 per cubic millimeter. In Case IV. there was a leucocytosis of 22,000, and in Case V. a leucocytosis of 15,000. Three of the cases, as you see, had practically no leucocytosis. The strong statements as to the invariable presence of leucocytosis in abscess of the liver—made even, I am sorry to say, in the
recent fourth edition of a text-book of medicine in which I am interested—require to be modified. Lastly, amebic abscess of the liver is not always associated with existing ulceration in the intestines, as is shown by the postmortem in Case II. The patient may have had dysentery months before and the ulcers may have healed completely.
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NOTE ON THE OCCURRENCE OF ASCITES IN SOLID ABDOMINAL TUMORS.

By WILLIAM OSLER, M. D.,

of Baltimore, Md.

Professor of Medicine, Johns Hopkins University.

The interesting lecture by Dr. Eden in the Lancet of February 8th., on the two cases of solid abdominal tumor with ascites, calls attention to a not sufficiently recognized cause of abdominal dropsy. In 1885, I saw with Dr. Walker, of Dundas, Ontario, a woman with recurring ascites, of doubtful origin, for which she had been tapped many times. Fortunately I saw her a day or two after the removal of the fluid, and was able to feel a tumor in the lower part of the abdomen. A week later, Dr. Thomas, of New York, removed a solid ovarian growth, and the patient has been well ever since.

My interest in the subject has been renewed recently by a very remarkable case referred to me by Dr. Koehler and Dr. Fackler, in a woman, aged 53, who had had at intervals for three years attacks of ascites. Within the past four months she had been tapped four times. Ten years ago it was stated that a tumor had been detected in the abdomen. There was a good deal of discussion as to the nature of the case, and she was referred to me for a decision as to the advisability of an operation. There was a solid tumor in the lower abdomen, which could be moved from side to side. I suggested the possibility of dropsy dependent upon a solid ovarian tumor, and asked my colleague, Dr. Kelly, to operate. He found a large fibroma of the right ovary with twisted pedicle and adhesions to the omentum. The tumor was removed, and the patient has recovered.

Dr. Hunner, Professor Kelly's first assistant, has very kindly collected for me the cases bearing upon
this point from the gynecological clinic of the Johns Hopkins Hospital. Among 9400 cases there have been 10 patients with solid ovarian tumors, the ages ranging from 32 to 63. In six of these cases ascites was present on admission. Three of the cases had required repeated tapping. All of the cases recovered after operation.

As Dr. Eden remarks, ascites is the rule with solid tumors of the ovary, and so rare with fibroids of the uterus that its presence almost serves to exclude them. Other forms of tumor may be associated with ascites. In Montreal I saw a case of leukemia with recurring ascites. On the occasion of my first visit the distension was so great that the spleen could not be felt; in fact, the diagnosis was not made until after the patient had been tapped. In a case of a solid tumor of the mesentery there was an ascites of moderate degree.

The association is one to which the attention of the profession has not been called sufficiently. I was so impressed with it in the case upon which Dr. Thomas operated, that I made a reference to solid tumors as a cause of recurring ascites in the first edition of my text-book (1892). The question of operation is a very important one; the solid ovarian tumor is usually benign, and, as mentioned, the cases in Dr. Kelly's clinic have uniformly recovered.
ON HEREDITY IN BILATERAL CYSTIC KIDNEY.

BY

WILLIAM OSLER, M.D.,
Professor of Medicine, Johns Hopkins University.

Since reporting the two cases in American Medicine of March 22, the following case has come under observation, illustrating the unusual feature of heredity in this condition:

B. E. B., aged 39, Chestnuthill, Mass. He was perfectly well until two years ago, when he had influenza severely. He at that time had hematuria, and three years before, while coasting, he tripped and had a fall, and then had hematuria. Before this he had noticed that he had not been in as good health as usual, and had some fulness of the abdomen, more at times than at others, and had felt a hardness in it. He was under the care of Dr. Baldwin, of Chestnuthill, and he at this time began to fear that he had the same malady of which his mother died. In 1882 Dr. Fitz performed a necropsy on his mother and found bilateral cystic kidneys. This statement is confirmed in a letter from Dr. Fitz, who says that the patient was supposed to have serofulose glands. She died unconscious in the fiftieth year of her age, probably in a state of uremia.

With the exception of occasional attacks of dyspepsia, the patient had been strong and well, had taken plenty of exercise, had no pain in the back, no lameness. He has been playing golf and has felt very well and vigorous. He had been seen by Dr. Folsom and by Dr. Fitz, both of whom decided that he had bilateral cystic kidneys.

Present Condition.—The patient looks very well, of good color. There is nothing in his appearance to attract attention. There is a little fulness in the upper abdomen. I dictated the following note at the time of examination: Robust, healthy-looking man; weight about 145, stripped; good color; tongue clean. Pupils are of medium size, react well to light and on accommodation. Superficial arteries are sclerotic. Heart: apex beat in fourth and fifth, in and just inside the nipple a little forcible; rather wide area of pulsation; aortic second palpable; soft systolic at apex; ringing, accentuated aortic second.

Abdomen.—Symmetrical; looks a little full in proportion to the chest. The costal border in the nipple line is lifted on both
sides; a little greater fulness below the right costal border. The flanks bulge considerably. Girth of abdomen at navel, 85 cm.; at level of ensiform, 89 cm. From behind slight bulging in both flanks. When he stands up there is a marked prominence of the abdomen, particularly in the flanks. The lower ribs have been spread by the tumors. On palpation both flanks are occupied by large masses. On the left side, the larger, the tumor extends fully three inches below level of navel; not so much to be felt except on deep pressure below the costal border in the nipple line. On bimanual palpation the mass can be lifted up and visibly pressed forward; irregularities can be distinctly felt. The descending colon runs over it, and can be felt as a cord (he himself has noted that it can be moved from side to side). In the right side the mass is not so large. The colon is felt in front of it. There are several distinct nodular prominences; one can feel definite hemispheric irregularities with the greatest ease. Both masses descend with inspiration. The liver is not enlarged; perhaps a little pushed up by the tumor. The thyroid is not enlarged; both lobes are palpable. Both discs are clear.

Urine.—Pale, straw yellow; clear; no precipitate, acid, 1.012; faint trace of albumin; no sugar; no diazo. Microscopically (centrifugalized specimen) no casts to be found; few squamous cells.

The bilateral tumors, the cardiovascular changes, the recurring hematuria and the condition of the urine make the diagnosis quite clear. The unusual feature is the fact that his mother died of the same disease. So far as he knew, no other members of the family had been attacked.

With reference to heredity in this condition Morris notes as follows: "Polycystic kidney has been known to follow a natural labor in a mother of five children; it affected only one of her kidneys. There cannot be said to be more than a slight hereditary tendency to polycystic kidney. The three cases in the same family reported by Bar have been just referred to. A case is recorded in which it affected one kidney of a woman two members of whose family died of post-scarlatinal nephritis, and another child, a daughter, had a polycystic kidney." (Vol. i, p. 656.) In a recent paper by Borelius (Nordiskt Med. Arkiv, abstracted in the Journal of the Amer. Med. Assoc., 1902, I), three of the four cases which he described belonged to the same family, father, son and nephew.
Amebic Dysentery.

By William Osler, M.D.,
Professor of Medicine, Johns Hopkins University.

Reprinted from The Therapeutic Gazette, April, 1902.

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WILLIAM M. WARREN, PUBLISHER,
Box 484, Detroit, Mich.
AS, with the exception of the studies of Kartulis, the most important work on the subject of amebic dysentery has come from the Johns Hopkins Hospital, we have naturally followed the recent investigation on dysentery with great interest. I cannot here go into historical details, but the work in this country dates from March, 1890, when I found amebae in the liver abscess of a young doctor from Panama. Ever since the question of the relationship of the amebae to dysentery has been one of constant study. In quick succession a series of cases occurred in my wards, and were made the subject of study by Councilman and Lafleure, whose monograph has done much to make this form of the disease widely known.

I do not propose in this discussion to speak of the pathology of the disease or of the characters of the amebae. What I wish to make is a brief statement as to the colitis, with which in Baltimore we have found the amebae associated.

A sporadic affection, it has not occurred in wide-spread epidemics, either throughout the city or State, so far as I

*Remarks at a discussion on dysentery at the Philadelphia County Medical Society, Philadelphia, March 26.
know, or in institutions. A very limited number of cases have been admitted to the wards, only ninety-three to date. In a few instances three, four, and five cases have come from the same locality, or three and four members of the same family have been attacked. It has involved chiefly males; only eleven females in our group. It is more common among whites than among the colored; there were only nine colored patients. It is a disease of adults; more than fifty per cent of the cases were in the third and fourth decades.

While the disease may run an acute course and may prove fatal within a few weeks, in a very large proportion of the cases it is chronic, characterized by slight fever and frequent movements, containing mucus, blood, pus, and amebæ. Many cases are from the very outset subacute; a majority of them become chronic, so that the disease drags on for many months or years, with alternating periods of constipation and diarrhea. Very few cases die of the dysentery per se; of the ninety-three patients in my wards, only two died of the asthenia induced by the dysentery itself. Two died of perforation.

By far the most important and serious feature of the type of colitis with which the amebæ are associated is the liability to abscess of the liver. Of the ninety-three cases referred to, twenty-three had abscess of the liver. This large percentage is due to the fact that only the more severe cases come to hospital. In Strong's sev-
enty-nine post-mortems on cases of amebic dysentery there were fourteen instances of liver abscess.

