THE HOME TREATMENT OF CONSUMPTION.

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In the city, from the country or from small towns, I not infrequently see persons with pulmonary tuberculosis whose circumstances are such that change of climate or life in a sanitarium is out of the question; and when we reflect for a moment on the enormous number of cases of phthisis and the trifling accommodation offered in sanitaria, the practical problem which confronts us is, how best to treat the 95 per cent. of cases necessarily confined to their homes. Cannot these poor victims reap some benefit from the recent experience of the profession?

The usual surroundings of a consumptive are too well known to all of us. In a majority of cases the treatment is desultory, unsystematic and directed to symptoms alone. It is not too sweeping an assertion to say that of the 8000 or 10,000 cases of consumption in the city of Baltimore today, few live under a definite regime. Last spring I saw in rapid succession two cases which impressed upon me forcibly the familiar fact that our theoretical knowledge of this disease has, as is so often the case, not reached a practical working basis. In a small house in South Baltimore I saw a young man, aged eighteen (one of five children), who had had tuberculosis for at least nine months. Nothing could have been more unfavorable than his surroundings, though the people were of the mechanic class, and of good intelligence. The room was stuffy, ill-ventilated, with both windows closely shut, and the temperature of the room, heated by a small stove, was nearly 80°. He had been in bed for at least three months, with much cough and a great deal of expectoration, some of which was visible on the floor, as it did not always reach the spittoon. He had high fever, loss of appetite, and was being fed on panopeptone and beef extracts. The room had a good exposure, and I suggested to the young man to have the bed moved to the window, to be well covered up, and to rest in the sunshine during part of every day. The reply was that it would kill him, and I could see by the mother's looks that she was of the same opinion. The doctor, too, I am afraid, regarded me as a fanatic. In the same week I saw a similar picture in a different setting, a young girl, who had been in bed for many weeks, with high, irregular fever and a rapidly-progressing disease. I could see that the suggestion of an open-air course of treatment was extremely distasteful, but she was induced to go to the Adirondacks, where she has done very well.

Arrest or cure of tuberculosis is a question entirely of nutrition, and the essential factor is so to improve the resisting forces of the body that the bacilli cannot make further progress, but are so hemmed in that they are either prevented effectually from breaking through the entrenchments, or, in rare cases, they are forced to capitulate and are put to the sword. Of the measures by which
the general nutrition of the body may be encouraged and improved, the first and most important is:

*Fresh Air.*—For more than two centuries the clearer-headed members of the profession have known that an open-air life sometimes cures a case of phthisis. One of the earliest and most interesting cases of this kind is reported by John Locke, the philosopher, in his "Anecdota Sydenhamiana." "Mr. Lawrence, Dr. Sydenham's Nephew after a fever fell into a Cough, & other signs of an incipient Phthisis, (the Morbidic matter being violently translated in upon his Lungs) and at length the Diarrhoea colliquativa came on: then ye Dr sent him into ye Country on Horseback, (tho he was see weak yt he could hardly walk) & ordered him to ride 6 or 7 miles ye first day, (wch he did) and to encrease dayly his Journey as he shd be able, untill he had rid 150 miles: When he had travelld half ye way his Diarrhoea stopte, & at last he came to ye end of his Journey, & was pretty well (at least somewhat better) & had a good appetite; but when he had staid at his Sister's house some 4 or 5 days his Diarrhoea came on again; the Dr had ordered him not to stay above 2 days at most; for if they stay before they are recovered this spoils all again; & therefore he betook himself to his riding again, and in 4 days came up to London perfectly cur'd. The same course hath ye Dr put others upon, especially in Pulmonic Diseases, & wth ye like Success when all things else had faileth him: & he was not ashamed to own yt he was fain to borrow a cure from this way now & then when he found himself puzzled with some lingering Distemper not reducible to a common & known (sic) Disease."

This reminds one of Dr. H. I. Bowditch's description of the ride which did him so much good when as a young man he was supposed to have lung trouble.

The quality of the fresh air in our large cities may not be very good, but it is the best a large proportion of our patients can possibly get to breathe, and it is a great deal better than the atmosphere of the overheated, ill-ventilated rooms in which a majority of them live.

I give the following directions: Take the almanac and count off the hours of sunshine. In winter cut off two hours in the morning and an hour in the evening, and for the rest of the day the patient is to be out of doors. If there is no possible arrangement for life out of doors, the patient is to be in a room with a southern exposure with the windows wide open. The bed is to be moved into the sunshine. If there is a balcony or a veranda with a good outlook towards the south, it should be arranged for the patient; if not, a sheltered protection can be put up in the yard at a very moderate cost. On a well-padded lounge, covered with a couple of thick blankets, well wrapped up, the patient sits or reclines all day, coming in only to attend to the calls of nature. Only on blistering, stormy or very rainy days the patient is to remain in the house. No degree of cold is a contraindication. This continuous open-air life, at rest, is the most powerful influence we possess today against the fever of tuberculosis. It may take a month, it may take two or even three months before the temperature reaches normal, but it has been one of the many valuable lessons which we have learned from Dr. Trudeau, that in the fever of consumption the patient should not only be out of doors, but at rest, taking no exercise. The bedroom of the patient should be
thoroughly ventilated, and the patient should be accustomed gradually to sleep with the window open.

Secondly, Food.—The stomach controls the situation in pulmonary tuberculosis. In any long series of cases the patients who do well are those who can take plenty of food. An important cause of the lack of appetite and feeble digestion is the persistent fever, and we often find that as the temperature falls the appetite improves. It is easy to lay down rules; very hard to carry them out. Each case must be dealt with separately, but as large a quantity of food as possible should be given. Overfeeding or stuffing, when possible, should be practised, and the patient should be encouraged to pay as little attention to his subjective gastric sensations as possible. We rarely can carry out the autocratic, cast-iron method followed at Nordrach, which insists that a patient who has vomited a meal shall, *nolens volens*, eat another very shortly of the same character. For some time I have been urging the patients to accustom themselves to taking raw eggs, beginning with one three times a day, and increasing one a week until they took, if possible, twenty or twenty-four daily. For the hyperalimentation this is probably the simplest and most satisfactory diet. It has been carried out with marked success by Dr. Ely of Rochester, who literally prescribes eggs by the dozen. Broken into the egg-cup, sprinkled with a little pepper and salt, the egg can be readily swallowed without breaking the yolk. It is most important to get the patient accustomed to taking the natural foods. Milk and cream and butter, meat and eggs and oysters should constitute the main part of the diet.

The medicinal treatment of cases may be divided into—first, the use of stomachics, bitter tonics and certain digestives; secondly, remedies such as codliver oil, hypophosphites and creasote, the benefits of which are chiefly in promoting general nutrition, and, thirdly, remedies for the relief of certain symptoms, as cough, pain, night sweats, etc.

In December last a young woman came to me from one of the towns in the State with well-marked tuberculosis. Her grandmother and two of her father's brothers had died of consumption. She had a cough off and on for three years, and for more than a year she had a great deal of fever, had lost very much in weight and had profuse night sweats. She never had had any vomiting. When I saw her she had high fever (temperature 103°), and there were signs of extensive disease at the right apex—flattening dullness on percussion with resonant rales as low as the fourth rib. There were signs of involvement of the right apex behind, and there were a few crackling rales at the apex of the lower lobe on the left side behind. She was short of breath, and looked thin and pale. Her weight was 109 pounds. I gave her directions such as I have indicated, and she has given me a brief statement in her own words of her progress in the eleven months. She writes as follows (November 10): "When I begun treatment the first day I sat out was December 11, 1898; don't know just how cold it was, but could see the river from our porch and they were skating. In winter usually had breakfast about 8 and went outdoors about 9. When I begun was not well enough to walk much, was so short of breath; after sitting out for some weeks would walk up and down porch an hour before sitting down. I spent a good deal of my time reading; became so interested in my book at times forgot how cold it was."
The first two weeks I took three eggs a day, one at 10 A.M., another at 3 and another before going to bed; then six a day, two at a time, and continued to increase till I got up to fifteen a day; continued that number for two months or more, then took twelve a day for three months, then nine. For breakfast I had oatmeal and cream and toast, or small piece of beefsteak and coffee; dinner at 12, drank one glass of milk and ate anything that was on the table in the line of meats or vegetables (provided I liked them); seldom if ever eat desserts. Went out immediately after dinner and remained there until sundown; more eggs at 3 and supper at 6: another glass of milk, and with that a small piece of meat, as a rule; and bread. Eggs again at 9, and go to bed between 9 and 10. Was sitting out one day when the thermometer registered 10° below zero. When it felt like snow or rain remained indoors. I kept this up till the weather was warm and then went driving, took eggs along and stayed out in country till dinner time; drove out again late in evening, and after my return home would sit out till after 10 o'clock. When I begun treatment had bad cough, expectorated a great deal and no appetite. The cough begun to get better, and after about four months I coughed very little; now, so rarely and expectorate so very seldom that it is hardly worth mentioning. When I consulted you last December weighed 109 pounds; now tip the scales at 132 pounds. I have improved steadily and gained in flesh gradually from the above date.

This very practical story illustrates what could be done by many patients. Last spring I happened to be in the town in which this girl lived, and I fortunately thought of her and paid her a visit. She lived in a small two-story house, with a narrow balcony on the first story behind, and here at half-past eleven one morning I found her carefully wrapped up. She looked a different girl, and the report indicates that she has done remarkably well. At the time of my visit she was without fever, but there were still numerous moist rales at the right apex.

Since writing the above I have seen this patient (December 1), who looks remarkably well, has a good color, is free from fever, has no cough, no expectoration and weighs 133 pounds. Luckily I dictated a note on the condition of the lung at the time of her first visit, otherwise I should not have believed the extent of the change. The resonance is still impaired, the flattening is marked beneath the right clavicle, the breath sounds are harsh, the expiration prolonged, but there are only a few dry crackling rales on coughing or on deep breathing. There were no signs at the apex of the lower lobe of the left lung behind.

Two additional points of interest may be mentioned. She has not had a doctor, and she has not had a dose of medicine except an occasional dose of paregoric for the cough. She took creasote for a short time, but afterwards gave it up. Shortly before she visited me her physician died, and I did not know, until my visit to her, that she had not been under any, professional care. She could not have done better had she been at the Adirondacks under Dr. Trudeau.

A rigid regimen, a life of rules and regulations, a dominant will on the part of the doctor, willing obedience on the part of the patient and friends—these, with the conditions we have discussed, are necessary in the successful treatment of pulmonary tuberculosis.
On Splenic Anæmia.

BY

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ON SPLENIC ANÆMIA.

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Under the names of splenic pseudoleukæmia, anæmia splenica, lymphadénie splénilque, and the splenic form of Hodgkin's disease is described an idiopathic enlargement of the spleen with anæmia. I prefer the name splenic anæmia, which indicates the two essential features.

From Griesinger's clinic, in 1866, Gretzel1 described a case of enlargement of the spleen with anæmia in a child of ten months. Griesinger, who termed the condition anæmia splenica, had many such cases in adults which had terminated fatally. He recognized the condition as a non-leuæmic counterpart of the ordinary splenic leukæmia.

In 1871, H. C. Wood,2 of Philadelphia, in a paper on the relations of leukæmia and pseudoleukæmia, brought the subject to the notice of the profession in this country. After speaking of the two forms of the latter, in which the lymphatics are involved alone, or the lymphatics with the spleen, he says: "I now desire to show that there is still a third form of pseudoleukæmia—a splenic variety. Under the names of tumor of the spleen, splenic cachexia, etc., from time far back, medical records furnish accounts of cases which I believe represent this affection." The case which he reported was very characteristic; the spleen was enormously enlarged and the anæmia extreme, without any increase in the leucocytes. Usually described with Hodgkin's disease or pseudoleukæmia, splenic anæmia has not received until lately widespread recognition. Thus while familiar with the papers of Wood, Strümpell and others, and although I had had cases under my care, I did not discuss the diseases in a separate section in Pepper's System of Medicine, 1885, vol. iii., but only referred to it under the differential diagnosis in pernicious anæmia and in leukæmia. The critical summary of the literature, by Dr. Sippy, in the November number of this Journal (in which, by the way, Dr. Wood's paper is overlooked) makes superfluous any additional references to the literature of the subject. I give here, as briefly as possible, my experience with this condition, limiting the cases strictly to those which have presented a primitive splenomegaly and anæmia without enlargement of the lymph-glands.

1 Berliner klinische Wochenschrift, Band iii.
2 The American Journal of the Medical Sciences.
I purposely have not spoken of anæmia with enlarged spleen in very young children, a subject which requires separate consideration.

**Case I. Malaria in India some years previously; no syphilis; recurring attacks of hemorrhage from the stomach; enlarged spleen; progressive anæmia; ascites; death from hæmatemesis.**—This patient, a man, aged thirty-six years, was admitted to the Montreal General Hospital, September 2, 1879, with anæmia. He had a very much enlarged spleen, which extended to the navel, and the lower edge was below the transverse navel line. There was no enlargement of the lymph-glands. The red blood-corpuscles were under 2,000,000 per c.mm. The hæmoglobin unfortunately was not estimated. There was no leukæmia. He had served with the army in India, and had had intermittent fever. He had had recurring attacks of hæmatemesis. Two months before admission he began to have dropsy of the legs and abdomen.

**Case II. Severe hæmatemesis at the ninth year, again at the eleventh year; anæmia; swelling of the feet; enlarged spleen.**—Girl, aged eleven years, seen August 13, 1879. Two years before she had had a very severe hemorrhage from the stomach, from which she recovered, though she remained somewhat pale. A month before I saw her she had a second attack, in which she lost, the mother said, nearly three quarts of blood in thirty-six hours. She was very anæmic. The red blood-corpuscles were 2,250,000; leucocytes, 7120 per c.mm.

These two cases were reported in full in the Canada Medical and Surgical Journal, vol. xi.

**Case III. Recurring attacks of hæmatemesis and melena between 1885 and 1897; excellent health in the intervals; chronic enlargement of the spleen; death in an attack.** Anatomical summary: Chronic hyperplasia of the spleen; liver smooth, macroscopically showing no signs of cirrhosis; microscopically showing only fatty changes.—W. M., aged thirty-five years, seen on December 9, 1892, complaining of hemorrhage from the bowels. This patient was very anæmic after each hemorrhage. When I saw him first he was only slightly anæmic. The blood was examined, but unfortunately the slip with the count was mislaid. There was no leucocytosis, no enlargement of the lymph-glands.

**Case IV. No history of malaria or of syphilis; nearly ten years ago first attack of hæmatemesis; since then, at intervals of about a year, very severe attacks, in which he vomited blood and passed blood in the stools; enlarged spleen; exploratory laparotomy; stomach and duodenum normal; liver smooth, not cirrhotic; removal of enlarged spleen; recovery.**—C. D. B., aged thirty-three years, of Fincastle, Va., farmer, admitted on March 9, 1898, complaining of hemorrhages from the stomach and bowels, and pain, with enlargement in the left side of the abdomen. On his first admission, four months after the last hemorrhage, the red blood-corpuscles were 3,000,000, the leucocytes 2800 per c.mm., and hæmoglobin 25 per cent. Differential count: polymorphonuclears, 84.4 per cent.; small mononuclears, 4.4 per cent.; large mononuclears, 5 per cent.; transitionalis, 3.4 per cent.; eosinophiles, 2.8 per cent. There was no enlargement of the lymph-glands. This patient has been heard from a year subsequent to the removal of the spleen, and he continues well.