While at first, after the work of Shiga and Flexner, there was a feeling that possibly all the forms of dysentery might be due to the bacilli, gradually those who have had the most favorable opportunities for studying the diseases have come to the conclusion that the amebic form of dysentery has well marked and characteristic differences. As Dr. Strong has pointed out in his admirable studies in Manila, where the two forms occur together, the cases can be recognized from each other and readily differentiated. In the first place the amebic variety does not seem to occur in such wide-spread epidemics. Secondly, it rarely has the very acute course, and it kills much more frequently by its complications than by the actual colitis. The chronicity and the liability to recurrence give it a very peculiar stamp. Thirdly, characteristic amebae are found in the stools or in the liver abscess which may have followed a protracted case. Lastly, and this is a very important point in the differentiation, the serum reaction with Shiga's bacillus is absent in the amebic form. Upon this point we can speak very positively. Since the return of Dr. Flexner from the Philippines there have been some fifteen or sixteen cases of amebic dysentery in my wards, in none of which has the serum reaction, so characteristic of the bacillary form, been present.
NOTES ON ANEURISM

WILLIAM OSLER, M.D.
Baltimore, Md.

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NOTES ON ANEURISM.

WILLIAM OSLER, M.D.
PROFESSOR OF MEDICINE, JOHNS HOPKINS UNIVERSITY.
BALTIMORE, MD.

SUMMARY.
1. Arteriovenous Aneurism of the Subclavian Vessels.
2. The Humming-top Murmur in Thoracic Aneurism.
3. On the Value of the Fluoroscope in the Diagnosis of Obscure Cases of Thoracic Aneurism.

1. ARTERIOVENOUS ANEURISM OF THE SUBCLAVIAN VESSELS.

The elaborate study by Matas, published in the early numbers of The Journal this year, and his analysis of the 15 cases on record, add interest to the following report:


Edward S., aged 29, of Kentucky, was sent to me by Dr. Alderson on April 9, 1900, with the following history: On the night of Jan. 5, 1900, he was shot, receiving four bullets. One entered the left shoulder and is now imbedded in the upper portion of the spine of the scapula and gives no trouble. One entered about the middle of the back of the left arm and passed inwards and downwards to inside the condyle of the humerus, where it was deflected across the bend of the elbow and down the forearm, making its exit about the upper third, injuring the ulnar nerve. The third bullet entered the left side a little behind the mid-axillary line between the ninth and tenth ribs. It apparently did not penetrate the chest at all. The fourth entered just about the middle of the fold of the left trapezius, passed inwards and downwards in front of
the spine and came out under the right clavicle. The wounds healed rapidly. He had at first some difficulty in swallowing, but he has gradually been getting well. There was at once considerable swelling in the neighborhood of the clavicle, with marked pulsation, a thrill and a bruit.

Present Condition.—He looks well. Tongue is clean. Chest is well formed. Immediately above the free margin of the middle of the left trapezius there is a bullet-wound, the point of entrance of the ball which caused the aneurism. The left clavicle stands out a little more prominently than the right. The right clavicle is just visible. The supraclavicular fossa is occupied by a pulsating swelling which causes a marked prominence between the sterno-clavicular margin, extending outward a distance of about 7 cm. It does not lift the sternocleido-mastoid muscle, the sternal outline of which is plainly marked. The sternal notch is plainly marked. Above, the swelling extends for fully 7 cm. The pulsation is visible over the whole tumor. From behind it is very noticeable. On palpation there is a marked thrill, continuous, but with systolic intensification, felt and heard over the whole tumor, and felt up the neck fully 7 cm. from the clavicle. It is well felt on deep pressure to the right in the sternal notch, not felt on the clavicle. The tumor forms a distinct pulsating mass about the size of, or a little larger than, an egg, quite painless. No thrill is felt below the clavicle or over the body of the heart or on the sternum. Apex beat in nipple line; no increase in area of cardiac flatness. On auscultation both sounds are loud and clear at apex and over the whole precordia. Everywhere, too, from the apex up, increasing in intensity, is heard a humming-top murmur, with marked systolic intensification. At the sternum it is very loud, and over the aneurism reaches its maximum intensity. An interesting feature is that he feels the pulsation in the left ear, not in the right. The murmur is of extraordinary intensity, heard up and down the neck, heard along the axillary artery to the elbow. The systolic murmur is very intense, and the whole diastole is occupied by a wheezing, wiry Æolean murmur. In the recumbent posture the tumor does not look larger, and the thrill is not so evident. The pulsation in the subclavarian below the clavicle on the left side is visible. On the right side it is not visible. There is a marked difference between the pulse in the radial arteries; the right is feeble, only just to be felt. The brachial pulse can be felt. The axillary can be felt, much feeble on the right side than on the left. The carotid on the right side is full and easily felt. There is no thrill in it on palpation. There is no difference in the pulse in the temporal arteries. The bullet was located with the x-rays, and can be felt just below the clavicle.
There is no question that the bullet in this case has nicked the subclavian artery and vein, causing arteriovenous aneurism. The man's general condition was good, and as he was improving I counseled very strongly non-interference. Subsequently he saw several surgeons, some of whom were anxious to operate, but fortunately he escaped them. Since then he has been doing well, and I heard from his physician, March, 1902, that the tumor is smaller and he is able to do quiet work and has little or no inconvenience.

The question of operation in these cases has been very fully discussed by Matas in his exhaustive study above referred to. Of his collection of 15 cases 4 were operated on, 3 within 12 days of the injury, and one 32 years after, which was the only one fatal. Unfortunately, 6 of the 11 cases passed out of observation within a few weeks or months after the injury, while the lesion was still active. The ultimate result of the other cases shows that the condition may remain quiescent for a long period of years. In a few instances there were serious disturbances of the circulation and innervation of the hand and arm, while in one case (Watmann's) after a latent period of thirty-one years, the lesion became active and gave rise to fatal complications.

The condition of arteriovenous aneurism has interested me for a number of years, having had under observation at intervals a man whose case I described in the Annals of Surgery, 1893. At that time he was twenty-five years of age. When fifteen he had fallen and a lead-pencil in his waistcoat pocket penetrated the axilla, causing an arteriovenous aneurism. He had remained very well, had been very active and strong, had rowed in boat races. I heard of this patient not many months ago. He had served through the South African war, so that his general condition must have remained good. The aneurism has persisted now for more than twenty-three years.

Arteriovenous aneurism is so rare a lesion that even surgeons of large experience are often a little perplexed as to the best course to follow. I am very much impressed with this in the extraordinary differences of opinion given to the young man with the lesion high up in the axillary artery. The conclusions of Matas which are strongly in favor of non-interference may be quoted:
"The statistics which we furnish in this paper—the most complete list of the reported instances of this rare lesion which has thus far appeared—tend to confirm the arguments of the 'let-well-enough-alone' policy, in so far as they demonstrate that in at least 11 of the 15 cases the patient survived the immediate effects of the injury and of the arteriovenous aneurism that followed it for variable and often long periods of time."

2. THE HUMMING-TOP MURMUR IN THORACIC ANEURISM.

In September, 1888, there was admitted under Dr. Pepper's care at the University Hospital, Philadelphia, a Chinaman, whose case I had frequent opportunities to study with Dr. Crozier Griffith. The case was reported by Pepper and Griffith in the "Transactions of the Association of American Physicians," Vol. V. The remarkable features were cyanosis, and a murmur of extraordinary character, heard loudest at the aortic cartilage and accompanied with a thrill. As described by the writers, the murmur was "loudest and highest pitched with the cardiac systole; it died away very considerably during the diastole, and lowered its pitch by several tones, to rise again both in volume and pitch with the next systole. It was thus continuous, and had a distinctly venous quality, although unlike a venous hum in that it was distinctly rhythmic." At the autopsy there was found a small aneurism of the ascending aorta which communicated with the superior vena cava by an opening three-fourths of an inch in length. The case made a very definite impression upon me, and I have since learned to recognize the murmur as almost pathognomonic of abnormal communication between the chambers of the heart or between the great vessels at the root of the neck, or of an aneurism at the aorta with the vena cava or pulmonary artery. More definitely, the cases in which I have recognized it have been congenital heart disease with persistence of the ductus arteriosus, cases of imperfection of the ventricular septum, and in the two cases here given:


Joseph M., aged 30, admitted first on July 29, 1901 (Med.
No. 13,212), complaining of shortness of breath, cough and pain in the chest. An important point in his history was that three years ago he had syphilis. He had been a heavy drinker and a heavy smoker. His illness began in October, 1900, with a cough, which was dry and hard and troubled him very much at night. He had shortness of breath from the beginning. These symptoms increased throughout the winter. He had pain first in February.

On his first admission the signs of aneurism of the thoracic aorta were very well marked—a visible bulging with pulsation to the right of the sternum; no thrill; very exaggerated diastolic shock; flatness over the pulsating area. Dr. Futcher, who dictated the note, described the heart sounds as clear and a very faint soft systolic murmur along the left sternal border and over the prominent part of the pulsation. There was no diastolic murmur. The patient was given a gelatin injection and kept at rest. On my return in September I saw him, and he then had very much the symptoms described by Dr. Futcher when first admitted.

Then he returned on December 31. He had been in the country and had become very much worse, having attacks of dyspnea and weak spells. The pulsating tumor was larger. There was a wider extent of flatness. The most remarkable change was on auscultation over the sac. The diastolic shock was extreme and there was a feeble thrill. There was a very loud, continuous murmur occupying the entire cardiac cycle, with a great deal of echoing reverberation and marked systolic intensification.

The sac was evidently so large and so far out that, while I recognized the murmur as the kind heard with abnormal communication, I must say I thought it possible that this remarkable whirring, continuous murmur might be produced in a very large sac.

The patient died Jan. 10, 1902. The anatomic diagnosis was arteriosclerosis, aneurism of the arch of the aorta, compression and atelectasis of right lung. On the posterior wall of the sac, where it had pressed into the lung, one of the main branches of the right pulmonary artery, fully as large as the little finger, opened directly into the sac.

**CASE 3.—CLINICAL SUMMARY.** Syphilis two years before observation. Cyanosis. Shortness of breath. Great congestion of the veins of the upper-half of the body and of the arms. Gradual development of compensatory circulation in the mammary and epigastric veins. Over the manubrium and aortic regions a continuous murmur with marked systolic intensification, limited to the area about the aortic cartilage and the middle of the manubrium. Death. No Autopsy.

Jos. S., aged 39, an iron-molder, applied at the dispensary of the Johns Hopkins Hospital Dec. 7, 1889. He had been ill
since January, complaining of giddiness, cough, shortness of breath, swelling of the feet and a congested and bluish condition of the face, which became aggravated when he attempted to do heavy work. He is a thick-set, well-built, muscular man. He had a chancre two years ago. There is no history of rheumatism or chorea, but in September, 1888, he was in bed three weeks with some obscure pulmonary trouble.

**Physical Examination.** Face is swollen and reddish; lips and ears are cyanotic. Conjunctival watery. The tongue is clean, deeply congested and the whole of the pharyngeal mucosa is intensely engorged. Chest is large, antero-posterior in diameter, deep. The skin, covering the entire thorax and of the arms is congested. The venules along the line of the diaphragm and in the lateral region of the chest are dilated. The neck is thick, supra-clavicular spaces distended, sternal notch obliterated. The breathing is quiet, 24 to the minute. The apex beat is indistinct, but a feeble impulse is visible in 5th in nipple line and there is throbbing in the epigastric notch. There is a feeble shock of the first to be felt at the apex, but there is no pulsation at the base on deep pressure. There is no dulness on the manubrium sterni and the superficial area of heart dulness is not increased. On auscultation there is a systolic murmur at apex, propagated to the back. The second sound is ringing. Along the left sternal border the systolic murmur becomes more intense. Over the manubrium there is a loud murmur of very peculiar character, not like an ordinary aortic systolic, short and rough, but a murmur which seems continuous and during the systole greatly intensified. The second sound at the base is clear and ringing. The radial pulses are equal; pupils equal. There is no brassy cough. On examination of the chest a few piping rales with prolonged expiration were noted.

The patient was seen on four occasions during the next month. The cyanosis and shortness of breath had increased. On January 7 I made the following note: Much worse since last seen on the 2d. The face is much swollen and absolutely blue, looking like that of a man who had been strangled. The mucous membrane of the pharynx intensely livid. Eyelids swollen; conjunctivae deeply engorged. The neck is enlarged; the external jugular is prominent. The upper part of the chest and both arms are swollen but not edematous. The veins of the arms are full. The whole subcutaneous tissue feels thickened and infiltrated. The right side and the right arm are more swollen than the left. In the lower chest zone the venules are greatly enlarged, but no large mammary veins are visible. When stripped the contrast between the upper and the lower parts of the body is remarkable. The engorgement goes as far as the lower abdominal zone. The legs are quite pale.
The amount of subcutaneous infiltration is such that the superficial veins are not visible. The apex beat is indistinct. There is a systolic shock. The area of cardiac dulness is not increased. In 5th interspace below nipple, there is a loud systolic murmur not obliterating the first sound, at aortic cartilage and on manubrium the same remarkably loud, continuous murmur is heard, with systolic intensification; second sound clear and ringing. The systolic murmur is heard to left and right two inches from the sternum, but the continuous murmur is only heard at the more limited area about the aortic cartilage with a maximum at mid-manubrium.

The subjective sensations of the patient are remarkable. He says that he feels comfortable with the exception of the feeling of distension in face, chest and arms. It is extraordinary how slight is the distress in breathing in a man presenting a condition of such extreme cyanosis. He says that one of his chief annoyances is the shock which his appearance gives to his friends. He is not drowsy. His intellectual condition is perfect. He sleeps at night with his head high.

About two weeks subsequent to this visit we heard that the patient had died; but his wife refused an autopsy. She said he got progressively worse and even more cyanotic. He was taken to the city hospital, but whether he died there or at his house she did not say.

This patient presented the characteristic features which Pepper and Griffith describe in an analysis of some 29 cases of communication between an aneurism of the aorta and the superior vena cava, more particularly the extreme cyanosis of the face and upper parts of the body, with evidences of obstruction of the circulation in the tributaries of the superior vena cava. They regard the murmur as characteristic of communication between an artery and a vein, and state that it was first described by Thurman in 1832-33. The characters are:

1. It is continuous, occupying both the systole and diastole.
2. There is a systolic reinforcement, often of great intensity.
3. The venous quality of the murmur, resembling the characteristic venous hum in the jugular and the murmur over the thyroid in Graves' disease.

The quality varies. It may be a buzzing or it may have a remarkable, sonorous, vibratory character, or, again, it may be a churning or purring murmur. Ord describes
it very well as a long continuous humming murmur, never ceasing, but varying in intensity, more sonorous during systole, fainter during diastole. To Thurman the credit appears to be due for the recognition of a murmur of this quality as pathognomonic of arteriovenous aneurism. The question has been very fully discussed by Sir William Gairdner in the Glasgow Hospital Reports, 1899, in the report of an interesting case in which a small aneurism of the ascending portion of the arch communicated with the pulmonary artery.

3. ON THE VALUE OF THE FLUOROSCOPE IN THE DIAGNOSIS OF OBSCURE CASES OF THORACIC ANEURISM.


On Jan. 15, 1902, I was consulted by Mr. T. R. F., who had been complaining of cough for six months, loss in weight and pains through the chest. I was impressed at once with the expression of great distress and anxiety in the poor fellow's face. He looked worn and exhausted with suffering, and he said that he had not been able to lie down for some weeks, and had had nights of indescribable anguish owing to the orthopnea, pain and sense of smothering. I was impressed at once with the noisy, stridulous, tracheal character of the breathing. He had been a bartender, had taken alcohol freely, and had had venereal sores at different times; the strong probability is that he has had syphilis. He thinks that for a year he has had some cough, but for six months there have been shortness of breath, loss of weight and pain in the chest. About three months ago his voice changed. He has had no spitting of blood. Of late he has had frightful paroxysms of pain and orthopnea, particularly at night. He had consulted a number of physicians in New York and elsewhere, and the diagnosis had been made of mediastinal sarcoma.

On examination the chest was well-formed, expansion good and seemed equal on both sides. No abnormal area of pulsation was noticeable; no throbbing in the sternal notch. There was an area of impaired resonance in the first, second and third left interspaces and over the central portion of the manubrium. The point of maximum impulse was in the fifth interspace, 10 1/2 cm. from the mid-sternal line. The cardiac flatness was not increased. There was a soft systolic murmur at the apex; the second sound was clear and without special
accentuation over the area of dulness. The pulse was of good volume; the left radial was smaller than the right. The breath sounds on the left side were less intense than on the right.

Altogether, at the first examination I was inclined to agree with the diagnosis which had already been made of mediastinal sarcoma. It seemed to me that an aneurism would by this time have shown more definite physical signs. The patient entered the Johns Hopkins Hospital that I might study his case more fully. The following additional points were then made out. First, "with the x-rays there was a large shadow seen, which extended from the upper end of the sternum to the upper border of the third rib. It did not extend to the right beyond the shadow of the vertebrae, but did to the left to about opposite a point 2/5 of the extent of the clavicle from the inner end. It was sharply defined with clear outlines, showed slight pulsation and moved very slightly to the left on deep inspiration. It could be clearly separated from the shadow of the heart. Looked at from behind it looked larger than from in front. It is worthy of note that it seemed denser and with much sharper outlines than in cases of undoubted aneurism previously examined." (Dr. McCray.) Secondly, on the second day after admission, on getting the patient into a bright light and examining the chest critically, there was seen a distinct slight visible pulsation in the first left interspace and the left clavicle was slightly lifted. Thirdly, there was well-marked paralysis of the left vocal cord. Fourthly, the blood pressure showed the right brachial maximum 118, left brachial maximum 103. These points seemed quite sufficient to settle the diagnosis of aneurism against that of mediastinal sarcoma. It is interesting to note that there was no bruit over the pulsation; no special accentuation of the aortic second sound. The patient's condition was most distressing. The nights were passed in terrible distress and in order to reduce the blood pressure he was bled on several occasions with very great relief. On January 20 his condition seemed perfectly desperate, and as a last resort I asked Dr. Finney to wire the sac. The patient stood the operation remarkably well. The needle was inserted in the second left interspace about 5 cm. from the sternal margin over an area in which there was marked pulsation. "A medium-sized needle was inserted in a direction backward and slightly downward and inward. When the needle had been inserted about 6 cm. a pulsation was transmitted to it. It was then pushed in about 2 cm. further, when fresh blood escaped in spurts. Ten feet and seven inches of No. 27 spring silver wire, wound large, (75 parts copper to 1000 silver, alloy) was then slowly inserted. A current of 10
ma. was then allowed to pass through the wire for one hour.” The patient seemed very much benefited by the operation, and seemed for a few days decidedly improved. Then, on the night of the 17th he had a small hemorrhage. On the 18th he had a sudden profuse hemorrhage from the lungs and died in a few moments. The heart beat faintly for thirty seconds after the last respiration.

Postmortem there was found an aneurism of the transverse arch, containing mural thrombi within the sac, and the wire was within the sac. There was compression of the left bronchus, perforation into the trachea, hemorrhage into the right lung.

It is particularly in this group of aneurisms, with symptoms and no physical signs, that the x-ray examination is of such service, but we have not had a case in which it was more clearly demonstrated than in the one here noted.

1. ON THE VALUE OF CAREFUL INSPECTION OF THE CHEST IN THE DIAGNOSIS OF THORACIC ANEURISM.

A bare chest, a good light and good eyes are the essentials. Routine in the examination is important. Invariably at the ward visit after the inspection of the front of patient’s chest I say to the student, “What next?” and he immediately proceeds to palpation, overlooking the inspection of the back, and which, if not made in the right time, and in a routine manner, may be overlooked altogether.