**Case V. No malaria; no syphilis; eleven years ago first attack of hæmatemesis; for four or five years recurring attacks of melena; in 1892**
second attack of haematemesis; an occasional attack of melena; January, 1898, severe haematemesis and melena; great enlargement of the spleen; marked anaemia of the chlorotic type—A. B., aged thirty-eight years, of Durham, N. C., admitted to Ward C, on November 10, 1898, complaining of hemorrhages from the stomach. In this very remarkable case the hemorrhages have recurred for nearly twelve years, as I have heard within a few weeks (November, 1899) that he has had another severe attack. He had been persistently pale for many years. The blood on admission gave haemoglobin 30 per cent.; red blood-corpuscles, 4,000,000; leucocytes, 6500 per c.mm. Differential count: polymorphonuclears, 73; small mononuclears, 10; large mononuclears, 12; transitional, 3; eosinophiles, 2.

Cases III., IV., and V. have been reported in full in the Edinburgh Medical Journal, May, 1899.

Case VI. Haematemesis and melena in April, 1898; enlarged spleen; second attack of haematemesis in October, 1889; swelling of abdomen and feet; melanoderma.—W. H., aged twenty years, admitted to Ward F, January 14, 1890, complaining of swelling of the abdomen.

Family History. Mother died, aged forty-six years, of disease of the lungs; father died at thirty years, cause unknown; one brother has had malarial fever.

Personal History. Until 1887 he lived at Centreville, Md., which is in a malarial district. For the past five or six summers he has had attacks of what was called bilious fever, with vomiting for a few days, but no jaundice or pain. The first attack was the most severe, and in it he became very pale and sallow, and had oedema of the legs. He does not think he has ever had malaria; he is sure that he has never had ordinary ague.

In April, 1889, after feeling wretchedly for a month, he vomited a good deal of blood, and passed dark blood in the stools. He was in bed at this time for three or four weeks. In May there was first noticed an enlargement in the left side of the abdomen. In June the patient applied at the out-patient department, complaining of uneasy feelings in the abdomen, headache, and weakness. At that time the spleen was noticed to be very large, and the notch was distinctly felt. He got better throughout August and September, and was able to work for three weeks. Early in October he had a second and more severe attack of vomiting of blood. This recurred on three successive days. It was dark-colored, and the stools again became bloody as before. He had slight fever, headache, and increasing swelling of the abdomen and of the feet.

On admission the patient had a very remarkable mottling of the face, with brown pigment. There was a good deal less pallor than when he was seen in June. There was a general brownish discoloration of the skin everywhere; no pigmentation of the mucous membranes. The conjunctive were very pearly. The examination of the abdomen showed a greatly enlarged spleen, which toward the middle line reached to within an inch and a half of the umbilicus, and below to within three inches of the crest of the ilium. It was smooth and not painful. The liver was not enlarged. The superficial lymph-glands were not enlarged.

Blood. On admission, January 14th, the red blood-corpuscles were
2,187,000; leucocytes, 12,497. There were no microcytes, no poikilocytosis. He was placed upon Fowler’s solution, and he improved rapidly. The color got better, and on January 23d the red blood-corpuscles had risen to above 3,000,000. He progressively improved, and on February 5th the red blood-corpuscles were 3,912,500 and the leucocytes 18,720. He left the hospital on March 24th greatly improved, his weight having risen from 140 pounds on admission to 154 pounds. While in the hospital he had slight fever—99° to 100°, and it once rose to 102°. I have not been able to learn the subsequent history of this case.

Case VII. Residence in a malarial district; no attacks; no syphilis; progressive enlargement of the spleen, with anaemia; melanoderma.—W. R., aged forty years, of Port Antonio, Jamaica, referred to me on May 18, 1895, by Dr. Henderson, of Kingston.

Personal History. A native of Jamaica, he had malaria when a boy, and has lived in Port Antonio and the neighborhood for some years (which is a very malarial district), but has never had chills or fever, and has never been laid up in bed. He has at times had slight feverish attacks. He has not had syphilis.

The present trouble dates from about two years ago, when he began to get pale and lost his weight—from about 165 to 148 pounds. He has worked steadily until April of this year, when he consulted Dr. Henderson, of Kingston. The doctor writes that he found him suffering from anaemia, with considerable enlargement of the liver and great increase in the size of the spleen, which came down nearly to the iliac crest, and extended inward to within one inch and a half of the umbilicus.

Present Condition. Patient was remarkably bronzed on the face and hands, and there was a diffuse pigmentation of the whole skin. The mucous membranes were not anaemic; not pigmented. There was an old scar on the left ankle, and a small fresh abrasion on the right shin, in the neighborhood of these there were remnants of extensive fresh hemorrhages; a similar very large one existed over the dorsum of the left foot. He said there had been recurring hemorrhages in the skin of the legs. The pulse was steady and strong—80 to the minute. The heart-beat was in the fourth interspace; the sounds were everywhere clear.

The abdomen was prominent. An enormous spleen occupied almost the entire left side, extending to within three finger-breadths of the pubes and about two finger-breadths beyond the middle line, just below the navel. The lower and anterior borders were felt readily; the notch was just at the navel. The surface was smooth; pressure was not painful. The flatness extended to the upper border of the eighth rib in the mid-axillary line. The liver was not so much enlarged as at the time of Dr. Henderson’s examination. It extended only two finger-breadths below the costal margin in the nipple line.

Blood count (Dr. Thayer): red blood-corpuscles, 4,816,000; white blood-corpuscles, 5000; haemoglobin, 55 per cent. There were no nucleated red blood-corpuscles; there was no poikilocytosis. The large mononuclear elements were more numerous than the small; the eosinophiles were also slightly increased.

Case VIII. Recurring attacks of diarrhoea; tumor in the left side noted three years ago; no hemorrhages; progressive anaemia, with greatly enlarged spleen.—Mrs. Phoebe N., aged fifty-six years, admitted on
October 15, 1896, complaining of diarrhoea and swelling of the abdomen. There was nothing of any moment in her family history. She has had six children; has always been very well and strong. She has not had malaria.

She dates her present illness from three years ago, when, after an attack of diarrhoea, she noted a swelling in the left side beneath the costal margin. From the onset she noticed that her color was bad, of a grayish-brown, unhealthy tint. The diarrhoea had been a very persistent feature in her case, and she had to exercise the greatest caution in diet, and sometimes had as many as six to twelve greenish-watery stools in the twenty-four hours. She has never passed any blood or mucus. There had been intervals of from one to three weeks when the diarrhoea would stop entirely. The tumor which she had felt in her left side had increased, and it caused a dragging, uneasy sensation. She has had no hemorrhages, no edema, no ascites.

**Present Condition.** The patient was a small woman, not specially emaciated, but of a very pale, gray, pasty-brown color; mucous membranes pale; tongue slightly coated; no special pigmentation. There were haemorrhagic murrums at the base of the heart.

The abdomen presented a marked prominence on the left side and a bulging just to the left of the umbilicus. This area was occupied by a large solid mass, with sharp border and two well-defined notches, one above the navel and one a little to the right and below. The whole mass was readily movable on bimanual palpation. On percussion the flatness extended from the sixth rib in the nipple line.

**Blood.** Hæmoglobin, 60 per cent.; red blood-corpuscles, 3,600,000; white blood-corpuscles, 3,000 per c.mm. There was a slight poikilocytosis; the corpuscles looked pale. No nucleated red blood-corpuscles. A differential count of the leucocytes gave: polynuclears, 66; small mononuclears, 25; large mononuclears, 7; transitional, 2; eosinophiles, 1.

The feces were of a greenish-brown color, contained no blood, no mucus, no parasites, no ova of parasites. They were repeatedly examined.

The patient remained in the hospital until October 21st. She improved; the red blood-corpuscles rose to 4,300,000, hæmoglobin 60 per cent., leucocytes 6000 per c.mm. There was no change in the differential count of leucocytes. The urine had a specific gravity of 1022; contained no tube-casts or albumin. The patient had no fever during her stay in the hospital.

**Case IX.** Chills and fever when a child—febrile attacks in 1892, six years before death, in which enlargement of the spleen was noticed; gradual anaemia; in May, 1895, ascites; recovery; in May, 1897, again ascites; recovery; progressive anaemia; greatly enlarged spleen; early in 1898 again ascites; repeated tappings; death; spleen enormously enlarged; no cirrhosis of the liver.—D. S. C., aged fifty-eight years, a physician from Illinois, consulted me on October 29, 1897, complaining of anaemia and an enlarged spleen. He had had chills and fever as a child of seven, inflammatory rheumatism at ten years of age. In 1872 had a bad attack of erysipelas. He has been a temperate man and a very hard worker.

The present illness began in the winter of 1892–1893 with a fever, which recurred at intervals for six weeks, but which seemed to be
checked easily with doses of quinine and atropine. He did not feel very ill and kept at work. Toward the end of this attack there was a slight swelling and redness of the right ankle. He noticed now for the first time that the spleen was enlarged, but it was not very prominent. In 1893 and 1894 he worked along, not feeling very robust, and he thinks that the spleen continued enlarged all this time. In May, 1895, he became very anaemic and weak, and, not improving through the summer, he gave up work for eight months. In this attack, in addition to the anaemia and enlargement of the spleen, he had ascites. In January he felt better and went home and began work again, and continued to practice during the winter of 1896-1897. He says the spleen was at this time enlarged. In May of that year he again became very anaemic and pale, and took much iron and arsenic. The abdomen also became swollen, but was not so large as in 1895, and he had oedema of the feet; both disappeared. The blood count, which he had made at that time, showed 4,400,000 red blood-corpuscles; 5100 white blood-corpuscles per c.mm.

Present Condition. He looked a little pale, was not specially emaciated. Tongue was of good color, pulse of good volume, superficial bloodvessels not specially full.

The abdomen was large and the navel projected, and to the left of it there was a very marked prominence, which descended with each inspiration, and in it a distinct notch could be seen. A second prominent mass was seen just below the left costal margin. On palpation these two masses were found to be continuous, evidently a very greatly enlarged spleen, firm and hard, with rounded edges; the notch, which was visible, could be readily felt. The edges were singularly rounded; the surface was smooth. The edge of the liver could be felt just two finger-breathds below the costal margin outside the right rectus. The outlines on percussion did not show any enlargement. There was a small ecchymosis just to the left of the navel; the superficial veins were not distended; the superficial glands were a little enlarged.

Blood (Dr. Futcher): moderate poikilocytosis, slight increase in the average size of the red corpuscles, a few microcytes and macrocytes, apparent diminution in the number of leucocytes. Blood count: red blood-corpuscles, 4,788,000; white blood-corpuscles, 5200; haemoglobin, 60 per cent. The percentage of the different leucocytes was as follows: Small mononuclears, 52; large mononuclears, 2; transitionalis, 4.8; polymorphs, 40; eosinophiles, 1.2. In stained specimens the same poikilocytosis was noted, and variations in size, as in the fresh specimens. There were no nucleated red blood-corpuscles.

On January 4, 1898, the swelling became so great that he had to be tapped, and an enormous quantity of fluid was withdrawn. The operation was repeated again in four weeks. Early in February he had a very severe attack of sciatica, hiccup developed, and he became greatly enfeebled. He sank gradually, and died on the 12th of February. The spleen was enormously enlarged. There was no cirrhosis of the liver.

Case X. Residence in a malarial region; occasional attacks of chills and fever; chancre, no symptoms; progressive weakness and anaemia; epilepsy for years; greatly enlarged spleen; anaemia; melanoderma.—Cornelius B., aged thirty-nine years, of Port Royal, S. C., admitted to Ward C, June 15, 1898, complaining of epilepsy, hemorrhages, and progressive weakness. There was nothing of any moment in his family
history. He has always lived in a malarial district, and nine years ago had two congestive chills, and following this for three years he had occasional attacks of malarial fever. He had gonorrhœa ten years ago, and a non-indurated sore three years ago, not followed by symptoms. For five or six years he has had hemmorhoids. He is a moderate drinker. He has had epilepsy for nearly eighteen years; the attacks now recur about once a month. The patient has been growing progressively weaker for the past six or eight months. He has never noticed anything in the abdomen. He came to consult me, complaining of epilepsy and a nervous breakdown.

Present Condition. His face had a sallow look, which he attributed to his occupation, as he had been out in the open air fishing a great deal. The lips and mucous membranes had a good color. The general surface of the skin had a slight degree of dark brownish pigmentation, with here and there little patches of leucoderma. His weight was 138 pounds. He had no fever, and the pulse was of good volume, 92 per minute. The superficial lymph-glands were easily palpable, perhaps in places a little enlarged. With the exception of a soft apex systolic murmur there was nothing of note in the examination of the chest.

Abdomen. The spleen was greatly enlarged, reaching 7 cm. below the costal margin in the parasternal line. Above the flatness began in the sixth interspace; anteriorly the margin could be felt close to the navel. The edge was sharp, easily felt, the surface smooth and painless. The liver flatness began at the fifth space in the nipple line, and extended 3½ cm. below the costal margin, 12 cm. in vertical extent. The edge of the organ was distinctly palpable and felt normal.

Blood. A fresh specimen showed considerable poikilocytosis, with megalocytes and microcytes; no nucleated red corpuscles were seen. There were no malarial organisms and no pigment. Blood: red blood-corpuscles, 4,128,000 per c.mm.; white blood-corpuscles, 2800 per c.mm.; hemoglobin, 45 per cent.

The urine was of a low specific gravity, 1010 to 1014; there were no tube-casts, no albumin.

The patient remained under observation for two weeks, during which time he improved, and was then transferred to the surgical side for operation on the hemorrhoids.

An interesting point was the fact that this patient did not know that his spleen was enlarged. He had had no treatment, and consulted me for the epilepsy.

Case XI. In 1891 obscure abdominal attack, thought to be peritonitis; color not good since; April, 1898, spleen found to be greatly enlarged; progressive anæmia; persistent enlargement of the spleen; stone in the bladder; operation; death.—J. K. E., aged fifty-seven years, seen early in September, 1898, with Dr. Graham, of Toronto, and he was under my subsequent care through January and February, 1899. The patient has always been a strong, healthy man, high-strung and nervous, actively engaged in political and legal work. His habits have been good; he has taken alcohol in moderation; has never been what would be termed a heavy drinker. In 1891 he had an obscure abdominal attack, the nature of which was never very clear. His doctor at that time thought it was possibly peritonitis. He does not think that he has ever been quite the same since, particularly in the matter of color, though he has of late years been able to attend to a great deal of work. In the early
part of 1898 his wife and others noticed that he was becoming very pale, and in April he discovered that he had a lump in the left side of the abdomen. The first blood count was made in June by Dr. Harold Parsons, when the hemoglobin was found to be 37 per cent. and the red blood-corpuscles somewhat under 2,500,000; the leucocytes were normal. Throughout the summer he did not do well. The pallor persisted; he had a little swelling of the feet, and he also had dyspepsia. In August, a little before I saw him, he had 45 per cent. of hemoglobin, and the corpuscles were rather more than two millions and a half; leucocytes normal. In September, when I examined him with Dr. Graham, the pallor was marked; he had lost about fifteen pounds in weight. The spleen was considerably enlarged, extending more than a hand-breadth below the costal margin. The superficial glands were not enlarged; liver was not enlarged. Dr. Graham regarded the case as one of anæmia splenica, in which opinion I concurred. All through the summer he had at intervals attacks of slight fever; sometimes the temperature would go as high as 101°; more frequently it would be an afternoon temperature of 100°.