Many years ago at the Girard Hotel, Philadelphia, I saw a remarkable case which illustrated the value and importance of the point. The patient had a large area of pulsation in the lower front of the chest, extending almost from one nipple to the other, with distinct prominence. There was a double murmur at the base of the heart, and the case had been regarded as one of aortic insufficiency, which condition was present. He had paroxysms of great distress and orthopnea, and there were peculiar features about the case, so that one or two of the leading physicians in Philadelphia had expressed themselves as somewhat puzzled about its nature. Fortunately, after finishing the inspection in front, I turned the patient’s back to a good light, and the diagnosis was made at a glance. There was a pulsating aneurismal tumor in the left interscapular region, which had given him no pain whatever, and which had not attracted the attention of his physicians. A remarkable condition
was present in this case, which I had never seen before; namely, a complete absence of the pulse in the iliacs and femorals.

At present in my wards are two cases illustrating this very well; a man (Leonard) has a wide area of impulse in the lower sternum and adjacent interspaces. He has been under observation now for nearly three years, and time and again Dr. Thayer, Dr. Futcher and myself have discussed the possibilities. A positive diagnosis was not reached until a year ago, when a slight pulsation was seen in the left interscapular region, which has increased, and it is now quite evident that there is a large aneurism of the descending thoracic aorta.

The second case, a man aged about 35, has on inspection of the chest a very well-marked pulsation of the manubrium. The diagnosis of aneurism will be made at a glance. He has had a great deal of dyspnea and pain in the chest. On additional examination it is noted as rather remarkable that with so much pulsation on the manubrium there is little or no flatness. There is a well-marked to-and-fro friction. Inspection of the back shows in the left interscapular region slight bulging, with well-marked visible and palpable pulsation.

Sometimes the diagnosis is hidden beneath a tucked-up undershirt. Last year a robust-looking man consulted me about Nauheim: he had been told that he had heart disease, and a physician in Florida had said that his case was a very suitable one for the Schott baths. When stripped, the diagnosis was made at a glance. The head of the clavicle was lifted out of its bed with each systole, and there was a definite pulsating tumor above the sternal notch with a thrill and a loud to-and-fro murmur. In the numerous examinations he had never taken off his shirt, but had tucked it up, and consequently, nobody had ever noticed the aneurism.

Some years ago I got into trouble by too careful inspection and detecting an early throbbing in the third right interspace. A robust, strong man consulted me for cough, shortness of breath and inability to lie down at night. He had the wheezing, goose-cough, as it is called, and there was to be seen most clearly and distinctly, a pulsation to the right of the sternum. With rest, the symptoms improved and the pulsation lessened remarkably. Other physicians (among them one well-
recognized authority on heart disease) assured the family there must have been a mistake, as there were no signs of aneurism. The patient improved and I saw him about for more than two years. I began to think that there had been a mistake, but subsequent events showed that the diagnosis was correct. Spontaneously, particularly after prolonged rest, the pulsation of an aneurism to the right or left of the sternum may completely disappear. I do not refer here to cases of 20 called dynamic pulsation, but to cases in which the subsequent history and autopsy has confirmed the existence of an aneurism.
WILLIAM BEAUMONT
A Pioneer American Physiologist

William Osler, M.D.
Baltimore

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Come with me for a few moments on a lovely June day in 1822, to what were then far-off northern wilds, to the Island of Michilimacinae, where the waters of Lake Michigan and Lake Huron unite and where stands Fort Mackinac, rich in the memories of Indian and voyageur, one of the four important posts on the upper lakes in the days when the rose and the fleur-de-lys strove for the mastery of the western world. Here the noble Marquette labored for his Lord, and here beneath the chapel of St. Ignace they laid his bones to rest. Here the intrepid LaSalle, the brave Tonty and the resolute Du Luht had halted in their wild wanderings. Its palisades and block-houses had echoed the war-whoops of Ojibwas and Ottawas, of Hurons and Iroquois, and the old fort had been the scene of bloody massacres and hard-fought fights, but at the conclusion of the War of 1812, after two centuries of struggle, peace settled at last on the island. The fort was occupied by United States troops, who kept the Indians in check and did general police duty on the frontier, and the place had become a rendezvous for Indians and voyageurs in the employ of the American Fur Company. On this bright spring morning the village presented an animated scene. The annual return tide to the trading
post was in full course, and the beach was thronged with canoes and batteaux laden with the pelts of the winter’s hunt. Voyageurs and Indians, men, women and children, with here and there a few soldiers, made up a motley crowd. Suddenly from the company’s store there is a loud report of a gun, and amid the confusion and excitement the rumor spreads of an accident, and there is a hurrying of messengers to the barracks for a doctor. In a few minutes (Beaumont says twenty-five or thirty, an eye-witness says three) an alert-looking man in the uniform of a U. S. Army surgeon made his way through the crowd and was at the side of a young French Canadian who had been wounded by the discharge of a gun, and with a composure bred of an exceptional experience of such injuries, prepared to make the examination. Though youthful in appearance, Surgeon Beaumont had seen much service, and at the capture of York and at the investment of Plattsburgh he had shown a coolness and bravery under fire which had won high praise from his superior officers. The man and the opportunity had met—the outcome is my story of this evening.

I. THE OPPORTUNITY—ALEXIS ST. MARTIN.

On the morning of June 6 a young French Canadian, Alexis St. Martin, was standing in the company’s store, “where one of the party was holding a shotgun (not a musket), which was accidentally discharged, the whole charge entering St. Martin’s body. The muzzle was not over three feet from him—I think not more than two. The wadding entered, as well as pieces of his clothing; his shirt took fire; he fell, as we supposed, dead.”

“Doctor Beaumont, the surgeon of the fort, was immediately sent for and reached the wounded man in a very short time, probably three minutes. We had just gotten him on a cot and were taking off some of his clothing. After the doctor had extracted part of the shot, together with pieces of clothing, and dressed his wound carefully, Robert Stuart and others assisting, he left him, remarking: ‘The man can not live thirty-six hours; I will
come and see him by and by.' In two or three hours he visited him again, expressing surprise at finding him doing better than he had anticipated. The next day, after getting out more shot and clothing and cutting off ragged edges of the wound, he informed Mr. Stuart, in my presence, that he thought he would recover."

The description of the wound has been so often quoted as reported in Beaumont's work that I give here the interesting summary which I find in a "Memorial" presented to the Senate and House of Representatives by Beaumont. "The wound was received just under the left breast, and supposed, at the time, to have been mortal. A large portion of the side was blown off, the ribs fractured and openings made into the cavities of the chest and abdomen, through which protruded portions of the lungs and stomach, much lacerated and burnt, exhibiting altogether an appalling and hopeless case. The diaphragm was lacerated and a perforation made directly into the cavity of the stomach, through which food was escaping at the time your memorialist was called to his relief. His life was at first wholly despaired of, but he very unexpectedly survived the immediate effects of the wound, and necessarily continued a long time under the constant professional care and treatment of your memorialist, and, by the blessing of God, finally recovered his health and strength.

"At the end of about ten months the wound was partially healed, but he was still an object altogether miserable and helpless. In this situation he was declared 'a common pauper' by the civil authorities of the county, and it was resolved by them that they were not able, nor required, to provide for or support, and finally declined taking care of him, and, in pursuance of what they probably believed to be their public duty, authorized by

* Statement of G. G. Hubbard, an officer of the company, who was present when St. Martin was shot, quoted by Dr. J. R. Bally, of Mackinac Island, in his address on the occasion of the Beaumont Memorial Exercises, Mackinac Island, July 10, 1900. The Physician and Surgeon, December, 1900.
the laws of the territory, were about to transport him, in this condition, to the place of his nativity in lower Canada, a distance of more than fifteen hundred miles.

"Believing the life of St. Martin must inevitably be sacrificed if such attempt to remove him should be carried into execution at that time, your memorialist, after earnest, repeated, but unavailing, remonstrances against such a course of proceedings, resolved, as the only way to rescue St. Martin from impending misery and death, to arrest the process or transportation and prevent the consequent suffering, by taking him into his own private family, where all the care and attention were bestowed that his condition required.

"St. Martin was, at this time, as before intimated, altogether helpless and suffering under the debilitating effects of his wounds—naked and destitute of everything. In this situation your memorialist received, kept, nursed, medically and surgically treated and sustained him, at much inconvenience and expense, for nearly two years, dressing his wounds daily, and for considerable part of the time twice a day, nursed him, fed him, clothed him, lodged him and furnished him with such necessaries and comforts as his condition and suffering required.

"At the end of these two years he had become able to walk and help himself a little, though unable to provide for his own necessities. In this situation your memorialist retained St. Martin in his family for the special purpose of making physiological experiments."

In the month of May, 1825, Beaumont began the experiments. In June he was ordered to Fort Niagara, where, taking the man with him, he continued the experiments until August. He then took him to Burlington and to Plattsburgh. From the latter place St. Martin returned to Canada, without obtaining Dr. Beaumont's consent. He remained in Canada four years, worked as a voyageur, married and had two children. In 1829 Beaumont succeeded in getting track of St. Martin, and the American Fur Company engaged him
and transported him to Fort Crawford on the upper Mississippi. The side and wound were in the same condition as in 1825. Experiments were continued uninterruptedly until March, 1831, when circumstances made it expedient that he should return with his family to lower Canada. The “circumstances,” as we gather from letters, were the discontent and homesickness of his wife. As illustrating the mode of travel, Beaumont states that St. Martin took his family in an open canoe “via the Mississippi, passing by St. Louis, ascended the Ohio river, then crossed the state of Ohio to the lakes, and descended the Erie and Ontario and the river St. Lawrence to Montreal, where they arrived in June.”

Dr. Beaumont often lays stress on the physical vigor of St. Martin as showing how completely he had recovered from the wound. In November, 1832, he again engaged himself to submit to another series of experiments in Plattsburgh and Washington. The last recorded experiment is in November, 1833.

Among the Beaumont papers, for an examination of which I am much indebted to his daughter, Mrs. Kein (Appendix A), there is a large mass of correspondence relating to St. Martin, extending from 1827, two years after he had left the doctor’s employ, to October, 1852. Alexis was in Dr. Beaumont’s employ in the periods already specified. In 1833 he was enrolled in the United States Army at Washington as Sergeant Alexis St. Martin, of a detachment of orderlies stationed at the War Department. He was then 28 years of age, and was five feet five inches in height.

Among the papers there are two articles of agreement, both signed by the contracting parties, one dated Oct. 19, 1833, and the other November 7 of the same year. In the former he bound himself for a term of one year to “serve, abide and continue with the said William Beaumont, wherever he shall go or travel or reside in any part of the world his covenant servant and diligently and faithfully, etc., . . . that he, the said
Alexis, will at all times during said term when thereto directed or required by said William, submit to assist and promote by all means in his power such philosophical or medical experiments as the said William shall direct or cause to be made on or in the stomach of him, the said Alexis, either through and by means of the aperture or opening thereto in the side of him, the said Alexis, or otherwise, and will obey, suffer and comply with all reasonable and proper orders of or experiments of the said William in relation thereto and in relation to the exhibiting and showing of his said stomach and the powers and properties thereto and of the appurtenances and the powers, properties and situation and state of the contents thereof.” The agreement was that he should be paid his board and lodging and $150 for the year. In the other agreement it is for two years and the remuneration $400. He was paid a certain amount of the money down.

There are some letters from Alexis himself, all written for him and signed with his mark. In June, 1834, he writes that his wife was not willing to let him go and thinks that he can do a great deal better to stay at home. From this time on Alexis was never again in Dr. Beaumont’s employ.

There is a most interesting and protracted correspondence in the years 1836, 1837, 1838, 1839, 1840, 1842, 1846, 1851 and 1852, all relating to attempts to induce Alexis to come to St. Louis. For the greater part of this time he was in Berthier, in the district of Montreal, and the correspondence was chiefly conducted with a Mr. William Morrison, who had been in the northwest fur trade and who took the greatest interest in Alexis and tried to induce him to go to St. Louis. (See Appendix B.)

In 1846 Beaumont sent his son Israel for Alexis, and in a letter dated Aug. 9, 1846, his son writes from Troy: “I have just returned from Montreal, but without Alexis. Upon arriving at Berthier I found that he
owned and lived on a farm about fifteen miles southwest of the village.” Nothing would induce him to go.

The correspondence with Mr. Morrison in 1851 and 1852 is most voluminous, and Dr. Beaumont offered Alexis $500 for the year, with comfortable support for his family. He agreed at one time to go, but it was too late in the winter and he could not get away.

The last letter of the series is dated Oct. 15, 1852, and is from Dr. Beaumont to Alexis, whom he addresses as Mon Ami. Two sentences in this are worth quoting: “Without reference to past efforts and disappointments—or expectation of ever obtaining your services again for the purpose of experiments, etc., upon the proposals and conditions heretofore made and suggested, I now proffer to you in faith and sincerity, new, and I hope satisfactory, terms and conditions to ensure your prompt and faithful compliance with my most fervent desire to have you again with me—not only for my own individual gratification, and the benefits of medical science, but also for your own and family’s present good and future welfare.” He concludes with, “I can say no more, Alexis—you know what I have done for you many years since—what I have been trying, and am still anxious and wishing to do with and for you—what efforts, anxieties, anticipations and disappointments I have suffered from your non-fulfilment of my expectations. Don’t disappoint me more nor forfeit the bounties and blessings reserved for you.”

So much interest was excited by the report of the experiments that it was suggested to Beaumont that he should take Alexis to Europe and submit him there to a more extended series of observations by skilled physiologists. Writing June 10, 1833, he says: “I shall engage him for five or six years if he will agree, of which I expect there is no doubt. He has always been pleased with the idea of going to France. I feel much gratified at the expression of Mr. Livingston’s desire that we should visit Paris, and shall duly consider the interest
he takes in the subject and make the best arrangements I can to meet his views and yours.” Mr. Livingston, the American minister, wrote from Paris March 18, 1834, saying that he had submitted the work to Orfila and the Academy of Sciences, which had appointed a committee to determine if additional experiments were necessary and whether it was advisable to send to America for Alexis. Nothing, I believe, ever came of this, nor, so far as I can find, did Alexis visit Paris. Other attempts were made to secure him for purposes of study. In 1840 a student of Dr. Beaumont’s, George Johnson, then at the University of Pennsylvania, wrote saying that Dr. Jackson had told him of efforts made to get Alexis to London, and Dr. Gibson informed him that the Medical Society of London had raised £300 or £400 to induce St. Martin to come, and that he, Dr. Gibson, had been trying to find St. Martin for his London friends. There are letters in the same year from Dr. R. D. Thomson of London to Professor Silliman urging him to arrange that Dr. Beaumont and Alexis should visit London. In 1856 St. Martin was under the observation of Dr. Francis Gurney Smith, in Philadelphia, who reported a brief series of experiments, so far as I know the only other report made on him.*

St. Martin had to stand a good deal of chaffing about the hole in his side. His comrades called him “the man with a lid on his stomach.” In his memorial address Mr. C. S. Osborn of Sault Ste. Marie states that Miss Catherwood tells a story of Etienne St. Martin fighting with Charlie Charette because Charlie ridiculed his brother. Etienne stabbed him severely and swore that he would kill the whole brigade if they did not stop deriding his brother’s stomach.

At one time St. Martin traveled about exhibiting the wound to physicians, medical students and before medical societies. In a copy of Beaumont’s work, formerly

* Medical Examiner, 1856, and Experiments on Digestion, Phila., 1856.
belonging to Austin Flint, Jr., and now in the possession of a physician of St. Louis, there is a photograph of Alexis sent to Dr. Flint. There are statements made that he went to Europe, but of such a visit I can find no record.

My interest in St. Martin was of quite the general character of a teacher of physiology, who every session referred to his remarkable wound and showed Beaumont's book with the illustration. In the spring of 1880, while still a resident of Montreal, I saw a notice in the newspapers of his death at St. Thomas. I immediately wrote to a physician and to the parish priest, urging them to secure me the privilege of an autopsy and offering to pay a fair sum for the stomach, which I agreed to place in the Army Medical Museum in Washington, but without avail. Subsequently, through the kindness of the Hon. Mr. Justice Baby, I obtained the following details of St. Martin's later life, and the picture here given, which was taken the year before his death so as to show the wound, which I here show you. Judge Baby writes to his friend, Prof. D. C. MacCallum of Montreal, as follows: "I have much pleasure to-day in placing in your hands such information about St. Martin as Revd. Mr. Chicoine, Curé of St. Thomas, has just handed over to me. Alexis Bidigan, dit St. Martin, died at St. Thomas de Jolliette on the 24th of June, 1880, and was buried in the cemetery of the parish on the 28th of the same month. The last sacraments of the Catholic church were ministered to him by the Revd. Curé Chicoine, who also attended at his burial service. The body was then in such an advanced stage of decomposition that it could not be admitted into the church, but had to be left outside during the funeral service. The family resisted all requests—most pressing as they were—on the part of the members of the medical profession for an autopsy, and also kept the body at home much longer than usual and during a hot spell of weather, so as to allow decomposition to set in
and baffle, as they thought, the doctors of the surrounding country and others. They had also the grave dug eight feet below the surface of the ground in order to prevent any attempt at a resurrection. When he died St. Martin was 83 years of age, and left a widow, whose maiden name was Marie Joly. She survived him by nearly seven years, dying at St. Thomas on the 20th of April, 1887, at the very old age of 90 years. They left four children still alive—Alexis, Charles, Henriette and Marie.

"Now I may add the following details for myself. When I came to know St. Martin it must have been a few years before his death. A law suit brought him to my office here in Joliette. I was seized with his interests; he came to my office a good many times, during which visits he spoke to me at great length of his former life, how his wound had been caused, his peregrinations through Europe and the United States, etc. He showed me his wound. He complained bitterly of some doctors who had awfully misused him, and had kind words for others. He had made considerable money during his tours, but had expended and thrown it all away in a frolicsome way, especially in the old country. When I came across him he was rather poor, living on a small, scanty farm in St. Thomas, and very much addicted to drink, almost a drunkard one might say. He was a tall, lean man, with a very dark complexion, and appeared to me then of a morose disposition."

II. THE BOOK.

In the four periods in which Alexis had been under the care and study of Beaumont a large series of observations had been recorded, amounting in all to 238. A preliminary account of the case and of the first group of observations appeared in the Philadelphia Medical Recorder in January, 1825. During the stay in Washington in 1832 the great importance of the observations had become impressed on the Surgeon-General, Dr. Lovell, who seems to have acted in a most generous and
kindly spirit. Beaumont tried to induce him to undertake the arrangement of the observations, but Lovell insisted that he should do the work himself. In the spring of 1833 Alexis was taken to New York and there shown to the prominent members of the profession, and careful drawings and colored sketches were made of the wound by Mr. King. A prospectus of the work was issued and was distributed by the Surgeon-General, who speaks in a letter of sending them to Dr. Franklin Bache and to Dr. Stewart of Philadelphia, and in a letter from Dr. Bache to Dr. Beaumont acknowledging the receipt of a bottle of gastric juice, Bache states that he has placed the prospectus in Mr. Judah Dobson's store and has asked for subscribers. Beaumont did not find New York a very congenial place. He complained of the difficulty of doing the work owing to the vexatious social intercourse. He applied for permission to go to Plattsburgh, in order to complete the book. After having made inquiries in New York and Philadelphia about terms of publication he decided, as the work had to be issued at his own expense, that it could be as well and much more cheaply printed at Plattsburgh, where he would also have the advice and help of his cousin, Dr. Samuel Beaumont. In a letter to the Surgeon-General, dated June 10, 1833, he acknowledges the permission to go to Plattsburgh, and says: "I shall make my arrangements to leave here for Pl. in about a week to rush the execution of the Book as fast as possible. I am now having the drawings taken by Mr. King engraved here."