On admission to the private ward there was no special change since I saw him in September; no loss in weight. Pulse was 72, regular, good tension. The abdomen looked full in the left flank and under the left costal margin. The spleen extended to about the level of the navel, to the right about three finger-breadths from the middle line; it felt round and firm; the notches were not distinct. It extended deep in the flank below the level of the anterior superior spine. The edge of the right lobe of the liver was readily felt just below the costal border on deep inspiration; left lobe of liver could also be felt two finger-breadths below the ensiform cartilage. There was no enlargement of the superficial lymph-glands.

Repeated very careful blood counts were made in this case by Dr. McCrae through January and February. The hemoglobin was at about 40 per cent. It rose on February 10th to 50 per cent. On January 15th and 29th it was 40 per cent. The red blood-corpuscles were 3,328,000 per c.mm. on the 15th, and they had gained only a few hundred thousand on February 10th. The highest leucocyte count was 4000 per c.mm. on February 4th. On January 29th it was 2000. The differential count was as follows: Polynuclear, 78; small mononuclear, 6; large mononuclear, 13; transitional, 2.5; eosinophiles, 0.5 per cent.

There was no poikilocytosis, but an occasional nucleated red blood-corpuscle was seen.

The patient improved somewhat through the spring, then symptoms of stone came on. Death followed the operation of lithotomy.

CASE XII. Dyspepsia for many years; July 9, 1899, profuse hemorrhage from the stomach, again on the 16th and 26th; marked anæmia; ascites; paracentesis; greatly enlarged spleen.—L. F. W., aged forty years, was referred to me on October 18, 1899, by Dr. Moran, of Roxbury, Mass. Up to eight years ago he was a very healthy man. He had not had malaria. No history of syphilis. Had been a temperate man. For the past eight years he had had dyspepsia, and on several occasions had vomited. He had had no pain, and had kept at work. During the first week of July of this year he did not feel very well; then on the evening of July 9th he had a profuse hemorrhage from the stomach, in which he brought up, he says, four quarts in three separate
attacks. On the 16th he had a second hemorrhage, and on the 26th two more, one of which was very severe. Naturally the bleeding was thought to come from an ulcer, and he was kept very quiet and had rectal feeding for many weeks. He gradually began to improve, although he was very weak and debilitated. The abdomen became progressively larger, owing to dropsy, and he was tapped about five weeks ago, and six quarts of fluid drawn off. On his way to join relatives in Baltimore he consulted Dr. Vickery, of Boston, who found a greatly enlarged spleen.

Present Condition. He was not emaciated; still looked pale. The abdomen was full, and under the left costal border there was a slight prominence. On palpation the spleen was found to be greatly enlarged, the lower border extended exactly to the level of the navel. Anteriorly it reached to the parasternal line. The border could be distinctly felt. The liver was not enlarged. The ankles were not swollen. There was a soft haemical murmur over the base of the heart. There were no retinal hemorrhages.

Blood. Haemoglobin, 45 per cent.; red blood-corpuscles, 4,208,000; white blood-corpuscles, 4000 per c.mm. A differential count of 300 white blood-corpuscles gave: polynuclears, 65.6 per cent.; small mononuclears, 15 per cent.; large mononuclears, 12.6 per cent.; transitional, 3.3 per cent.; eosinophiles, 3.3 per cent.; no nucleated red blood-corpuscles or myelocytes were seen.

Case XIII. Failing health; vomiting and diarrhoea; profound anæmia; greatly enlarged spleen; rapid improvement under treatment.—Mrs. C., aged forty-four years, colored, laundress, admitted to Ward O, on October 12, 1899, complaining of great weakness, nausea, and vomiting. Her husband died of tuberculosis. She has three children, one now tuberculous. She has had the usual disorders of childhood; has never had typhoid fever or malaria. She has had no miscarriages. She has had indigestion all her life; has been a hard-working woman, and has had to support her children for many years.

Present Illness. For the past three months she has been failing in health; has had loss of appetite, progressive weakness, and for the past six weeks much nausea, vomiting and diarrhoea. She gave up work about September 1st, and has been in bed ever since. She has felt giddy at times, and her eyesight has been dim. She has lost about fifteen pounds in weight. She has been short of breath on the slightest exertion.

She was a slenderly-built, fairly well-nourished, light mulatto woman; the mucous membranes very pale. There were all the objective features of extreme anæmia.

The abdomen looked full and prominent, particularly in the left half, and the left subcostal groove was obliterated. On palpation a large tumor was felt in the left hypochondriac region, extending into the epigastric region as far as the middle line. The border reached 7 cm. from the left costal margin. The edge was rounded. On bimanual palpation the mass could be grasped between the hands, and the posterior edge could be well felt. The surface was smooth, and there was no pain. There was no friction over it; no bruit. The liver flatness began at the sixth rib, and extended 7 cm. below the costal margin in the nipple line. The edge of the left lobe could be well felt 5 cm. above the navel. The surface was smooth. The superficial lymph-
glands were not enlarged. The posterior cervical lymph glands were perhaps a little larger than normal. No retinal hemorrhages.

Blood. Haemoglobin, 23 per cent.; red blood-corpuscles, 1,540,000; white blood-corpuscles, 3300. Differential count of 300 leucocytes gave: polymorphonuclears, 74; small mononuclears, 19.6; transitionals, 2.6; large mononuclears, 1.6; eosinophiles, 1.5; myelocytes, 1.5; forty-five nucleated red blood-corpuscles were met with in counting 300 leucocytes, thirteen of which were megaloblasts. (Miss Reed.)

On October 17th a blood count was made by Dr. McCrae. Haemoglobin, 20 per cent.; red blood-corpuscles, 1,380,000; white blood-corpuscles, 3250. Differential count showed no special changes from that previously noted. In 400 leucocytes there were 1.25 per cent. myelocytes. In counting the 400 leucocytes there were 75 nucleated reds, 21 of which were normoblasts, 19 megaloblasts, and 35 intermediate. Three was very marked poikilocytosis. There were some enormous nucleated red blood-corpuscles 12 x 15 microns in diameter.

The patient was kept in bed, had a good diet, was put out of doors every day, and given arsenic and iron. She improved with great rapidity, gaining in weight and in strength.

A very careful study of the blood was made in this case by Miss Reed, and counts were taken twice a week. On November 10th the following: Haemoglobin, 55 per cent.; red blood-corpuscles, 3,120,000; leucocytes, 4500. No nucleated red blood-corpuscles were seen. The most remarkable change was in the reduction of the size of the spleen, the edge of which was now felt 5 cm. from the middle line. She had increased in strength, her color was good, and she had gained thirteen pounds in weight.

The patient was discharged November 20th. The haemoglobin was 54 per cent.; red blood-corpuscles, 3,680,000; white blood-corpuscles, 4300.

Case XIV. Enlarged spleen; anaemia of chlorotic type; recurring attacks of haematuria; melanoderma; diarrhoea.—E. W. S., aged thirty-five years, lawyer, of West Virginia, seen with Dr. Thayer and admitted to Ward C, October 31, 1899.

His family history was good. When fifteen years old he had typhoid fever, and following it a great deal of rheumatism. At eighteen he had a primary sore, followed by pharyngitis and skin rash. He was very thoroughly treated. He is married and has three healthy children.

Until five years ago he was well. In the summer of 1894 he had an attack of diarrhoea, which lasted on and off for several weeks, and at this time he first noticed a sallowness of the complexion, and he had itching of the skin. In the following summer he had a return of the diarrhoea, but less intense, but with it the itching of the skin returned. He does not think that he was jaundiced. In the summer of 1896, while electioneering, the diarrhoea returned, and persisted on and off through the winter and spring, and through the summer of 1897. Then until July, 1898, he was quite free from it. He then had it for nearly four months. Last winter he was well until March, when the old trouble began, and since then he has lost forty pounds in weight. During these five years the movements have always been the same, watery at first, followed by much mucus, and at the end of the movement a little fresh blood. Parasites have been carefully looked for by Dr. Thayer on several occasions.

In the intervals between the attacks of diarrhoea he regained strength
quickly. The sallowness year by year became more marked. During the past summer for the first time he had three attacks of haematuria, each one followed by colic; no rigor; no fever. He was considered to have malaria, and given quinine. He had no hemorrhages from the stomach or bowels. He has never lived in a malarial region; has never had a chill. He had taken much arsenic during his illness.

**Blood.** Haemoglobin, 55 per cent.; red blood-corpuscles, 3,856,000; white blood-corpuscles, 4500. Differential count: Polymorphonuclears, 73.7; small mononuclears, 14; large mononuclears, 8; transitionals, 3.3; eosinophiles, 1. No nucleated reds, no myelocytes. In the fresh specimen the red blood-corpuscles looked rather pale, slight poikilocytosis, numerous endoglobular degenerations; no malarial parasites.

The pigmentation of the skin was fairly uniform on the face. On the trunk it was deepest in the groins and flanks, the folds of the arms and in the axilla. There was some roughness of the skin and ankles; no nodes.

**Abdomen.** A prominent mass below the left costal margin descended with inspiration, reaching almost to the navel. On palpation this corresponded to a greatly enlarged spleen. The notch was not very distinct. The splenic dulness began at the upper border of the seventh rib. There was no enlargement of the lymph-glands. The liver was slightly enlarged. In the parasternal line it could be felt 6 cm. below the costal border. The edge could be felt. He had had no pain in either liver or spleen. The heart and lungs showed no special signs. The stools contained fatty débris and a few small blood clots; no parasites. There was no fever.

The patient remained in the hospital until November 23d. He was out of doors, in bed, all day, and improved rapidly. The diarrhoea stopped; he took his food, and seemed very comfortable.

On November 16th: haemoglobin, 60 per cent.; red blood-corpuscles, 3,692,000; white blood-corpuscles, 3500 per c. mm. The spleen seemed to have reduced somewhat in size.

On November 19th he had an attack of haematuria which continued for nearly thirty-six hours; no pain. He passed several long clots. On the morning of November 21st the urine was perfectly clear.

The patient left on the 22d. There was no essential change in the condition of the blood. The haemoglobin was between 55 and 60 per cent. No nucleated red blood-corpuscles were seen at any time. A portion of skin was excised in this case. The pigment was distributed in the cells of the corium and in the subcutaneous tissue. It gave no iron reaction.

**Case XV.** Recurring hemorrhages from the stomach in 1891 and 1892; some abdominal pain; enlarged spleen; anaemia.—John F., Pennysylvania farmer, aged forty-three years, was seen on November 18, 1899, complaining of pains and uneasy sensations in the abdomen. He was at the hospital on October 8, 1895.

His family history was good. His personal history was excellent. He had had typhoid fever twenty years ago. He was a temperate man; said that he did not drink at all. Has not had syphilis. He has had psoriasis from his eighteenth year. He had fever and ague in 1885 when in Ohio. For two or three years he has had dyspepsia.

About Christmas, 1891, he vomited a large quantity of blood, as much as half a gallon. On January 1, 1892, he had a second hemor-
rhage, again bringing up about half a gallon. These attacks left him very anemic and exhausted. In August, 1892, he had two profuse hemorrhages from the stomach, six days apart. At that time a lump was noticed in the abdomen.

At his first visit, in 1895, he was examined by Dr. Thayer, who found a spleen which reached 10 cm. below the costal margin, and in which two notches could be felt. The liver-dulness began on the seventh rib, and the vertical area seemed reduced. The border of the liver could be felt below the costal margin.

November 18, 1899. The patient returned to-day for the first time. He has remained in good condition, has never had any return of the hemorrhages, but has had more or less uneasiness in the abdomen, sometimes pain in the left side. He was robust, well nourished, looked a little pale. The abdomen was protuberant. There was no pigmentation of the skin. On examination the left side of the abdomen looked prominent, and on palpation the spleen was felt extending into the umbilical region, to within an inch of the navel, and below reaching nearly to the crest of the ilium. The notches could be plainly felt. It was not painful. The liver seemed slightly reduced in volume since the first examination. The edge, which could be felt, appeared normal. The blood examination showed: Haemoglobin, 45 per cent.; red blood-corpuscles, 4,270,000; leucocytes, 2500. Differential count: Polymorphonuclears, 80.3; small mononuclears, 8; large mononuclears, 4; transitionals, 2; eosinophiles, 5; mastzellen, 6.

From a study of this series I find nothing to throw light on the nature or origin of the anaemia, which remains quite as obscure as in pernicious anaemia, as in the latter disease males appear to be more frequently affected than females—twelve to three in this series. With one exception all of the cases were in adults above the age of thirty-five. The youngest was a girl of eleven years. Three of the patients were above fifty years of age. Four patients had had malaria. Case IX. had chills and fever when nine years old. Only in Cases VII. and X. is this disease a possible factor, as the patients had lived all their lives in very malarial regions. Locality has nothing to do with the number of cases here reported. Only four of the patients were natives of Maryland; three came from Canada, and the others from various States. Two of the patients had had syphilis. In four dyspepsia was a special feature, and in two there had been recurring attacks of diarrhoea of great severity.

Clinical Features. Before referring to these we may speak of one of the most interesting points brought out by this series—namely, the long duration of the affection. Samuel West, in the article on "Anæmia Splenica" in Allbutt's System, states that the disease is not of long duration—from six months to two years. In several of the cases the symptoms had lasted more than five years. Case V. has probably had the condition for at least twelve years, and in Case XV. the spleen was as much enlarged four years ago as it is now.

The Spleen. In all the enlargement of the spleen appears to have
preceded the anæmia. The patient suffered no inconvenience from it, and, as a rule, until discovered by the physician, did not know of its existence. In one case there were recurring attacks of pain in the region of the spleen. In all the spleen was large, reaching nearly to the navel, but only in Case VII. was it of maximum size, equalling the largest spleen of leukæmia. No case presented any difficulty in the diagnosis of the character of the tumor in the abdomen.

**Hemorrhages.** I have already called attention to the remarkable attacks of hematemesis in cases of enlarged spleen, whether simple or in leukæmia. In the series here reported eight had hemorrhage from the stomach, and usually after it malaria. In seven cases this was the feature for which the patients sought relief. In Case V. the hemorrhages have recurred over a period of twelve years. Watson’s explanation of the hematemesis in enlarged spleen is probably the most correct. “The stress of the congestion is continually felt in the submucous capillary system, and the hemorrhage, which is apt in such cases to occur from the loaded membrane, receives a simple solution upon principles almost purely mechanical.” The vasa brevia, passing from the fundus, which empty into the splenic vein, drain a large section of the stomach. From estimates of Mall and Krauss 40 per cent. of the blood of the splenic artery goes to the stomach, so that one may reasonably conclude that a similar percentage of blood in the splenic vein is derived from that organ. The amount of blood brought up may be enormous, and the patient may be rendered exsanguine. Only in Cases I. and III. did the fatal termination follow hemorrhage. In a majority of the cases the diagnosis of ulcer of the stomach has been made. Hæmaturia occurred in Case XIV. It was probably not connected with stone, as it never came on with colic, but on several occasions was followed by pain and the passage of moulds of the ureter. Case VII. had on several occasions purpuric attacks.

**Ascites,** which was present in three cases, may be due, as in leukæmia, directly to the enlarged spleen, or it may be in part associated with the anæmia. It is important to bear in mind that ascites does not necessarily indicate cirrhosis of the liver. In Case IX. the patient had three severe attacks of ascites, and the liver at autopsy showed no trace of cirrhosis.

**Lymphatic Glands.** In no case in the series were the external lymphatic glands specially enlarged.

**Anæmia.** The patient may present only a very slight pallor, but there may be all grades of anæmia to a form as intense as that met with in progressive pernicious anæmia (Case XIII.). At least one-half of the patients when they came under observation did not present the

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objective features of a very profound anaemia. One of the most striking features on first inspection was the melanoderma, which was present in six cases. In Case VII. the pigmentation was as dark as in the most advanced cases of Addison’s disease. In Case XIV. a portion of the skin was examined and showed none of the ochre-brown pigment of haemachromatosis. In some of the cases the pigmentation may have been arsenical.

Blood. The following are the most striking features of the blood in this series:

1. The relatively high blood count: Of the fourteen cases the corpuscles ranged above 4,000,000 per c.mm. in six cases; between three and four millions in three; under three millions in four, and below one million in only one case. The average blood count of the fourteen cases was 3,336,357 red blood-corpuscles per cm.

2. The relatively low haemoglobin: The estimate was not made in four cases; in the remaining eleven the ratio of haemoglobin to corpuscular richness was low. In Case XIII. the haemoglobin was 23 per cent., with the corpuscles above 30 per cent.; and in Case IV. the haemoglobin was 25 per cent., with corpuscles at 60 per cent. Of the six counts in which the corpuscles were above four millions (80 per cent.) the haemoglobin was 45 per cent. in three, 30 in one, 55 in one, and 60 per cent. in one.

3. The low leucocyte count: Of the thirteen cases in which the leucocytes were estimated there were nine with white blood-corpuscles below 5000 per c.mm. In six cases extreme leukopenia existed. In one case the count was 12,497.

The following table gives the result of the blood examinations in the series:

Case I.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,000,000; white blood-corpuscles, —.
Case II.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,250,000; white blood-corpuscles, 7120.
Case III.—No count.
Case IV.—Hæmoglobin, 25 per cent.; red blood-corpuscles, 3,000,000; white blood-corpuscles, 2800.
Case V.—Hæmoglobin, 30 per cent.; red blood-corpuscles, 4,000,000; white blood-corpuscles, 6500.
Case VI.—Hæmoglobin, — per cent.; red blood-corpuscles, 2,187,000; white blood-corpuscles, 12,497.
Case VII.—Hæmoglobin, 55 per cent.; red blood-corpuscles, 4,816,000; white blood-corpuscles, 5000.
Case VIII.—Hæmoglobin, 60 per cent.; red blood-corpuscles, 3,600,000; white blood-corpuscles, 3000.
Case IX.—Hæmoglobin, 60 per cent.; red blood-corpuscles, 4,788,000; white blood-corpuscles, 5200.
Case X.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,128,000; white blood-corpuscles, 2800.
Case XI.—Hæmoglobin, 37 per cent.; red blood-corpuscles, 2,500,000; white blood-corpuscles, 3000.

Case XII.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,208,000; white blood-corpuscles, 4000.

Case XIII.—Hæmoglobin, 23 per cent.; red blood-corpuscles, 1,540,000; white blood-corpuscles, 3300.

Case XIV.—Hæmoglobin, 55 per cent.; red blood-corpuscles, 3,856,000; white blood-corpuscles, 4500.

Case XV.—Hæmoglobin, 45 per cent.; red blood-corpuscles, 4,270,000; white blood-corpuscles, 2500.

Some additional points may be referred to.

Red Blood-corpuscles. Poikilocytosis was present in five cases. Marked endoglobular degeneration was noted in two cases. Nucleated red blood-corpuscles were met with in two cases; in Case XIII. in enormous numbers, both normoblasts and megaloblasts.

White Blood-corpuscles. As already mentioned, marked leukopenia was present in six cases. Differential counts of the leucocytes were made in ten of the cases. In the following cases there were changes in the proportion of the large and small mononuclears; in Case VII. the large mononuclears were more numerous than the small; in Case VIII. the small mononuclears were 25 per cent.; in Case IX. the small mononuclears were very high, 52 per cent.; in Case XIII. the small mononuclears were 19 per cent.; in Case XIV. the small mononuclears were 14 per cent. Altogether there was nothing in the differential count of any special moment or significance.

Diagnosis. I have considered in this series only cases which presented idiopathic enlargement of the spleen (primitive splenomegaly) with anaemia and without enlargement of the lymph-glands. In this locality enlargement of the spleen from malaria is exceedingly common, and it will be noted that there is no case included which could be called paludal cachexia. I have not included a few cases of idiopathic enlargement of the spleen in persons who appeared perfectly healthy and in whom this was found accidentally, or in whom the organ was enlarged and dislocated. Two cases presenting this latter condition have been operated upon by my colleague—Halsted—who packed the spleen into position with gauze. Both were seen more than two years subsequent to the operation, and had remained perfectly well. In a third case, a young woman with an enlarged and floating spleen had a twist of the pedicle with necrosis of the organ and intense splenitis. Dr. Halsted operated, scraped out a large quantity of necrotic material, and she made a good recovery.

The following conditions are those in which there has been in my experience a difficulty in the differential diagnosis.

(a) From pernicious anaemia. In Case XIII., for example, in which the spleen was very large, reaching to the navel, there were three points
very suggestive of pernicious anaemia—namely, the very low blood count, the extraordinary number of nucleated red blood-corpuscles, and the remarkable way in which the blood improved and the spleen reduced in size under the use of arsenic, iron, good food, and fresh air. While sometimes a little enlarged, the spleen in pernicious anaemia is more commonly small, and I do not remember ever to have seen it so large as in Case XIII. A relatively low haemoglobin percentage is rare in this disease. Another case, in which there was a doubt, was a Mr. C., aged sixty-one years, admitted July 6, 1892. He had a profound anaemia (under 1,000,000 per c.mm.), and the spleen was three-fingerbreadths below the costal margin. He had at first a slight leucocytosis and a remarkable increase in the number of lymphocytes, without any special sign of lymphadenitis. Two weeks before his death the condition changed from one of anaemia to that of leukæmia, and in a count of 1000 leucocytes there were 841 lymphocytes. This was probably an anomalous case of leukæmia. It was very thoroughly studied by Dr. Thayer and Dr. Barker, who will subsequently publish the case in detail.

(b) From certain cases of splenic leukæmia. There are cases of splenic leukæmia in which the leucocytes gradually diminish and remain at the normal number for protracted periods. In my text-book I give a chart of a case, in which, from February 6th to the end of April, the leukæmia had disappeared. For the greater part of the time there was leukopenia. The myelocytes, however, were still present, and from them a suggestive diagnosis, at least, might have been made. Bennet also refers to a case of this kind in his clinical lectures.

A very remarkable case came under observation in September, 1898. The patient at the time presented the features of a splenic anaemia, while a few months previously leukæmia had been diagnosed. As the case will be reported in full by Dr. McCrae, I shall give only the briefest abstract. Man, aged twenty-eight years, never very strong, but of good habits; no malaria or lues. He came complaining of weakness and of swelling of the abdomen. During the summer he had been under the care of Dr. Lichty, who had diagnosed a splenomyelogenous leukæmia. The haemoglobin was 45 per cent., the reds about 50 per cent., and the leucocytes 1 to 4. He had improved very rapidly, and when he first came under our observation the leucocytes were only 9250 per c.mm. The spleen was greatly reduced in size, and there were no nucleated reds, no myelocytes. Fortunately, Dr. Lichty had kept slides, which he was kind enough to send us. The blood was that of an ordinary splenomyelogenous leukæmia. The patient was under observation again in April, 1899, and the leucocytes were only 5000 per c.mm.; haemoglobin, 70 per cent.; red blood-corpuscles above 5,000,000.

1 Such cases are exceedingly rare.
(c) From cases of Hodgkin's disease with enlarged spleen. There is no warrant for the opinion that these cases of anaemia splenica have anything to do with Hodgkin's disease (anaemia lymphatica) from which the clinical picture is very different. Slight enlargement of the spleen is common enough in Hodgkin's disease, but it rarely attains a large size, and I do not remember an instance in which it caused, per se, special symptoms.

In not one of the series of cases of which I have notes have the lymphatic glands been enlarged at any stage of the disease. So, also, in splenomyelogenous leukæmia there is rarely any great enlargement of the lymph-glands. In an interesting case, seen recently, the spleen and lymph-glands were enlarged without any anaemia or leukæmia.

William W., aged sixty-four years, referred to me by Dr. Wolfe, of Roanoke, November 13, 1899, complaining of pain in the side and swelling of the lymph-glands. He had not had syphilis; no malaria; was a very moderate drinker. He was a very healthy, robust-looking man for his age. There was general enlargement of all the external lymphatic glands; in the neck they were as large as hazel-nuts. The inguinal groups were uniformly enlarged, as big as cherries; the epitrochlears slightly enlarged. The spleen was three finger-breadths below the costal margin; the edge and the notch were easily felt. The edge of the liver could be felt below the costal margin. It was not specially firm nor painful. The inguinal glands above Poupart's ligament were enlarged. He had had no fever, no sweating. The red blood-corpuscles were 5,500,000, the leucocytes 10,000, haemoglobin 87 per cent. The differential count by Dr. Thayer of the leucocytes showed a normal relation of the different forms.

(d) From cirrhosis of the liver with enlarged spleen. Banti has described cases with a triple combination of anaemia, enlarged spleen, and cirrhotic liver. Some of these cases he thinks represent the terminal stage of a splenic anaemia. From the history of recurring attacks of ascites, in Case IX. I thought it possible that the liver was cirrhotic, but the autopsy showed that it was normal. In Case XV., though the patient had been a temperate man, he had a reduced area of liver-dulness, and when we examined him in November, 1899, we might have laid some stress upon this had not the same condition been noted by Dr. Thayer four years previously, and it is not likely that he would have enjoyed continuous good health and to-day show no signs of trouble with a progressive cirrhosis of the liver. I have no personal knowledge of the interesting condition described by Banti. There are three varieties of cirrhosis of the liver with which enormous enlargement of the spleen may be associated, and which may lead to doubt in diagnosis.

(a) Alcoholic cirrhosis. In long-standing cases the spleen may be
enormously enlarged, and if ascites be present, or there have been re-
current hemorrhages, the clinical picture is very like that of primary
splenic anæmia. The history, the facies, the more moderate enlarge-
ment of the spleen, and the whole course of the disease should enable
one to make a diagnosis.

(b) Syphilitic cirrhosis. Enormous enlargement of the spleen may
be secondary to gummos hepatitis, and in children with congenital
syphilis this may cause difficulty in diagnosis. The history, the irregu-
larity of the liver, and the more moderate enlargement of the spleen
would be the important point. Illustrating the association of anæmia
with enlarged spleen in syphilitic liver, there was admitted to my ward
in 1891 a girl, aged twenty-three years, with signs of hereditary
syphilis. She had trouble in the abdomen eight years ago, since which
time it had been enlarged. She had a chronic pleurisy on the right
side. When admitted she had fever—temperature 103°. The abdomen
was greatly enlarged, and the whole of the left side was occupied by a
greatly enlarged spleen. The right epigastric and upper umbilical
regions were occupied by a second firm, irregular mass. There was
slight enlargement of the lymph-glands. The blood showed: red
blood-corpuscles, 2,234,000 per c.mm.; leucocytes greatly increased;
a ratio of 1 to 25 red blood-corpuscles; hæmoglobin, 28 per cent. She
died four days after admission. There was found a greatly enlarged
spleen, measuring 23 x 16 cm., and weighing 1510 grammes; a syphil-
itic liver, much divided by fibrous bands, and necrotic gummata
throughout its substance. The mesenteric and peritoneal lymph-glands
were slightly enlarged. This was the largest spleen I have ever seen
in cirrhosis of the liver.

Another case was that of C. A. H., aged thirty-four years, admitted
December 11, 1897, with anæmia and an enormously enlarged irregular
spleen. He had been a very heavy drinker; had a well-marked history of
syphilis. Jaundice when seventeen. Three years ago he had jaun-
dice and dropsy, which gradually disappeared. Eighteen months ago
he noticed the mass in the left side of the abdomen, and he has gradu-
ally been becoming anæmic. Blood on admission: Hæmoglobin, 28
per cent.; red blood-corpuscles, 1,400,000; leucocytes, 7500 per c.mm.
The spleen was enormously enlarged and irregular, and the liver could
also be felt as an extremely irregular mass in the right hypochondrium.
He had several attacks of colic while in the hospital, and was jaundiced.
He improved very much, the spleen diminished in size, and he left the
hospital with the hæmoglobin at 65 per cent., red blood-corpuscles
3,000,000, leucocytes 8370. In this case the history of syphilis, the
previous attack of jaundice, and the irregular condition of the liver
left no question, I think, as to the presence of syphilitic hepatitis with
secondary enlargement of the spleen.
(c) Hypertrophic cirrhosis. Haemachromatosis, that remarkable condition of hypertrophic cirrhosis with melanoderma, enlarged spleen, and diabetes as a terminal phenomenon, may simulate anaemia splenica. The spleen may be very large, and in the later stages ascites and hemorrhages have been noted. Anaemia is not often present, and in two early cases which I have examined the blood count was normal. In young persons there is a non-alcoholic hypertrophic cirrhosis of the liver, with very great enlargement of the spleen, in which, when anaemia exists, it might be difficult to reach a diagnosis. In not one of the fifteen cases here recorded was the liver greatly enlarged.

Doubt has been expressed as to the existence of a separate and distinct disease to which the term splenic anaemia should be given. We do not know whether the anaemia is the result of the enlarged spleen, or whether, as seems more probable, both are secondary to some cause as yet unknown. Provisionally, until we have fuller knowledge, it is useful to group together, as I have done here, cases of idiopathic enlargement of the spleen with anaemia and without lymphatic involvement, and to label the condition splenic anaemia. There are borderland cases difficult to classify, but, on the whole, the composite picture, as obtained by grouping the fifteen cases here recorded, has tolerably definite outlines.

The treatment is that of the severe types of anaemia. Case XIII. illustrates how rapidly improvement may follow under iron, arsenic, sunshine, and good food. In the chronic cases with recurring hemorrhages the question of removal of the spleen should be considered. It was successfully carried out in Case IV., and the patient has remained well for more than a year.
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LEA BROTHERS & CO., PUBLISHERS
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THE CHRONIC INTERMITTENT FEVER
OF ENDOCARDITIS.
THE CHRONIC INTERMITTENT FEVER OF ENDOCARDITIS.

BY WILLIAM OSLER, M.D., F.R.C.P. LOND.,
Professor of Medicine in the Johns Hopkins University, and Physician-in-Chief to the Johns Hopkins Hospital, Baltimore.

The type of endocarditis characterised by a protracted course and an irregular intermittent fever has been specially studied by Wilks, Bristowe, Coupland, and Lancereaux. In my Gulstonian Lectures (1885) its characters are thus described: The paroxysms may have the features of ague; the chill, hot stage, and sweating succeeding each other with regularity, and in the intervals there may be an entire absence of the fever. The quotidian type is the most common; the tertian has occasionally been described; and in rare instances two paroxysms have recurred within the twenty-four hours. The disease may be much prolonged, even to three or four months.