The summer was occupied in making a fresh series of experiments and getting the work in type. On December 3 he writes the Surgeon-General that the book will be ready for distribution in a few days and that 1,000 copies will be printed.

The work is an octavo volume of 280 pages, entitled "Experiments and Observations on the Gastric Juice and the Physiology of Digestion," by William Beau-
mont, M.D., Surgeon in the United States Army. Plattsburgh. Printed by F. P. Allen, 1833. While it is well and carefully printed, the paper and type are not of the best, and one can not but regret that Beaumont did not take the advice of Dr. Franklin Bache, who urged him strongly not to have the work printed at Plattsburgh, but in Philadelphia, where it could be done in very much better style. The dedication of the work to Joseph Lovell, M.D., Surgeon-General of the United States Army, acknowledges in somewhat laudatory terms the debt which Beaumont felt he owed to his chief, who very gratefully acknowledges the compliment and the kindly feeling, but characterizes the dedication as "somewhat apocryphal."

The work is divided into two main portions; first, the preliminary observations on the general physiology of digestion in seven sections: Section I, Of Aliment; Section II, Of Hunger and Thirst; Section III, of Satisfaction and Satiety; Section IV, Of Mastication, Salivation and Deglutition; Section V, Of Digestion by the Gastric Juice; Section VI, Of the Appearance of the Villous Coat, and of the Motions of the Stomach; Section VII, Of Chylification and Uses of the Bile and Pancreatic Juice. The greater part of the book is occupied by the larger section of the detailed account of the four series of experiments and observations. The work concludes with a series of 51 inferences from the foregoing experiments and observations.

The subsequent history of the book itself is of interest, and may be dealt with here. In 1834 copies of the Plattsburgh edition, printed by F. P. Allen, were issued by Lilly, Wait & Co., of Boston.

In the Beaumont correspondence there are many letters from a Dr. McCall, in Utica, N. Y., who was an intimate friend of a Mr. Wm. Combe, a brother of the well-known physiologist and popular writer, Dr. Andrew Combe of Edinburgh. Doubtless it was through this connection that in 1838 Dr. Combe issued an edi-
tion in Scotland, with numerous notes and comments. (Appendix C.)

The second edition was issued from Burlington, Vt., in 1847, with the same title page, but after Second Edition there are the words, Corrected by Samuel Beaumont, M.D., who was Dr. William Beaumont's cousin. In the preface to this edition the statement is made that the first edition, though a large one of 3,000 copies, had been exhausted. This does not agree with the statement made in a letter of Dec. 3, 1833, to the Surgeon-General, stating that the edition was to be 1,000 copies. Of course more may have been printed before the type was distributed. While it is stated to be a new and improved edition, so far as I can gather it is a verbatim reprint, with no additional observations, but with a good many minor corrections. In an appendix (D) I give an interesting letter from Dr. Samuel Beaumont with reference to the issue of this edition.

A German edition was issued in 1834 with the following title: "Neue Versuche und Beobachtungen ueber den Magensaft und die Physiologie der Verdaunung, auf eine hochst merkwürdige Weise während einer Reihe von 7 Jahren, an einen und demselben Subject angestellt." Beaumont's earlier paper, already referred to, was abstracted in the Magazin der ausländischen Litteratur der gesammten Heilkunde, Hamburg, 1826, and also in the Archives generales de Medecine, Paris, 1828. I can not find that there was a French edition of the work.

The "Experiments and Observations" attracted universal attention, both at home and abroad. The journals of the period contained very full accounts of the work, and within a few years the valuable additions to our knowledge filtered into the text-books of physiology, which to-day in certain descriptions of the gastric juice and of the phenomena of digestion even the very language of the work is copied.
III. THE VALUE OF BEAUMONT’S OBSERVATIONS.

There had been other instances of artificial gastric fistula in man which had been made the subject of experimental study, but the case of St. Martin stands out from all others on account of the ability and care with which the experiments were conducted. As Dr. Combe says, the value of these experiments consists partly in the admirable opportunities for observation which Beaumont enjoyed, and partly in the candid and truth-seeking spirit in which all his inquiries seem to have been conducted. “It would be difficult to point out any observer who excels him in devotion to truth and freedom from the trammels of theory or prejudice. He tells plainly what he saw and leaves every one to draw his own inferences, or where he lays down conclusions he does so with a degree of modesty and fairness of which few perhaps in his circumstances would have been capable.”

To appreciate the value of Beaumont’s studies it is necessary to refer for a few moment’s to our knowledge of the physiology of digestion in the year 1832, the date of the publication. Take, for example, “The Work on Human Physiology” (published in the very year of the appearance of Beaumont’s book), by Dunglison, a man of wide learning and thoroughly informed in the literature of the subject. The five or six old theories of stomach digestion, concoction, putrefaction, trituration, fermentation and maceration, are all discussed, and Wm. Hunter’s pithy remark is quoted, “some physiologists will have it, that the stomach is a mill, others, that it is a fermenting vat, others, again, that it is a stew-pan; but, in my view of the matter, it is neither a mill, a fermenting vat nor a stew-pan; but a stomach, gentlemen, a stomach.”

The theory of chemical solution is accepted. This had been placed on a sound basis by the experiments of Reaumur, Spallanzani and Stevens, while the studies of Tiedemann and Gmelin and of Prout had done much
to solve the problems of the chemistry of the juice. But very much uncertainty existed as to the phenomena occurring during digestion in the stomach, the precise mode of action of the juice, the nature of the juice itself and its action outside the body. On all these points the observations of Beaumont brought clearness and light where there had been previously the greatest obscurity.

The following may be regarded as the most important of the results of Beaumont’s observations: First, the accuracy and completeness of description of the gastric juice itself. You will all recognize the following quotation, which has entered into the text-books and passes current to-day. “Pure gastric juice, when taken directly out of the stomach of a healthy adult, unmixed with any other fluid, save a portion of the mucus of the stomach with which it is most commonly and perhaps always combined, is a clear, transparent fluid; inodorous; a little saltish, and very perceptibly acid. Its taste, when applied to the tongue, is similar to this mucilaginous water slightly acidulated with muriatic acid. It is readily diffusible in water, wine or spirits; slightly effervesces with alkalies; and is an effectual solvent of the \textit{materia alimentaria}. It possesses the property of coagulating albumen, in an eminent degree; is powerfully antiseptic, checking the putrefaction of meat; and effectually restorative of healthy action, when applied to old, foetid sores and foul, ulcerating surfaces.”

Secondly, the confirmation of the observation of Prout that the important acid of the gastric juice was the muriatic or hydrochloric. An analysis of St. Martin’s gastric juice were made by Dunglison, at that time a professor in the University of Virginia, and by Benjamin Silliman of Yale, both of whom determined the presence of free hydrochloric acid. A specimen was sent to the distinguished Swedish chemist, Berzelius, whose report did not arrive in time to be included in
the work. In a letter dated July 19, 1834, he writes to Professor Silliman that he had not been able to make a satisfactory analysis of the juice. The letter is published in Silliman's Journal, Vol. 27, July, 1835.

Thirdly, the recognition of the fact that the essential elements of the gastric juice and the mucus were separate secretions.

Fourthly, the establishment by direct observation of the profound influence on the secretion of the gastric juice and on digestion of mental disturbances.

Fifthly, a more accurate and fuller comparative study of the digestion in the stomach with digestion outside the body, confirming in a most elaborate series of experiments the older observations of Spallanzani and Stevens.

Sixthly, the refutation of many erroneous opinions relating to gastric digestion and the establishment of a number of minor points of great importance, such as, for instance, the rapid disappearance of water from the stomach through the pylorus, a point brought out by recent experiments, but insisted on and amply proven by Beaumont.

Seventhly, the first comprehensive and thorough study of the motions of the stomach, observations on which, indeed, are based the most of our present knowledge.

And lastly, a study of the digestibility of different articles of diet in the stomach, which remains to-day one of the most important contributions ever made to practical dietetics.

The greater rapidity with which solid food is digested, the injurious effects on the stomach of tea and coffee, when taken in excess, the pernicious influence of alcoholic drinks on the digestion, are constantly referred to. An all-important practical point insisted on by Beaumont needs emphatic reiteration to this generation: "The system requires much less than is generally supplied to it. The stomach disposes of a definite
quantity. If more be taken than the actual wants of the economy require, the residue remains in the stomach and becomes a source of irritation and produces a consequent aberration of function, or passes into the lower bowel in an undigested state, and extends to them its deleterious influence. Dyspepsia is oftener the effect of over-eating and over-drinking than of any other cause."

One is much impressed, too, in going over the experiments, to note with what modesty Beaumont refers to his own work. He speaks of himself as a humble "enquirer after truth and a simple experimenter." "Honest objection, no doubt, are entertained against the doctrine of digestion by the gastric juice. That they are so entertained by these gentlemen I have no doubt. And I cheerfully concede to them the merit of great ingenuity, talents and learning, in raising objections to the commonly received hypothesis, as well as ability in maintaining their peculiar opinions. But we ought not to allow ourselves to be seduced by the ingenuity of argument or the blandishments of style. Truth, like beauty, when 'unadorned is adorned the most'; and in prosecuting these experiments and inquiries, I believe I have been guided by its light. Facts are more persuasive than arguments, however ingeniously made, and by their eloquence I hope I have been able to plead for the support and maintenance of those doctrines which have had for their advocates such men as Sydenham, Hunter, Spallanzani, Richerand, Abernethy, Broussais, Philip, Paris, Bostock, the Heidelberg and Paris professors, Dunglison, and a host of other luminaries in the science of physiology."

In reality Beaumont anticipated some of the most recent studies in the physiology of digestion. Doubtless many of you have heard of Professor Pawlow's, of St. Petersburg, new work on the subject. It has been translated into German, and I see that an English edition is advertised. He has studied the gastric juice in an iso-
lated pouch, ingeniously made at the fundus of the stomach of the dog, from which the juice could be obtained in a pure state. One of his results is the very first announced by Beaumont and confirmed by scores of observations on St. Martin, viz., that, as he says, "the gastric juice never appears to be accumulated in the cavity of the stomach while fasting." Pawlow has shown very clearly that there is a relation between the amount of food taken and the quantity of gastric juice secreted. Beaumont came to the same conclusion: "when aliment is received the juice is given in exact proportion to its requirements for solution." A third point on which Pawlow lays stress is the curve of secretion of the gastric juice, the manner in which it is poured out during digestion. The greatest secretion, he has shown, takes place in the earlier hours. On this point hear Beaumont: "It (the gastric juice) then begins to exude from the proper vessels and increases in proportion to the quantity of aliment naturally required and received." And again: "When a due and moderate supply of food has been received it is probable that the whole quantity of gastric juice for its complete solution is secreted and mixed with it in a short time." A fourth point, worked out beautifully by Pawlow, is the adaptation of the juice to the nature of the food, on which I do not see any reference by Beaumont, but there are no experiments more full than those in which he deals with the influence of exercise, weather and the emotions on the quantity of the juice secreted.

IV. MAN AND DOCTOR.

Sketches of Dr. Beaumont's life have appeared from time to time. There is a worthy memoir by Dr. T. Reynburn in the St. Louis Medical and Surgical Journal, 1854, and Dr. A. J. Steele, at the first annual commencement of the Beaumont Medical College, 1887, told well and graphically the story of his life. A few years ago Dr. Frank J. Lutz, of this city, sketched his life
for the memorial meeting of the Michigan State Medical Society on the occasion of the dedication of a Beaumont monument.

Among the papers kindly sent to me by his daughter, Mrs. Keim, are many autobiographical materials, particularly relating to his early studies and to his work as a surgeon in the War of 1812. There is an excellent paper in the handwriting, it is said, of his son, giving a summary of the earlier period of his life. So far as I know this has not been published, and I give it in full:

Dr. William Beaumont was born in the town of Lebanon, Conn., on the 21st day of November, A. D. 1785. His father was a thriving farmer and an active politician of the proud old Jeffersonian school, whose highest boast was his firm support and strict adherence to the honest principles he advocated. William was his third son, who, in the winter of 1806-7, in the 22d year of his age, prompted by a spirit of independence and adventure, left the paternal roof to seek a fortune and a name. His outfit consisted of a horse and cutter, a barrel of cider, and one hundred dollars of hard-earned money. With this he started, laying his course northwardly, without any particular destination, Honor his rule of action, Truth his only landmark, and trust placed implicitly in Heaven. Traversing the western part of Massachusetts and Vermont in the spring of 1807 he arrived at the little village of Champlain, N. Y., on the Canada frontier—an utter stranger, friendless and alone. But honesty of purpose and true energy invariably work good results. He soon gained the people’s confidence and was entrusted with their village school, which he conducted about three years, devoting his leisure hours to the study of medical works from the library of Dr. Seth Pomeroy, his first patron. He then went over to St. Albans, Vt., where he entered the office of Dr. Benjamin Chandler and commenced a regular course of medical reading, which he followed for two years, gaining the utmost confidence and esteem of his kind preceptor and friends. About this time the War of 1812 commenced, and he applied for an appointment in the U. S. Army, successfully. He was appointed assistant-surgeon to the Sixth Infantry, and joined his regiment at Plattsburgh, N. Y., on the 13th of September, 1812. On the 19th of March, 1813, he marched from Plattsburgh with the First Brigade, for Sackett’s Harbor, where they arrived on the 27th inst. Here he remained in camp till the 22d of April, when he embarked with the troops on Lake Ontario. His journal will best tell this portion of his history:

"April 22, 1813.—Embarked with Captain Humphreys, Wal-
worth and Muhlenburg, and companies on board the Schooner 'Julia.' The rest of the brigade, and the Second, with Fore­
sith's Rifle Regiment and the Eighth Artillery, on board a ship, brig and schooner—remain in the harbor till next morning.

"23d.—11 o'clock a. m.—Weighs anchor and put out under the impression we were going to Kingston. Got out 15 or 20 miles—encountered a storm—wind ahead and the fleet returned to harbor.

"24th.—6 o'clock a. m.—Put out with a fair wind—mild and pleasant—the fleet sailing in fine order.

"26th.—Wind pretty strong—increasing—waves run high, tossing our vessels roughly. At half past four pass the mouth of Niagara river. This circumstance baffles imagination as to where we are going—first impressed with the idea of Kingston—then to Niagara—but now our destination must be 'Little York.' At sunset came in view of York Town and the Fort, where we lay off some 3 or 4 leagues for the night.

"27th.—Sailed into harbor and came to anchor a little below the British Garrison. Filled the boats and effected a landing, though not without difficulty and the loss of some men. The British marched their troops down the beach to cut us off as landing, and, though they had every advantage, they could not effect their design. A hot engagement ensued, in which the enemy lost nearly a third of their men and were soon com­
pelled to quit the field, leaving their dead and wounded strewn in every direction. They retired to the Garrison, but from the loss sustained in the engagement, the undaunted courage of our men, and the brisk firing from our fleet, with the 12 and 32 pounders, they were soon obliged to evacuate it and retreat with all possible speed.—Driven to this alternative they devised the inhuman project of blowing up their magazine, containing 300 pounds of powder, the explosion of which had well-nigh destroyed our army. Over 300 were wounded and about 60 killed on the spot, by stones of all dimensions falling, like a shower of hail, in the midst of our ranks. A most distressing scene ensues in the hospital. Nothing is heard but the agoniz­
groans and supplications of the wounded and the dying. The surgeons wade in blood cutting off arms and legs and tre­
paning heads, while the poor sufferers cry, 'O, my God! Doct­
or, relieve me from this misery! I can not live!' "Twas enough to touch the veriest heart of steel and move the most relentless savage. Imagine the shocking scene, where fellow­
beings lie mashed and mangled—legs and arms broken and sun­
dered—heads and bodies bruised and mutilated to disfigure­
ment! My deepest sympathies were roused—I cut and slashed for 36 hours without food or sleep.

"29th.—Dressed upwards of 50 patients—from simple contu­
sions to the worst of compound fractures—more than half the latter. Performed two cases of amputation and one of trepan­
ing. At 12 p. m. retired to rest my fatigued body and mind."
One month after the taking of York he witnessed the storming of Fort George. The troops were transported from York to "Four-Mile Creek" (in the vicinity of Ft. George), where they encamped from the 10th of May to the 27th, when they advanced to the attack. His journal runs thus:

"May 27 (1813).—Embarked at break of day—Col. Scott with 800 men, for the advanced guard, supported by the First Brigade, commanded by General Boyd, moved in concert with the shipping to the enemy's shore and landed under their battery and in front of their fire with surprising success, not losing more than 30 men in the engagement, though the enemy's whole force was placed in the most advantageous situation possible. We routed them from their chosen spot—drove them from the country and took possession of the town and garrison."

On the 11th of September, 1814, he was at the Battle of Plattsburgh, still serving as assistant-surgeon, though doing all the duty of a full surgeon. At the close of the war, in 1815, when the Army was cut down, he was retained in service, but resigned soon after, deeming himself unjustly treated by the government in having others, younger and less experienced, promoted over him.

In 1816 he settled in Plattsburgh and remained there four years in successful practice. In the meantime his army friends had persuaded him to join the service again, and, having applied, he was reappointed, in 1820, and ordered to Ft. Mackinac as post surgeon. At the end of the first year he obtained leave of absence, returned to Plattsburgh and married one of the most amiable and interesting ladies of that place. (She still survives her honored husband, and in her green old age is loved devotedly by all who know her.) He returned to Mackinac the same year, and in 1822 came in possession of Alexis St. Martin, the subject of his "Experiments on the Gastric Juice." By the accidental discharge of his gun, while hunting, St. Martin had dangerously wounded himself in the abdomen and came under the treatment of Dr. Beaumont, who healed the wound (in itself a triumph of skill almost unequalled) and in 1825 commenced a series of experiments, the results of which have a world-wide publication. These experiments were continued, with various interruptions, for eight years, during which time he was ordered from post to post—now at Niagara, N. Y., anon as Green Bay, Mich., and finally at Fort Crawford, on the Mississippi. In 1834 he was ordered to St. Louis, where he remained in service till 1839, when he resigned. He then commenced service with the citizens of St. Louis, and from that time till the period of his last illness, enjoyed an extensive and distinguished practice, interrupted only by the base attacks of a few disgraceful and malicious knaves (self-deemed members of the medical profession) who sought to destroy a reputation which they could not share.
They gained nothing except some little unenviable notoriety and they have skulked away like famished wolves, to die in their hiding places.

The dates of Beaumont's commissions in the army are as follows: Surgeon's Mate, Sixth Regiment of Infantry, Dec. 2, 1812; Cavalry, March 27, 1819; Post Surgeon, Dec. 4, 1819; Surgeon First Regiment and Surgeon, Nov. 6, 1836.