One of the first references I find to cases of this kind is in a footnote to one of Dr. Ormerod’s Gulstonian Lectures,¹ in which a case of Dr. Bond, of Cambridge, is narrated—an instance of chronic valvular disease, with intermittent fever and diarrhoea, two paroxysms occurring in the day. The case lasted four months. In a remarkable case described by Dr. Wilks,² during a six or seven weeks’ illness, rigors recurred with such regularity that a tertian ague was suspected for a time, although the patient was known to be the subject of heart disease. In some instances, the existence of ague previously has rendered the condition much more puzzling. In several of Lancereaux’s cases³ the patients had had intermittent fever a short time

¹ Medical Gazette, 1851. ² British Medical Journal, 1868. ³ Gazette de Médecine, 1862; Archives Générales, 1873.
before; so also with one of Leyden's cases. But the most extraordinary case of the kind is recorded by Dr. Bristowe. A patient had ague in October, with chills once or twice a day, in an illness of six weeks. After an interval of two or three weeks they recurred in the second week in December, and continued until December 23. She was well for a few days, and then the attacks recurred after sleeping in a cold bed, and persisted until her admission to hospital on February 12. For the four weeks previous to entrance, the attacks came every twelve hours regularly. A murmur was noticed; but the history of ague was so clear, and the attacks so characteristic, that a suspicion of malignant endocarditis was at first not entertained. It was only after the failure of quinine, and a variation in the character of the paroxysms, that a diagnosis was reached. In this case, the most protracted with which I am acquainted, the condition persisted for more than five months, and Dr. Bristowe has informed me that he regarded the case as one of ulcerative endocarditis from the outset.

I have recently had under observation a remarkable case in which the symptoms persisted for nearly ten months; and through the kindness of Dr. Mullin of Hamilton, Ontario, I am able to give the notes of a second case in which the disease continued for eleven months. The clinical features of these two cases may thus be summarised:

(1) Daily intermittent pyrexia for many months, the temperature rising to 102°-5 and 104°, occasionally preceded by a distinct rigor, more commonly by feelings of slight chilliness. Following the pyrexia there was more or less sweating.

(2) Progressive failure of strength, with varying intervals of improvement.

(3) Physical signs of cardiac disease—in the cases here reported an apex systolic murmur, with hypertrophy of the left heart.

(4) Development towards the close of the embolic symptoms more usually associated with ulcerative endocarditis, and cutaneous ecchymoses.

2 British Medical Journal, 1881.
The anatomic condition in both cases was the same, namely large vegetative outgrowths on the mitral valve.

Case I.—A. B., aged forty-three, merchant, admitted from Missouri to the private ward of the Johns Hopkins Hospital on March 13, 1892, complaining of weakness and fever. The patient has an excellent family and personal history, and up to the onset of the present trouble has enjoyed good health. Twenty years ago he had an attack of typhoid fever, with which he was confined to bed for six weeks; and when a young man there is an undefined history of an attack of what he says was "chronic malaria." There is no history of syphilis or of any excesses, except perhaps in tobacco.

His present illness began, early in December 1891, with a chill, accompanied by fever, general malaise, and muscular soreness; headache, loss of appetite, insomnia, and cough were marked symptoms, and also, according to Dr. Block, who kindly gave us these details, marked suffusion of countenance. The spleen was enlarged. The severity of the symptoms abated in a few days, and he improved so far as to attempt to continue his business. In about three weeks, however, there was marked dyspnea with increasing cough, and it was noted for the first time that he had a loud systolic murmur at the apex. He had a daily fever of an intermittent type, usually sub-normal in the morning, and ranging from 102° to 103° in the evening, with occasional sweats. He complained of pains in different parts of the body, particularly in the left inguinal region, and there was tenderness over the fourth and fifth left costal cartilages near the sternum. Throughout the winter the intermittent fever persisted, and there were weakness, cough, and dyspnea, so that he was confined to his bed for the greater part of the time.

The condition on admission was as follows: Patient is an under-sized man of fair musculature; not emaciated; slightly anemic, and with a sallow complexion. The tongue is clean and red; the papillae prominent. Pulse is 92, regular, of medium volume, the tension about normal. The radials are not stiffened. The temperature at the time of examination was normal. The thorax is well-formed; the costal angle good. Percussion gives everywhere a full and clear resonance, and on auscultation there are heard normal breezy breath-sounds.
Heart.—The impulse is feebly visible in sixth interspace, 3 cm. outside of nipple line. The impulse extends as far as the parasternal line; it is not forcible, nor heaving. On palpitation the shock of the second sound is well felt over the whole precordial area. There is no thrill. The impulse at the point indicated above is visible, but scarcely palpable. It is most forcible in the parasternal line in the fifth interspace. The area of absolute dulness begins on the fourth rib in the parasternal line; does not extend beyond the nipple to the left, nor beyond the mid-sternal line to the right. Auscultation—In the apex region there is a loud systolic murmur of a somewhat musical quality, which is propagated to the axilla and is well heard at the angle of the scapula. It almost completely masks the first sound. Towards the sternum it diminishes in intensity, but is well heard at the ensiform cartilage, and is feebly heard as far as the right parasternal line. Along the left sternal margin it diminishes in intensity above the fourth rib, and is only just audible in the second left interspace. The second sound is very loud along the left sternal margin, particularly below the second interspace. The sounds at the aortic cartilage are clear, and there is no diastolic murmur. Both sounds are audible in the carotids; the second not accentuated. There is no distension in the veins of the neck; the aorta is not palpable in the sternal notch. There is no tracheal tugging. Examination of the abdominal organs is negative; the edge of the spleen cannot be felt; the dulness is almost entirely masked by colon and stomach tympany. The liver is not enlarged; there is no swelling of the lymphatic glands.

Urine.—Sp. gr. 1019, acid, no albumen. The blood count showed above four millions of red corpuscles to the cubic mm., and marked leucocytosis, the ratio being one white corpuscle to seventy-five red.

The patient was under our observation from March 15 to May 10, and his history during this time may be thus summarised. Fever: the temperature was taken every four hours. During his stay he had no chills, but he frequently had slight chilly feelings. The usual course of the temperature was as follows. The morning record varied from 97°.5 to 98°. A rise took place through the morning hours and usually about 4 p.m.
the maximum was reached, from 102° to 103°; then, throughout the evening hours, the temperature fell, and by midnight it was generally normal. Between four and five in the afternoon, sometimes not until the evening, there was sweating, occasionally profuse; more frequently the skin was only slightly moist. From April 14 to 24 the fever was lower than at any time during his stay in hospital, and for several days was below 100°. The pulse ranged from 80 to 100, was always regular, and of medium volume. The respirations were never increased. His general condition improved somewhat, and he gained slightly in weight. The appetite was fair, and he never had any special gastric trouble. His only complaint was of pain in the left side in the splenic region, and sometimes there was very distinct tenderness on pressure.

Repeated examinations showed no apparent change in the cardiac condition. The intense systolic murmur at the apex, obliterating the first sound, persisted. No increase could be determined in the area of cardiac dulness. The sounds in the aortic region remained clear. The patient left the hospital on May 10, and the history chart was headed "chronic vegetative endocarditis."

For the subsequent history I am indebted to Dr. Block, who has sent the careful temperature chart kept by the nurse up to the time of the patient's death. From this it may be gathered that the temperature range throughout May and June was from 97° to 103°. In July the average was decidedly lower, and towards the end of the month he had several days when the temperature was almost normal. Early in July petechiae appeared, and several groups of these were noticed. On August 19 the temperature became normal, and remained so until the 24th; but the pulse was weak and he had free sweats. During the first week in September the temperature was usually sub-normal, and only reached 98° in the evening. The morning temperature was frequently 95°. There were profuse perspirations. From the 9th until his death on the 14th the temperature only once registered 98°, and for four days was continuously below 96°. He failed progressively, became extremely emaciated, had diarrhœa, and there were blood-corpuscles and blood-casts in the urine. The pulse was feeble, irregular, and intermittent.
There were no brain symptoms, and he remained conscious until the last.

**Autopsy** (by Dr. Block) made on September 16 at 9.15 a.m., twenty-one hours after death.

Body extremely emaciated; abdomen strongly retracted; rigor mortis very slight; petechiae universally distributed over the skin and mucous membranes; corneæ clouded and pupils equally dilated; dependent portions of body oedematous.

**Thorax.**—Left pleural cavity contains about four ounces of serous fluid; no adhesions. The right pleural cavity presented adhesions in the upper lobe, of old date. Posteriorly hypostatic congestion of the left lung; right lung healthy throughout; petechial spots well marked on both pulmonary pleura.

**Heart.**—Pericardial sac contains a small amount of fluid, no evidences of pericarditis; heart firmly contracted; left auriculo-ventricular orifice easily admits one finger; the valves, chiefly on ventricular surface, especially of the posterior leaflet, being studded with an enormous mass of vegetations, some of which had undergone calcareous degeneration; the chordæ tendineæ thickened, and studded with similar projections; right auriculo-ventricular orifice easily admits two fingers; valves normal, pulmonary and aortic orifices and valve normal, and the vessels free of clot, seemingly healthy. A few petechiae on the serous coverings of the great vessels. Heart muscle pale and firm. The heart *in toto*, though apparently small, corresponds with the weight of the body.

**Abdominal cavity.**—Spleen slightly enlarged and of about normal consistence; at its inferior extremity an abscess containing about three ounces of dirty sanious pus, with thickened wall; a large anæmic infarct just above it.

**Liver.**—In size corresponds to the body. Gall bladder full; no evidences of disease.

**Kidneys.**—Relatively increased in size, pale, capsule easily detached; there is an anæmic infarct in the medullary structure near the inferior portion of the left organ.

The *peritoneum* generally studded with petechial extravasations.

**Stomach.**—Empty, small, coated with mucus, walls thrown into longitudinal folds and somewhat thickened; mucosa of an
intense pinkish hue, and uniformly tinged with mucous and sub-mucous extravasations.

**Intestine.**—Jejunum, ileum, and colon marked by hæmorrhagic extravasations, not so intense, however, as in the stomach; no ulcers; the mesenteric glands not enlarged; all the intestines very much reduced in volume.

**Brain** not examined. No bacteriological examinations or cultures made.

**Case II.** (Report by Dr. Mullin).—Miss E. G., aged 28. Father died of aneurysm of the first part of the arch of the aorta, at fifty-four years of age; mother living and well, except that she has suffered with gall stones on several occasions. Three brothers and one sister are living; one brother has disease of the aortic valves with regurgitation. The patient has generally enjoyed good health, but at twelve years of age she had an attack of rheumatism, apparently not severe, as she was in her room only one week, and not in bed all of the time. About four years before the onset of her last illness she had pain and slight swelling in one knee, was not confined to bed, but wore a splint for a week. She has always been pale, and when at boarding school her teacher often suggested that iron would be of use. She, however, did not feel ill, and scarcely ever thought that she required medical treatment. At times, however, upon some sudden exertion she felt a stabbing pain in the region of the heart which never lasted long. The menses were always regular until the early part of the illness. In February 1888, she caught cold when tobogganing, and had pain in the back part of the chest, but did not require to go to bed. In March she visited some friends at Niagara Falls, where she remained until July. Here her friends noticed that she looked miserable for some time before she spoke of being ill. The menses failed to appear, and she thought this was the reason why she did not feel so well as usual. She sometimes had attacks of faintness, which soon passed away on taking a stimulant. She became weaker, and had fever followed by night sweats; the fever came on in the afternoon. A physician was consulted, who said the heart was affected and that she required prolonged medical treatment and rest. She continued, however, to go about, and
frequently took long walks, though on exertion she complained of being short of breath. She had fever and sweating at night, and was often so restless that she was obliged to leave her bed and recline on the sofa.

Before she came home her hair became very thin, and much of it fell out. It was cut short, and afterwards the colour was not so dark. Menses were absent only one month, until March 1887, when they ceased and did not return.

In the first week of July she came home, and was placed under my care. In the forenoon the temperature appeared normal, but every afternoon it rose to 102° or 103°. For a time she was thought to have typhoid fever, but no distinctive symptoms appeared. A milk diet was given, but when it became apparent that the fever was not typhoid, she took such forms of nutritious food as suited her taste.

The fever, especially from September, was attended with sweating, more or less profuse. It was often noticed that when sleeping in the afternoon her hair would become wet with perspiration. No local symptoms arose to account for the fever; pain was not complained of to any great extent; sometimes, for a few hours or half a day, there would be aching and pain in the hands and different joints, but these were always transient and at no time after she came home was there marked tenderness or swelling in any of the joints. When she reached home there was some swelling of the ankles and knees, but this soon passed away as she remained in bed. Not making any exertion she did not suffer from dyspnoea. There was a loud systolic murmur at the apex; and from the first the signs of hypertrophy showed that mitral disease had existed for some time. Before she came home it was noticed at the outset of the illness that small spots appeared on the hands and feet, also on arms and legs and face, that looked like "hives." These continued to appear; they were erythematous, some as small as a pea, others as large as a five-cent piece, with a white point in the centre. They often passed away in a few hours, and never lasted longer than the evening of the day on which they appeared. They were not numerous; sometimes they would appear near the tips of the fingers, which for a short time became swollen. These spots were seen more or less throughout
OF ENDOCARDITIS.

the illness, though more of them were noticed in the early part. She had frequently, at the time of the day when fever was more marked, sensations of chilliness, and several times in the winter at distant intervals there was a severe rigor; on one occasion her sister said that "the bed fairly shook." These were followed by high fever, and very profuse sweating. The appetite was variable, never very good, and often it was difficult to tempt her to take food. The bowels required the use of mild purgative medicine. Urine was examined frequently; sometimes there was a deposit of urates, but through the greater part of the illness the urine was normal; near the end albumen was found, and there was then öedema of the face and extremities. There was a slight cough late in the illness. At no time were there any indications of lung disease. The strength failed gradually. About two weeks before death, without apparent cause, a severe attack of diarrhœa occurred, lasting from 4 p.m. until the following morning, after which the decline of strength was more rapid. About three days before death the mind, which before had been clear and active, became clouded, and she died in coma.

A careful temperature record was kept in this case from July 17, 1888, until July 7, 1889. The type of fever was in each month remarkably uniform; the morning record always at or below the normal point, and the evening record reaching 102°, 103°, and sometimes 104°. At intervals for a week or two the evening temperature did not fall below 100°.

The autopsy showed moderate enlargement of the heart, due chiefly to hypertrophy and dilatation of the left ventricle. The aortic valves were normal; the mitral orifice readily admitted two fingers: the valve segments were thickened and presented numerous large vegetations, chiefly on the auricular surfaces, and extending from the base of the posterior segment to the wall of the left auricle. The choreæ tendineæ were a little shortened and thickened, and many of them encrusted with the vegetations. The spleen and kidneys contained numerous infarcts in all stages of change.

The diagnosis of these protracted cases is often very difficult, and not unnaturally they are mistaken at the outset for malarial fever, particularly when daily chills occur. In other instances
as in Dr. Mullin's case, the disease is at first thought to be typhoid fever. In Case I, prior to the onset of his illness, the patient was not known to be the subject of valvular disease while in Case II it is very probable that the attack of rheumatism at the twelfth year laid the foundation for chronic mitral lesions.