From the biographical sketches of Reyburn, Steele and Lutz, and from the personal reminiscences of his friends, Drs. J. B. Johnson, S. Pollak and Wm. McPheeters, who fortunately remains with you, full of years and honors, we gather a clearly-defined picture of the latter years of his life. It is that of a faithful, honest, hard-working practitioner, doing his duty to his patients, and working with zeal and ability for the best interests of the profession. The strong common sense which he exhibited in his experimental work made him a good physician and a trusty adviser in cases of surgery. Among his letters there are some interesting pictures of his life, particularly in his letters to his cousin, Dr. Samuel Beaumont. Writing to him April 4, 1846, he says:

I have a laborious, lucrative and increasing practice, more than I can possibly attend to, though I have an assistant, Dr. Johnson, a young man who was a pupil of mine from 1835 to 1840. He then went to Philadelphia a year or two to attend lectures, and graduated, and returned here again in 1842, and has been very busy ever since and is so now, but notwithstanding I decline more practice daily than half the doctors in the city get in a week. You thought when you were here before that there was too much competition for you ever to think of succeeding in business here—there is ten times as much now and the better I succeed and prosper for it. You must come with a different feeling from your former—with a determination to follow in my wake and stem the current that I will break for you. I am now in the grand climacteric of life, threescore years and over, with equal or more zeal and ability to do good and contribute to professional service than at forty-five, and I now look forward with pleasing anticipation of success and greater usefulness—have ample competence for ourselves and children, and no doleful or dreaded aspect of the future—to be sure I have to wrestle with some adverse circumstances of
life, and more particularly to defend myself against the envious, mean and professional jealousies and the consequent prejudices of some men, but I triumph over them all and go ahead in defiance of them.*

His professional work increased enormously with the rapid growth of the city, but he felt, even in his old age, that delicious exhilaration which it is your pleasure and privilege to enjoy here in the west in a degree rarely experienced by your eastern confrères. Here is a cheery paragraph from a letter dated Oct. 20, 1852: "Domestic affairs are easy, peaceable and pleasant. Health of community good—no severe epidemic diseases prevalent—weather remarkably pleasant—business of all kinds increasing—product of the earth abundant—money plenty—railroads progressing with almost telegraphic speed—I expect to come to Plattsburgh next summer all the way by rail."

But work was becoming more burdensome to a man nearing threescore years and ten, and he expresses it in another letter when he says: "There is an immense professional practice in this city. I get tired of it, and have been trying hard to withdraw from it altogether, but the more I try the tighter I seem to be held to it by the people. I am actually persecuted, worried and almost worn out with valetudinarian importunities and hypochondriacal groans, repinings and lamentations—Amen."

He continued at work until March, 1853, when he had an accident—a fall while descending some steps. A few weeks later a carbuncle appeared on the neck, and proved fatal April 25. One who knew him well wrote the following estimate (quoted by Dr. F. J. Lutz in his sketch of Beaumont):

"He was gifted with strong natural powers, which working upon an extensive experience in life, resulted in a species of natural sagacity, which, as I suppose,

* He had evidently hopes that when his cousin and son arrived with Alexis they would arrange and plan for another series of experiments and in another year or two make another book, better than the old one.
was something peculiar in him, and not to be attained by any course of study. His temperament was ardent, but never got the better of his instructed and disciplined judgment, and whenever or however employed, he ever adopted the most judicious means for attaining ends that were always honorable. In the sick room, he was a model of patience and kindness, his intuitive perceptions, guiding a pure benevolence, never failed to inspire confidence, and thus he belonged to that class of physicians whose very presence affords Nature a sensible relief."

You do well, citizens of St. Louis and members of our profession, to cherish the memory of William Beaumont. Alive you honored and rewarded him, and there is no reproach against you of neglected merit and talents unrecognized. The profession of the northern part of the state of Michigan has honored itself in erecting a monument to his memory near the scene of his disinterested labors in the cause of humanity and science. His name is linked with one of your educational institutions, and joined with that of a distinguished laborer in another field of practice. But he has a far higher honor than any you can give him here—the honor that can only come when the man and the opportunity meet—and match. Beaumont is the pioneer physiologist of this country, the first to make an important and enduring contribution to this science. His work remains a model of patient, persevering investigation, experiment and research, and the highest praise we can give him is to say that he lived up to and fulfilled the ideals with which he set out and which he expressed when he said: "Truth, like beauty, when 'unadorned, is adorned the most;' and, in prosecuting these experiments and enquiries, I believe I have been guided by its light."

APPENDIX A.

The Beaumont papers in the possession of his daughter, Mrs. Keim of St. Louis, consist of (1) interesting certificates from his preceptors, Dr. Pomeroy and Dr. Chandler, the license from the Third Medical Society of Vermont, the commissions in the
U. S. Army, several certificates of honorary membership in societies, and the parchment of the M.D. degree conferred upon him, *honoris causa*, by the Columbian University of Washington, 1833; (2) a journal containing his experiences in the War of 1812, from which I give an extract, a journal of his trip to Fort Mackinac, a journal containing the reports of many cases, among them that of St. Martin (in addition there is a protocol of the case in loose folio sheets), a journal of the experiments, and a commonplace book of receipts and jottings; (3) an extensive correspondence relating to St. Martin and the book, and many rough drafts of sections of the book; (4) a large mass of personal correspondence, much of it of interest as relating to conditions of practice in St. Louis.

The picture reproduced here in his army uniform is from a miniature; the picture which has been previously reproduced is of an older man from a daguerreotype. It is satisfactory to know that the ultimate destination of this most valuable collection of papers is the Surgeon-General's Library of the United States Army, of which Dr. Beaumont was so distinguished an ornament.

**APPENDIX B.**

On Oct. 20, 1853, he writes to his cousin, Dr. Samuel Beaumont, on the subject of "that old, fistulous Alexis," as he calls him. "Alexis' answer to yours is the very fac-simile or stereotype of all his Jesuitical letters to me for the last fifteen years. His object seems only to be to get a heavy bonus and undue advance from me and then disappoint and deceive me, or to palm and impose himself and whole family upon me for support for life."

"I have evaded his designs so far; but I verily fear that the strong and increasing impulse of conscious conviction of the great benefits and important usefulness of further and more accurate physiological investigation of the subject will compel me to still further efforts and sacrifices to obtain him. Physiological authors and most able writers on dietetics and gastric functions generally demand it of me in trumpet tones."

"I must have him at all hazards, and obtain the necessary assistance to my individual and private efforts or transfer him to some competent scientific institution for thorough investigation and report—I must retrieve my past ignorance, imbecility and professional remissness of a quarter of a century, or more, by double diligence, intense study and untiring application of soul and body to the subject before I die—"

Should posthumous Time retain my name,
Let historic truths declare my fame.

"Simultaneous with this I write to Mr. Morrison and Alexis my last and final letters—perhaps, proposing to him, as bribe to his cupidity, to give him $500 to come to me without his family, for one year—$300 of them for his salary, and $200
for the support and contentment of his family to remain in
Canada in the meantime—with the privilege of bringing them
on here another year, upon my former proposition of $300 a
year, at his own expense and responsibility and support them
himself after they get here out of his $300 salary—I think he
will take the bait and come on this fall, and when I get him
alone again into my keeping and engagement, I will take good
care to control him as I please.”

APPENDIX C.

Letter from Dr. Andrew Combe, May 1, 1838:

“My Dear Sir—May I beg your acceptance of the accompany-
ing volumes as a small expression of my respect for your char-
acter and scientific labors. I need not detain you by repeating
in this note the high estimation in which I hold you. The vol-
umes herewith sent will, I trust, convince you of the fact, and
that it will not be my fault if you do not receive the credit
justly due to your valuable and disinterested services. I re-
main, My Dear Sir,

                         Very respectfully yours,

                                       ANDW. COMBE.”

APPENDIX D.

Letter from Dr. Samuel Beaumont, March 16, 1846:

“Your letter of the 1st of February arrived here in the
course of mail, and I have attended to the business which you
authorized me to do. I am afraid, however, that you will be
disappointed, and perhaps dissatisfied with the arrangement.
Mr. Goodrich came here some five or six days after I received
your letter, and made his proposal, which was to give you
every tenth copy for the privilege of publishing an edition.
The number he proposed to publish was fifteen hundred, which
would give you 150 copies. I did not like to close the bargain
on this condition, and he was not disposed to give any more.
This was in the evening. I told him to give me time till the
next morning, and I would make up my mind. In the morning,
after consultation, I concluded to offer him the copyright for
the unexpired time (only one year) for two hundred copies.
After some demurring, we closed the bargain. I then thought
and I still think it was not enough; but it was all I could get.
In making up my mind the following considerations presented
themselves: First, that the copyright would expire in one
year, and he would then have the right to print it without
consulting the author; second, that it would be somewhat mor-
tifying to the author not to have his work republished, even if
no great pecuniary benefit was to be obtained by such a repub-
lication; and it appeared to me to be quite certain that a new
edition would not be soon printed, if I let this opportunity
slip; third, I have been long anxious, as I presume you have
been, to see the work gotten up in a better dress than it origi-
ally had, and in a way which will give it a general credit
and more notoriety among all classes of the reading public than it has heretofore possessed—in fact, make it a standard work; fourth, it has given us a chance to give it a thorough correction, a thing which was very desirable. The work, you recollect, was got up in a great hurry, and a great many errors escaped our notice. You may also recollect that the Philadelphia reviewer spoke of the inaccuracies in the work. And he had reason enough for it. In looking over the work critically with a view of correction, I have been perfectly astonished at the errors that occur on almost every page. And although we understood perfectly what we meant to say, the reader would find it somewhat difficult to decipher our meaning. In the first 140 pages I made nearly 300 corrections. These are practically merely verbal alterations or change of phrases or sentences so as to make them more accurate or perspicuous. I have in no case so changed the text as to give it a different meaning. I flatter myself that it will now be more worthy the public patronage; and if for no other, this chance for correction I consider alone almost a sufficient renumeration for the brief limits of the copyright. I have also written a preface for the second edition, making quotations from American and European authorities in praise of the merits of the work. From delicacy I have written this as from the publisher. I think it is pretty well done. The work will probably be published in the course of about a month, and those designed for you will be delivered to me, when I shall send them to you. He guarantees not to sell in the state of Missouri, or the states south and west of that state. But that, of course, is all gammon. The book will be thrown into market, and he can not control the direction in which it will go."