In chronic valvular lesions, particularly of the aortic segments there may be persistent fever, rarely however of a typically intermittent type, and in a majority of instances the cardiac features of the case predominate. The special interest of the group illustrated by these cases is the chronic intermittent fever with progressive failure of health and strength, without dyspnœa, anasarca, or other features of valvular disease.
A CASE OF MULTIPLE GANGRENE IN MALARIAL FEVER.

(WITH ILLUSTRATIONS.)

BY WILLIAM OSLER, M. D.,
Professor of Medicine, Johns Hopkins University.
A CASE OF MULTIPLE GANGLREN IN MALARIAL FEVER.

(WITH ILLUSTRATIONS.)

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

There are three groups of cases of multiple gangrene:

(1.) Raynaud's disease.—There have been previous well-marked vascular disturbances in the extremities (syncope, asphyxia or hyperæmia), the gangrene is very often symmetrical, is usually slight in extent and limited to the fingers or toes, more rarely to the ear-tips or nose.

(2.) Multiple spontaneous gangrene of limbs.—In young or middle-aged persons, without any obvious cause, massive gangrene of one, two or three extremities occurs. Many illustrations of this are recorded in the literature.

(3.) Multiple spontaneous gangrene in association with the acute infections.—In measles, typhoid fever, typhus fever, scarlet fever, diphtheria and malaria, local gangrene may occur. There are multiple patches, not symmetrical, and the skin and subjacent tissues are more frequently affected than the extremities. While of course the phenomena of Raynaud's disease may occur as a sequence of any of the specific fevers, a large proportion of all the cases of local gangrene occurring during or after one of the fevers have nothing whatever to do with this affection.

The relationship between malarial fever and Raynaud's disease is believed to be very close. Many references are given to cases (a majority from French sources) by Barlow in his article in Allbutt's System, and more fully by Monro in his excellent monograph on the disease. (Glasgow, James Maclehose & Son, 1899.) Altogether, in the cases he has collected, there were only 8.3 per cent. with malarious antecedents.
I have looked over the notes of cases of Raynaud's disease which I have seen in Baltimore, nine in number, and I do not find malaria to be related as an etiological factor in any one of them, nor, so far as I know, in our very large series of cases of malaria during the past ten years has there been a single instance of Raynaud's disease.

The following case is a very remarkable illustration of multiple gangrene occurring in a case of aestivo-autumnal malaria. Similar cases have been reported in the literature, and are referred to by Monro in his monograph (page 96), but they seem to be exceedingly rare.

**Clinical Summary.**—Malaria when six years old—typhoid fever twice—last attack four months before onset of present illness—illness in the middle of October, supposed to be influenza, but more probably malaria—on November 2nd, onset of spots of gangrene in various parts—rapid extension—condition on admission as shown in the figures—complexion muddy—spleen enlarged—blood showed very many aestivo-autumnal organisms—temperature slightly elevated at first—subsequently no fever—rapid recovery.

P. W. B., aged 23, bar-tender, admitted to Ward E, Thursday, November 29, 1899, complaining of sores on various parts of his body.

**Family History.**—Mother died of consumption. No history of rheumatism or of any special disorders of the skin.

**Personal History.**—As a child he had measles, mumps and whooping cough. When six years old he had malaria. Five years ago he had a very severe attack of typhoid fever, after which he had an abscess in the abdominal wall, which opened spontaneously and discharged for two months, leaving a large scar. He had at the same time many boils. Last year he went south with the Fifth Regiment, and in August he had a second attack of typhoid fever, and was ill for two months. He has had gonorrhoea twice; has never had lues. He has used tobacco freely; whiskey and beer in moderation.

**Present Illness.**—The patient has been living in Baltimore this autumn, and has been very well until the middle of October, when he was ill in bed for nearly two weeks with pains in the back and general weakness; no fever, no chills, no herpes. The doctor called it influenza. The patient got
To illustrate Dr. Osler’s Case of Multiple Gangrene in Malarial Fever.
up and was about for a few days, when, on November 2nd, just twenty-seven days ago, he noticed blebs about half an inch in diameter on both hands, which were slightly swollen. The next day a mottled area appeared on the instep of the left foot. It had a bruised appearance. A similar one appeared on the buttocks and on the dorsum of the right foot. Other spots came in the situation to be subsequently mentioned.

The hands and feet became very much swollen. The blebs broke and discharged a dark fluid; the skin around the affected areas was very red. There was no itching. He had some pain at night. Ten days ago he had slight chilly feelings. There had been no redness, nor swelling, nor blueness of the fingers or toes, and there had been no numbness or tingling. The urine had been clear. Dr. Futcher made the following note on the day after his admission.

"The patient is a large-framed, well-nourished man; complexion rather sallow. The skin of whole body is pigmented, markedly so about nipple and umbilicus, to slight extent about genitalia; no increase in either axilla. The lips and mucous membranes are of fairly good color; no pigmentation of mucous membranes. Over dorsum of left hand, just behind knuckles, there are four whitish scars, the result of healing vesicles. Over the ring, middle and little fingers there is a brownish-yellow discoloration of the skin which is gradually peeling off where the blebs are healing. On palmar surface of same fingers the skin is raised in large blebs. The skin has a brownish-yellow color, and over the ring finger is quite gangrenous, and there is involvement of the subcutaneous tissue. The thumb and index finger are not involved.

"Right hand.—The dorsum of hand is unaffected. On the dorsal surface of first and second inter-phalangeal joints of index, middle and ring fingers the skin is thickened, brownish in color, no vesicles. Over the hypothenar eminences on palm is a large area, measuring 5x6 cm., in which the skin is loosened from the subjacent tissue, markedly discolored, and at one point a serous fluid is exuding. The palmar surface of all four fingers shows a gangrenous condition of the skin with vesication and oozing of fluid, most extensive on ring finger, where the process invades the palm of the hand.

"Right foot.—Over dorsum of foot, below ankle, is an area,
5x3 cm., in which the skin is gangrenous and exceedingly black; slough still adherent to adjacent tissue; surrounding skin, slightly pigmented. Over the heel there is an area of brown, discolored, thickened skin, measuring 5x6 cm.; this area is sensitive to the touch.

"Left foot.—Below external malleolus is an area, 5x3 cm., of gangrenous and sloughing black skin.

"Left buttock.—Just over the spine at the junction of the dorsal and lumbar regions there is a patch of dry gangrenous skin 1½x2 cm. Over left gluteal region there is an irregular gangrenous patch, quite dry, measuring 4½x2 cm., slightly sensitive to pressure.

"Occiput.—Over the lower part of occiput, on each side, there are two areas in which the scalp has a gangrenous appearance, slight oozing of fluid causing matting of hair."

Though the history did not suggest malaria, as in the routine examination of the abdomen the spleen was found to be considerably enlarged, the blood was at once examined, and very large numbers of aestivo-autumnal organisms were found. The crescents were in unusually large numbers. Cultures taken from the blood proved negative. There was no leucocytosis, and the differential count was practically normal. The eosinophiles were only 2 per cent. The patient was at once given quinine in full doses, and he began to improve rapidly. The larger sloughs were treated with linseed poultices made with bichloride solution. Crescents and ovoids persisted in the blood for some time, though by December 15th they were rapidly disappearing. On December 14th, the gangrenous patches on both hands had healed. On the feet the sloughs had separated, leaving deep ulcers, the sheaths of the tendons being exposed. The urine examinations were negative throughout. The patient had a slight rise of temperature (100°) at first; subsequently none at all. The figures from photographs, by Dr. Brownell, illustrate the condition on admission.
LATENT CANCER OF THE STOMACH.

BY WILLIAM OSLER, M.D., AND THOMAS McCRAE, M.B.,
of Johns Hopkins Hospital.

In a study of 150 consecutive cases of carcinoma of the stomach in the medical department of the Johns Hopkins Hospital, we have been very much interested in a group in which the disease was unsuspected during life. As Welch remarks, it is rare to find cancer of the stomach in an apparently healthy man dying of accident. The latent cases are most frequently met in old persons, in whom the symptoms may be very slight, or absent, or they are mistaken for the ordinary dyspeptic complaints of the aged. Even after the most thorough examination it may not be possible to reach a diagnosis. In obscure cases, particularly with dyspepsia and emaciation, the possibility of latent carcinoma should be borne in mind.

There are three groups of cases of latent carcinoma of the stomach:

1. A very small one in general hospitals, a very large one in almshouses and asylums, comprising cases in which the symptoms are those of a gradual enfeeblement without any indication of local disease—as Oliver Wendell Holmes puts it, in the "One Hoss Shay," "a general flavor of mild decay, but nothing local."

2. Cases in which, with an absence of gastric symptoms, the lesions of associated disease seem sufficient to account for the condition. In this group were 4 of our cases. In 2 the diagnosis of nephritis was made; 1 had advanced pulmonary tuberculosis with pneumothorax, and the fourth showed profound anemia with multiple venous thrombi. The following is a summary of these cases:

Case I.—Diagnosis of nephritis, arteriosclerosis and pleurisy; no gastric symptoms.

No. 22. A. G., Hospital Nos. 2454 and 3251, male, aged 61 years, first admitted January 22, 1891, complaining of short-
ness of breath. A history of dyspnea, for some years. He had frequent attacks at night, and any ordinary exertion was difficult. With this he has had frequent cough. He had little appetite and the bowels had been loose.

Examination: Dyspnea, cyanosis, and edema. The arteries were very sclerotic. There was fluid in the left pleural cavity; over 600 cc. were withdrawn. The heart’s action was rapid, with gallop rhythm; on January 20, 900 cc. were withdrawn from the left pleura, and the following day a friction-rub was heard in the left axilla. There were albumin and tube casts in the urine. The dyspnea gradually lessened, and by February 16 his condition was much improved.

The patient remained in the hospital until April 29; on discharge he was still slightly cyanotic, but the dyspnea had gone. There was slightly impaired resonance on the left side of the chest. There was nothing noteworthy about the abdomen. During his stay there were no gastric symptoms and the general condition of the patient improved.

Second admission, May 19, 1891, three weeks later. He looked very ill, cyanosed, and with dyspnea and hiccup. The pulse was scarcely perceptible. On May 23, 260 cc. of fluid were withdrawn from the left pleural cavity. His condition remained much the same until death on June 5, 1891. There was no complaint of any gastric symptoms. The temperature was practically normal during both admissions. There was no loss of weight on the second admission, and the nephritis and arteriosclerosis seemed to account for the symptoms. and no stomach-symptoms were present to draw attention to that organ.

Autopsy showed carcinoma of the stomach and esophagus, there being an elevated tumor-mass 7 by 2 cm., which was half in the stomach. The center was ulcerated. There was chronic diffuse nephritis, arteriosclerosis, aortic and mitral insufficiency, and chronic pericarditis. There was pleural exudate with a fibrinous pleurisy over an infarction in the right lung. There were no metastases. Thrombi were present in both sides of the heart and in the pulmonary artery.

CASE II.—General edema; albumin and granular and hyaline tube casts in urine, rapid emaciation; vomiting at onset, but none during his stay in hospital; diagnosis of nephritis.

No. 73. T. C., Hospital No. 10,234, male, aged 61, admitted June 26, 1894, complaining of swelling of the legs. His family history was negative. He gave a history of an attack like the present 20 years ago, which lasted for 2 months. He then had both edema and dyspnea. In the last 5 years he had gradually lost over 40 pounds. His present illness began about 5 weeks before with persistent vomiting which lasted for one week. Swelling of the legs then appeared, and the vomiting stopped. He was able to keep at work until 4
days before admission. His appetite has been good, and the bowels regular. Examination showed marked emaciation and fairly general edema. There was slight dullness over the right base. The abdomen was distended, tympanitic in the elevated and dull in the dependent portions, but it was held so tensely that attempts at palpation were not satisfactory. The urine was of dark color. Specific gravity 1012, showed a faint trace of albumin and contained hyaline and granular casts. The temperature was slightly elevated. The edema increased and the patient died on July 4.

*Autopsy* showed a large scirrhous cancer involving nearly the whole of the stomach, and extending to the esophagus. The stomach was adherent to all surrounding structures. The growth extended through to the peritoneum at places. There were secondary growths in the glands and liver.

**Case III.**—Tuberculosis and pneumothorax, all the symptoms those of chronic consumption; no stomach symptoms.

No. 71. — J. A., Hospital No. 10,050, male, aged 41 years, admitted June 7, 1894, complaining of pain in the chest and cough. His family history was tuberculous. He had been very healthy previously. His present illness dated back about six months, though for some time before he had been troubled with a cough. This became worse, he had sharp pain in the left chest and several attacks of hemoptysis. For five months he had diarrhea, with the passage of mucus and blood in the stools. He has not had any appetite. There has been much loss of flesh. There was no history of any stomach-symptoms.

*Examination* showed great emaciation. There was clubbing of the fingers. There were marked signs on both sides of the thorax, both on percussion and auscultation. Pneumothorax was present on the left side. The abdomen looked natural, was nowhere tender and was negative on palpation. The temperature was only slightly elevated. The patient rapidly sank and died on June 11.

*Autopsy* showed cancer of the lesser curvature of the stomach with secondary growths in the lymph-glands and liver. The mass measured 6 by 5 cm. It was soft and fungoid in character. The pylorus was free. There was tuberculosis in both lungs and pneumothorax on the left side. Tuberculous ulceration of the large and small intestine was also found.

**Case IV.**—Multiple thrombi of superficial cutaneous veins; profound and progressive anemia; no gastric symptoms.

No. 64. — G. N., Hospital No. 9131, male, aged 50, admitted January 31, 1894, complaining of weakness and pains in the arms and legs. His family and previous history were normal. The present illness, which began four weeks before, he attributed to exposure, wet and cold. He had a chill fol-
ollowed by fever, which lasted some days. Pain then began in each leg and then in the arms. These were sharp, made worse by movement and there was a great tenderness of the muscles on pressure. There was not any edema, but great weakness. The appetite was poor. The bowels were regular.

Examination showed no marked general change, except

pallor and sallowness. The thorax was normal. On examination there was epigastric tenderness and marked resistance of the abdominal walls. Neither the spleen nor liver was enlarged. Many of the superficial veins of both the arms and legs were represented by firm hard cords. These thrombosed veins were somewhat sensitive. A portion of
one of these veins in the arm was removed. The thrombus was soft and could be squeezed out. Cultures made from it were negative. The chart shows the remarkable extent of the thrombosis:

Blood—Hemoglobin .......... 39%.
Red corpuscles ............ 2,300,000.
White corpuscles ......... 6,000.

On February 10 edema appeared in the left leg. Very many of the superficial veins showed thrombosis. The left foot felt as warm as the right. On February 15 edema began in the right leg. The left femoral vein could be felt as a firm cord.

The anemia increased, the blood-count on February 16 being:

Hemoglobin .................... 22%.
Red corpuscles ................ 1,716,000.
White corpuscles ............ 29,000.

The differential count showed 89% of polymorphonuclears. No nucleated red corpuscles were seen.

The patient gradually sank and died on February 18, 1894. His temperature was constantly somewhat elevated. There were no stomach-symptoms.

Autopsy showed cancer of the pylorus with secondary involvement of lymph-glands, gastrohepatic, anterior mediastinal and subclavicular, and the liver. The mass occupied the lesser curvature and did not involve the whole pylorus, so that the orifice was not narrowed. There were also multiple venous thrombi.

This remarkable case excited very special interest, more particularly the unusual number of thrombi in the superficial veins, and their association with great tenderness in the muscles. Though we spoke of the possibility of malignant disease, yet there was no positive evidence obtained. He was not given a test-meal, as there were really no features whatever pointing to the stomach.

3. Cases in which the metastases completely mask the primary disease.

Case V.—Paraesthesia in feet; symptoms of ataxia; gradual paraplegia; headache; marked pain in neck; development of a tumor in the right side of the pelvis; no stomach symptoms. Autopsy; primary carcinoma of lesser curvature of the stomach; secondary masses in the abdominal glands, the right ilium and the femur.

No 106. J. W., male, white. Hospital No. 14,944. Aged 40 years. Admitted January 10, 1896, complaining of inability to walk and pain in the neck and legs. His history
was negative and he had been healthy until his present attack.

Present illness began about 8 months before with peculiar sensations as of "pins and needles" in the feet. In about 2 months the weakness in the legs had so increased that he was unable to walk. Sensation was almost absent in the feet. Headache and pains in the neck had been severe. There had not been any special stomach symptoms, although he had vomited occasionally.

Examination showed emaciation and marked pallor. The abdomen was practically negative in the upper part. A mass was felt deeply in the right iliac fossa, which was palpable per rectum and involved the bony parts of the pelvis. There was great wasting of the legs with absence of the knee jerks. Blood examination showed hemoglobin 48%; red corpuscles, 2,432,000.

The patient had severe pain which required large amounts of morphin. The tumor of the right pelvis increased in size. He lost ground in every way. In February he developed marked mental symptoms with ideas of persecution, etc. Death followed on March 14, 1896.

Autopsy showed primary carcinoma of the lesser curvature of the stomach. The stomach was of normal size and on the anterior wall in the region of the lesser curvature was an area of new growth 6 cm. in diameter. There was no ulceration. Histologically, the growth was a colloid carcinoma. There were secondary growths in the abdominal glands and in the right ilium and femur. Unfortunately, the spinal cord was not examined.

Case VI.—Pains in the right arm and right side of neck, with wasting of the muscles of the right arm; inequality of the pupils; development of nodular masses on the ribs; diagnosis of cancer, but primary disease not suspected; no gastric symptoms. Autopsy showed cancer of lesser curvature of the stomach; a nodular mass compressing the brachial plexus; metastases in tenth dorsal and first lumbar vertebrae.

No. 124. G. K., Hospital No. 17,993, male, aged 39 years, admitted December 1, 1896, complaining of pain through the right shoulder and back, with loss of sensation in the right forearm. His family-history was negative. He had had malaria every year for eight years past and pains in the shoulders and back, thought to be rheumatic. The most severe of these attacks was 18 months before, during which he spent two weeks in bed. Since then he has been very well and able to work. His occupation, an ironfitter, involved much heavy lifting. He never had any stomach or bowel trouble; at times for many years he has had shortness of breath on exertion.

The present illness began in August, 1896, with coughing and profuse expectoration. Pain soon came on in the right
side, close to the shoulder, and was severe enough to make
him give up work. The cough soon left him, but the pain
remained. It gradually went down the right arm. It was
constant and described as boring in character. It was worse
on movement. About one week before admission he noticed
a loss of sensation in the forearm, and at the same time he
lost power in the right arm, so that since then he has not
been able to use it. The pain and weakness has also ex-
tended to his back, so that he had difficulty in raising him-
self up in bed. The legs were not affected. There was no
history of any injury. There had not been any stomach-
symptoms. The bowels had been constipated. He had lost
nearly 20 pounds in weight and much strength.
Examination showed fair nutrition. The patient remained
usually on the left side, he seemed to suffer much pain and
objected to changing his position or sitting up, on account of
the pain it caused. There were prominences on the 4th, 5th,
7th, 8th, and 12th ribs, not attached to the skin, but to the
bones. They were very tender, had a slightly elastic, but
not fluctuated feeling. Examination of the thorax was nega-
tive. There was no dulness over the manubrium. The
abdomen was flat, the muscles were held somewhat rigidly,
so that palpation was difficult. There was marked wasting
of the muscles of the right arm, and loss of power. There
seemed to be some disturbance of sensation over the ulnar
surface of the left arm, but the results were not constant.
There was distinct inequality of the pupil, the left being
larger. They both reacted to light and on convergence.
Ophthalmoscopic examination was negative. The patient
held himself very stiffly when asked to sit up, and the mobility
of the head downward was much impaired. There was no
pain on pressure over the spine. There was no general
glandular enlargement.

Blood—Hemoglobin .................................. 92%.
Red corpuscles .................................. 5,752,000.
White corpuscles .................................. 13,000.

The patient had severe pain, and frequently required mor-
phin hypodermically. He lost weight and strength. The
masses on the ribs gradually increased in size, and became
more tender. On December 26 it was noted that the abdo-
men was very tense, and moderately distended. No other
abdominal symptoms were present. The leukocytes increased
and were 22,000 on the 26th. A differential count showed 85%
of polymorphonuclear. The patient generally sank, and
died on December 30. During his stay he took nourishment
fairly well. There was no complaint or sign of any gastric
trouble.

The case was regarded as probably one of primary
neoplasm in the thorax with secondary deposits on the
ribs and probably in the vertebrae. The absence of history of any gastric trouble and of any signs during his stay in the hospital, did not call for special attention to the stomach, and no test-breakfast was given. The abdominal examination was always negative, except that the muscles were held tensely. As the patient was difficult of examination this did not perhaps arouse the attention it should have done. The true condition was not suspected.

Autopsy showed cancer of the stomach. The lesser curvature was converted into a rigid mass over which the omentum was closely bound. The growth extended along the posterior wall. It did not involve the cardia or pylorus. On section all the coats were infiltrated. The mucous membrane was smooth, white, and opaque. Near the pylorus was an ulcerated area 3 by 3 cm. on the posterior wall. There were metastases in the lungs, bronchial, pericardial axillary and abdominal lymph-glands, ribs, skull, and vertebrae. There was compression of the bronchial plexus by a tumor-nodule. The vertebral metastases were in the first and tenth dorsal and first lumbar.

Case VII.—Onset of illness with ascites; two months later aspiration of bloody fluid; recurrence of ascites with swelling of the legs; drainage of peritoneum; recognition of malignant disease of the stomach. Autopsy showed extensive cancer of the stomach.

No. 141. A. H., male, Hospital No. 21,173, aged 59 years; admitted November 9, 1897, complaining of "dropsy." His family history was negative. He had been a moderate drinker and denied syphilis.

Present illness began four months previously with swelling of the abdomen. This increased gradually and at the end of two months he was tapped by his physician, who drew off a large amount of bloody fluid. Soon after the abdomen began to enlarge again and this continued until the present admission. With this swelling of the legs came on. There had been some pain in the lower abdomen. His appetite had varied. He had occasional vomiting of mucus but no blood. The bowels had been irregular. There had been great frequency of micturition.

Examination showed emaciation but not cachexia. The thorax was negative. The abdomen was distended symmetrically. Movable dulness and fluctuation were obtained. The liver-dulness began at the fifth rib in the right nipple line and only extended a distance of 4 cm. Its edge could not be felt. There was edema of the legs, genitalia and lower trunk.
The case was suggestive in some ways of cirrhosis of the liver, although the history of bloody fluid being obtained on previous tapping pointed to malignant growth. The absence of any stomach-symptoms seemed against a primary growth there. The patient required tapping and it was thought best to do this by an exploratory exploration.

**Operation.**—On the abdominal cavity being opened a bloody turbid fluid was obtained. A mass was found in the stomach and secondary deposits over the peritoneum. The fluid showed numerous red corpuscles and leukocytes. There were also large cells many times the size of a leukocyte, some of which contained more than one nucleus. No signs of karyokinesis were seen. Certain groups of cells were found which were very suggestive of masses of cancer-cells. After the operation a firm mass was to be felt in the left hypochondrium. In the right hypochondrium several nodules were felt. The patient was much easier after the operation, but died suddenly on December 5, 1897.

**Autopsy** showed colloid carcinoma of the stomach along the lesser curvature from the cardia to the pylorus. The pylorus was converted into a dense ring and the growth extended for a short distance into the duodenum. The esophagus was invaded but the cardiac orifice was not narrowed. The omentum and peritoneum were involved. The stomach was adherent to the liver, spleen and diaphragm. The growth extended through the diaphragm to the pleura.

In reviewing this interesting series of cases, and particularly in the study of the autopsy records, one is astonished to notice how extensive and widespread the disease may be with practically no symptoms. In three of the cases a very large part of the stomach was involved, in two the cardiac orifice, and in two the pylorus. In one instance the growth involved the esophagus, and in one to a slight extent the duodenum. In three instances there was ulceration, and in five metastases were present.
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ON THE STUDY OF TUBERCULOSIS.*

BY WILLIAM OSLER, M.D.,

of Baltimore, Md.

The history of the acceptance of any great truth in medicine is an interesting study. A slow, gradual recognition seems essential to permanency and stability. As Locke well said, "Truth scarce ever yet carried it by vote anywhere at its first appearance." Even in this electric age the practical application of new knowledge is singularly tardy. Antiseptic surgery took twenty years to win its victory, and for about the same period we physicians have been participants in another long warfare, the successful outcome of which may be said to be now in sight. The twentieth anniversary of the discovery of the germ of tuberculosis by Robert Koch is near at hand—a discovery which, in far-reaching results, will prove to have had few equals in human history. Since 1881 the laboratory phase of the question, with its experiments and researches, has so far been the most complete; the clinical side has been enriched with two facts of supreme importance; first, the earlier and more positive diagnosis of the disease; and, second, a fuller knowledge of the means for its cure; and we have now entered upon an economic stage, and the tuberculosis leagues and congresses, laws and enactments, show how alive we have become to the importance of the disease in national and civic life.

I. General Relations of Tuberculosis.—If we compare the mortality bills of any large city today with those of fifty years ago, the most striking change is in a reduction of the deaths from fever, and in the absence of the names of certain diseases which were formerly amongst the most fatal of their kind. Public hygiene has done a great work in ridding us of several of the great scourges,

* Introductory Remarks at the organization of a Society for the Study of Tuberculosis, Johns Hopkins Hospital, October 30, 1900.
and in lessening the danger from such epidemics as cholera and yellow fever. Of the 10,152 persons who died last year in this city, 3,765 were victims of the infectious diseases. Measles, scarlet fever, diphtheria, whooping-cough, influenza and dysentery together accounted for 801. Three diseases head the list, each one as fatal as all the others combined; tuberculosis of the lungs 974, pneumonia 778, and cholera infantum 703. If we add the deaths due to tuberculosis of other organs, we are well within the mark in saying that one-tenth of the deaths in this city are due to this disease. It is estimated that above a million of persons are suffering with consumption alone in this country, of whom at least 150,000 die annually. The white plague, as Holmes called it, is the great scourge of the race, killing more than 5,000,000 yearly. Let me read you an abstract from De Quincey, which, while expressing an old, erroneous idea, gives in his strong and characteristic language the terrible, the appalling nature of this annual slaughter. "Are you aware, reader, what it is that constitutes the scourge (physically speaking) of Great Britain and Ireland? All readers, who direct any part of their attention to medical subjects, must know that it is pulmonary consumption. If you walk through a forest at certain seasons, you will see what is called a blaze of white paint upon a certain élite of the trees marked out by the forester as ripe for the axe. Such a blaze, if the shadowy world could reveal its futurities, would be seen everywhere distributing its secret badges of cognizance amongst our youthful men and women. Of those that, in the expression of Pericles, constitute the vernal section of our population, what a multitudinous crowd would be seen to wear upon their foreheads the same sad ghastly blaze, or some equivalent symbol of dedication to an early grave. How appalling in its amount is this annual slaughter amongst those that should by birthright be specially the children of hope, and levied impartially from every rank of society! Is the income-tax or the poor-rate, faithful as each is to its regulating tide-tables, paid by any class with as much punctuality as this premature florilegium, this gathering and rendering up of blighted blossoms by all classes? Then comes the startling question
—that pierces the breaking hearts of so many thousand afflicted relatives—Is there no remedy? Is there no palliation of the evil?” Let us be thankful that we can answer today—There is!

II. Some Special Features of Tuberculosis as a Subject of Study.—In a comprehensive view of the diseases which we are called upon to study, three only are of wide and universal interest—tuberculosis, cancer, and syphilis. In almost every particular tuberculosis out-tops the others. It is a disease of extensive distribution among animals, in which the veterinarian is interested equally with us. The general surgeon must know it thoroughly, and it occupies his thoughts almost as much as cancer, and his hands more than syphilis. The specialist must be familiar with its manifestations. Though not a disease upon which the specialist thrives, the laryngologist, the neurologist, the gynecologist, and the dermatologist see cases almost daily. Syphilis has a more enduring grasp, and, not content to follow man from the cradle to the grave, nips the fruit in the bud, and more often brands and maims than kills. Tuberculosis and cancer respect the embryo, and are not factors in intrauterine pathology. In many ways syphilis is the most benign of the three. There is a silver lining on the luetic cloud, which we never see in cancer, and not often enough in tuberculosis. And yet tuberculosis, which is a more serious disease than the others combined, offers a greater hope of a reduction in its ravages. We know the cause, the conditions under which the germs thrive and the modes of infection, and the public is at last awake to the importance of the subject, as shown by the remarkable manifestation of national and civic interest during the past few years. We have reached agreement on two points; first, the right of the State to insist that a tuberculous patient shall not be a source of danger to others, (and to this end there must be some supervision, to the extent at least of notification of the cases); and, secondly, the duty of the State, of civic authorities, or of private benefaction to provide suitable accommodation for the poor consumptives. The danger is not from the few well-to-do patients, in whose environments there may be less risk of infection than elsewhere. A person would probably run less risk of
"catching" consumption in the Adirondacks' sanatorium than living in the tenement districts of New York, or in the Jewish quarter of this city.

III. The Physician as a Student of Tuberculosis.—The brunt of the battle in the warfare against tuberculosis falls on the medical profession. We must not only be alive to our duties, but thoroughly prepared to carry them out. If a man looks back on the best work of his life he will find it to be that for which perhaps he has had the least acknowledgment from the public or his colleagues in either cash or credit; and so it must ever be with the work of the units of our army, and particularly in their crusade against tuberculosis. Within the past ten years there has been an extraordinary change in the attitude of the average doctor to the question of consumption; he is more expert in the early recognition of the disease; he appreciates the conditions under which cure may be expected, and he is more ready to take every advantage of the opportunities offered by the health boards and their laboratories; but I must confess he still very often lacks the enthusiasm which is necessary to make a strong fighter. I know how hard it is in general practice, particularly among the poor, to carry out instructions which we rattle off so glibly or write down with so much self-satisfaction, but physicians cannot escape from their responsibility in this matter. To them the public must turn for help, since they alone can insist that the tuberculous patients shall live a hygienic life, and when all fully realize their duties we may look for a marked reduction in the incidence of the disease. The really serious peril is the prevalence of the disease among the poorer classes, who live in the smaller houses and tenements, who for the most part have no physicians to advise and instruct them, and who seek aid at the hospitals and dispensaries. Two years ago I was much impressed with the number of such cases applying at our out-patient department of the Johns Hopkins Hospital, and some kind friends placed at my disposal a sum of money which was to be used to promote the study of tuberculosis, and to diffuse among the poor a proper knowledge of how to guard against the dangers of the disease. A plan of systematic visiting of each applicant was organ-
ized, and Miss Dutcher will speak of her experience during the past year. It was felt that if a well-informed and sympathetic person paid a visit to the house, saw the conditions under which the patient lived, directions could be given with much more likelihood that they would be carried out. Valuable information could also be obtained as to the mode of life and surroundings of these people.

This Society has been organized to promote the study of tuberculosis among the physicians and surgeons of the Hospital, the senior students of the Medical School, and any physicians who may wish to attend our meetings. Believing in the inspiration of great names, we have called it after the name of the greatest student of the disease. An historical review of the great epochs, a minor item relating to the symptomatology of the disease, a critical summary of the conditions relating to tuberculosis in the country at large and in this city, together with a presentation from each of the departments of the work upon tuberculosis in the Hospital during the first decade, will constitute our program for the session.
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FATAL ANGINA PECTORIS, WITHOUT LESIONS OF THE CORONARY ARTERIES IN A YOUNG MAN.

BY

T. E. BULLARD, M.D.,
OF SCHUYLERVILLE, N. Y.;
AND
WILLIAM OSLER, M.D.,
OF BALTIMORE.

FROM
THE MEDICAL NEWS,
DECEMBER 22, 1900.
FATAL ANGINAPECTORIS, WITHOUT LESIONS OF THE CORONARY ARTERIES IN A YOUNG MAN.

By T. E. BULLARD, M.D.,
OF SCHUYLERVILLE, N. Y.;

WITH DESCRIPTION OF THE HEART, AND REMARKS UPON THE CASE,
BY WILLIAM OSLER, M.D.,
OF BALTIMORE.

J. J. H. was twenty-six years old, 5 ft. 10 in. in height, weighed 186 lbs., very strong and active, and was, to all appearances, in robust health just previous to his death. I had known him for fifteen years. His father is a printer and has occasional attacks of epilepsy. His mother is in fair health; his four sisters are all well but one, who has heart-disease.

As a young man, the patient was somewhat eccentric. In about the year 1892 he enlisted. While in the army he engaged a good deal in ball-playing, football and athletics generally. He had been a very heavy smoker. He had not had syphilis.

In the spring of 1895 he was discharged and about this time married. Shortly afterward he returned to his home. Talking with me one day, he told me that he had had an attack of heart trouble while in the army. He did not say that he had had more than one, or that it was serious. He remained in town a short time, when he left. I heard of him working as a telephone lineman and as fireman on a steamboat. After a few months he reenlisted and was sent to Ft. Keogh, Montana. In the spring of 1896 he was discharged for disability and came home.
He told me that while in the West he had been well for a few months, had marched some hundreds of miles, but that in the winter he was taken with severe attacks of heart trouble. The name of his disease he did not remember. He was in the hospital several months. He described his attacks as coming on at first every other night, then four or five times a week; said there was a most intense pain in the heart, and awful cramps in his arms, that he was given large doses of morphine, digitalis and nitroglycerin. He said that his attacks increased in frequency and in severity, and at one time after he had had an attack he was considered dead, that they were about to remove him to the dead-room when he showed signs of life. All attempts to cure him were despaired of and he was discharged.

A few nights after I had learned from him the story of his winter's sickness, I was sent for to come to his home. I found him in bed, suffering with an intense paroxysm of pain in the cardiac region. His muscles were cramped and he had stopped breathing. He thrashed around in bed for a few moments, and then there seemed to be a cessation of the pain and a relaxation of the spasm. He breathed rapidly, had a few minutes respite, and then the paroxysm of pain and the spasm of the muscles returned. The chest became fixed and for the time being it was impossible for him to breathe or do anything but thrash about in his agony, apparently trying to jar something loose in his chest or heart.

His pulse during the interval was about 130. Just before the paroxysm it decreased in force and frequency to about 100. Sometimes there seemed to be a distinct increase in the force and tension with the decrease in frequency. During the paroxysm the pulse was very faint and slow,
and as soon as it was past the pulse immediately acquired a rate of about 130 again. I gave him morphine, digitalis and nitroglycerin. The attack passed off in a few hours.

Seven days later I saw him in another attack similar to the first. This was May 19, 1896. After that he did not have another attack until July 7, 1896, when he had one similar to that which I have described. This was repeated on the 9th, 14th, 17th, 22d, 25th and 31st of this month and also on August 4th, 6th, 9th and 12th. These continued at decreasing intervals and with increasing severity until the next spring when the intervals increased and the severity of the attacks decreased. During the attacks there was no wheezing in the tubes. Exertion did not seem to cause them.

His attacks were more sure to come on and be severe after a cold, damp day. They most frequently came at from 7:00 to 10:00 P. M. I never knew him to have but one severe attack during the day, and on that day he had been walking in the hot sun, and was somewhat excited over a fireman’s tournament which he was attending, but this attack was a very severe one.

I have notes of 105 attacks during which I was with him. At times the attacks were of the utmost severity. The pain was so intense that he would lose all consciousness. The muscular spasm extended to nearly all of the muscles of his chest and upper extremities, occasionally to his abdomen and legs, although it was always most severe in the left arm, neck on left side, chest and right arm, named in order of intensity. Some of the attacks lasted as long as five or six hours. There was always a similarity in the attacks, yet they were not exactly the same. To-
ward spring the pulse rate in the intermission was not as rapid and was slower just before and during the paroxysm. Time after time his respirations ceased for so long a time and his pulse became so feeble that he seemed to be dead. At times every muscles was in such a spasm that he could be picked up without his bending in the least. Sometimes to pick him up a few feet above the bed and drop him was the easiest way to reestablish respiration, and it seemed that had it not been for the most active efforts, rubbing of the muscles and artificial respiration, he would never have breathed again. This working over him had to be kept up for hours.

In order to relieve his attacks I at first depended principally on morphine. The doses had to be rapidly increased until 8 to 12 grains were given in order to have any effect on the patient. Digitalis, nitroglycerin and nitrate of amyl were used as indicated. The latter never seemed to be of much benefit. When owing to the repeated use of morphine, it seemed to have but little effect, ether was tried. I used to give him four or five grains of morphine and then etherize him. As a rule, after he was nicely under the anesthetic, the spasm would stop, the pulse would remain even, and if the anesthetic was continued for perhaps 30 minutes he would sleep on several hours and have no more pain that night and very seldom the next night. When it became so that it was almost impossible to etherize him I tried chloroform. This seemed to work equally well for a short time. Later, not being pleased with its effect, I discontinued its use. I finally depended almost entirely upon large doses of morphine. In the spring, after he ceased to have his attacks, he showed no evidence of having contracted the morphine habit. After the attacks had apparent-
ly ceased he went to New York, had an attack in a saloon, was taken to the hospital, where, according to the papers, the doctors did not know what to make of him. He went to Germany, came back again, worked on a dairy-farm near Boston, doing hard work, then came back to this place again, and remained for a few weeks, when he again left.

This was in the fall of 1897. I lost track of him for some time, but when I did hear from him I learned that he had gone to Europe with a circus. Whether he had any attacks during that winter, I do not know.

In the summer of 1898 he returned to this place and found employment as a teamster, at which occupation he worked until the middle of winter. During the winter he had a few attacks, but they were not as severe as usual. In the early spring of 1899 he left town again and worked in a paper-mill in New Jersey until the fall of 1899, when he again returned to this place. He had two or three attacks at intervals of a week or more in which I saw him. They were not of the most severe type.

November 27, 1899, he came to my office about 11:30 P. M. and told me that his pain was unusually severe. I immediately gave him several grains of morphine and noted his condition carefully. I saw that it was serious. His pulse in the interval was about 120 to 130. Just before a paroxysm it would slow down during the space of thirty seconds to about 90 and became very faint, then the spasm of the chest muscles suddenly came on. The spasm lasted from one to two minutes during which time he did not breathe. Then the breathing began again, the respirations would be rapid, and his pulse immediately ran up to 120 or 130. After having given 5 grains of
morphine, which was two grains more than I had given at any time this fall, and, failing to relieve him, I gave him a little chloroform. I wet the mask only once and held it to his face a few seconds. At this time the muscles of the chest became fixed and remained so, the breathing being entirely diaphragmatic.

It was 12:55 A. M. when I gave him the chloroform. At 1:00 A. M. his pulse was 68; at 1:05 it was 72. At this time I gave him some nitrate of amyl, hoping to help respiration. It did not seem to help him, and the respirations grew more rapid and short until they ceased entirely.

A short, sharp pressure over the ribs, together with artificial respiration, reestablished breathing, which continued for some time. At 1:25 A. M. his pulse was 127; at 1:35 A. M. it was 90. I gave brandy hypodermically freely. Strychnine, nitroglycerin and digitalis were also used in medicinal doses. Hot applications and rubbing were employed to assist in restoring the circulation.

He remained unconscious and the spasm of the chest which had been constant for some hours, relaxed. The attack now continued with intermissions and paroxysms. The pulse during the intermission was about 90. Just before and during the paroxysm it decreased to 60 or less. The interval between the paroxysms grew shorter, the respiration more shallow. The pulse became slower both before and during the paroxysm; during the height of the paroxysm it was at times about 30, and then for 15 seconds could scarcely be felt. At about 6:00 A. M. the paroxysms ceased. His breathing was short, shallow, rapid and regular. The pulse increased to about 120. It was weak and he remained unconscious. The respirations
became more shallow, the pulse more feeble, and he died at 6:40 A. M.

At the autopsy we found numerous adhesions between the left pulmonary and costal pleurae. The heart weighed when removed 14 ounces and 2 drams. It was apparently displaced somewhat to the right, although the displacement may have been post-mortem. The heart was immediately sent to Dr. Osler for examination, who sent the following report and remarks bearing on the general condition.

The heart was of average size for a man of 186 pounds. Considerable amount of subpericardial fat. No pericarditis. The pericardium was everywhere smooth and glistening. The muscle of the left ventricle looked beefy and red; the wall measured in thickness 15 to 20 mm. The papillary muscles were not sclerotic. The mitral segments were thin and showed no marked abnormalities.

Right ventricle, muscle looked red and natural. The tricuspid valves were normal. The pulmonary artery measured exactly 7 cm. across the top of the valves. There was no sclerosis and the valves looked normal. The aorta measured not 6 cm. just above the ring, a small vessel for a man of five feet and ten inches, weighing 186 pounds. The arch only admitted the index finger to the middle of the second joint. The anterior coronary artery was not sclerotic in its course. There were a few flakes of atheroma along its course. Its orifice was large, unusually so, nearly 4 mm. in diameter. There was no atheroma in its immediate vicinity. Posterior coronary artery was not so large; quite free in its course. There was a small, supplementary coronary artery. No atheroma in the neighborhood; no atheroma in its course. No thrombi or emboli in either vessel.
There were a few scattered flakes of atheroma in the aorta. The aortic valves were a little thickened about the corpora Arantii and about their attachments.

On slicing the heart muscle it was red and natural looking; no infarcts; no sclerosis of its muscular fibers nor of the walls of the bloodvessels.

In men under thirty years of age angina pectoris is a very rare disease. There are cases with syphilis in which an acute aortitis is associated with severe and even fatal angina. More common are the cases of a neurotic type in high-strung, nervous persons who have been heavy smokers and given to excesses of all kinds. I have notes of four or five of this sort in young men and have described them in my monograph on angina pectoris (pp. 94-95). In Dr. Bullard's case the extent of the muscular spasm was unusual, although it is not unknown in the ordinary form of the disease. The association of epileptic seizures with angina has been described in the monograph (p. 64). The intensity of the attacks, their long duration, the fatal termination, and the negative condition of the heart and arteries make the case one of unusual interest.
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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

William Osler, M. D., LL.D.,
Baltimore.

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

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

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
Advantages of a Trace of Albumin.

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 remolds 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-
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
Advantages of a Trace of Albumin.

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 aetiological 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
Advantages of a Trace of Albumin.

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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."
Advantages of a Trace of Albumin.

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.

BY WILLIAM OSLER, M. D.,
Professor of Medicine, Johns Hopkins University.
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 mer-
est 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 situated wholly within the abdominal cavity. There was no obstruction anywhere in the urethra or prepuce. The open-

![Image](image.png)

**Fig. 2.**

ings of the ureters into the bladder were quite free. The 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 transversals 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

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

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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 ischaemia, 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 Centrallblatt, 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 expansible 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-scleroticus. 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 dyspnoea 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
norphia. 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 dyspnoea 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 pulse 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—31½ 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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MONTREAL Can.
ON THE DIAGNOSIS OF BILATERAL CYSTIC KIDNEY.

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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 sharpened. 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 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 diptheria, 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 epigastriac 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 tumbules. 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,
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ON AMEBIC ABSCESS OF THE LIVER.\footnote{A Clinical Lecture delivered at the Johns Hopkins Hospital, Feb. 15, 1902.}

BY WILLIAM OSLER, M.D.,
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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 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
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, amebæ 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 cytometric 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 amebæ 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 amebæ 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. Amoebae 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 amebae.

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 fingerbreadths 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.

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

1 After 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.
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 amebæ 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 abcess 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 competely.
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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 serofululous 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.

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AMEBIC DYSENTERY.*

BY WILLIAM OSLER, M.D.

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 Lafleur, 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 amebae. 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 amebae 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 Eolean murmur. In the recumbent posture the tumor does not look larger, and the thrill is not so evident. The pulsation in the subclavian 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 feebleer 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:

**CASE 2.**—CLINICAL SUMMARY. Young man. Syphilis 3 years before admission. Cough. Shortness of breath. Aneurismatic tumor to right of sternum. Loud, continuous murmur with systolic intensification. Postmortem. Communication of a large branch of the right pulmonary artery with the aneurismatic sac.

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 con-
dition of the face, which became aggravated when he attempted
do heavy work. He is a thick-set, well-built, muscular man.
He had a chancre two years ago. There is no history of rheu-
matism 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. Conjunctivæ watery. The tongue is
clean, deeply congested and the whole of the pharyngeal mucosa
is intensely engorged. Chest is large, antero-posterior in di-
meter, deep. The skin, covering the entire thorax and of the
arms is congested. The venules along the line of the dia-
phragm 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 super-
facial 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 inten-
sified. 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; conjunctivæ 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 thick-
ened 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 radial pulses were equal, 98; respiration quiet. 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.

CASE 3.—CLINICAL SUMMARY. Cough and dyspncea for six months. Much emaciation. Flatness to left of sternum. Diagnosis of mediastinal sarcoma. Examination by fluoroscope showed a characteristic pulsating tumor. Subsequent slight pulsation of the thoracic wall. Wiring of the sac. Hemoptyysis. Death.

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, 10½ 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. McCrae.) 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
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

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* 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 a 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, In-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 Verdauung, auf eine hochst merkwurdige Weise wahrend 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
ALEXIS ST. MARTIN, AGED 81.
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 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 often 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 "enquirér 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. Reyburn 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.—Weights 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 comp­
pelled to quit the field, leaving their dead and wounded strewed 
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 agon­
izing 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! Do­
tor, 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 accompanying volumes as a small expression of my respect for your character and scientific labors. I need not detain you by repeating in this note the high estimation in which I hold you. The volumes 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 remain, 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 mortifying to the author not to have his work republished, even if no great pecuniary benefit was to be obtained by such a republication; 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 originally 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 remuneration 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.”