on September 17th, the number still further rising to 2,363,333, the proportion of white to red was 1 in 351; hæmoglobin had increased to 36 per cent. The patient was discharged on this date. On February 8th, 1893, he returned to the hospital, and was under Dr. James Stewart. The number of the red corpuscles had sunk to 700,000. The percentage of hæmoglobin had not fallen to the same extent; indeed, comparing the hæmoglobin percentage with the number of corpuscles, there was an actual increase of 23 per cent. per corpuscle. The patient was very prostrate, and the progressive asthenia ended in death upon February 21st. There had never been any hæmorrhage or diarrhœa, and vomiting occurred but twice, and on both occasions after taking arsenic.

NECROPSY.

The necropsy, performed by one of us, fully confirmed the diagnosis made during life.

There was the characteristic lemon-yellow tint of pernicious anæmia, and the subcutaneous fat was found in fair amount; the brain was large and anæmic; the lungs also pale, but crepitant throughout; the stomach was large, with distinctly thin and pale walls, presenting two small papillomatous overgrowths close to the pylorus (?gastritis polyposa). The lower part of the ileum presented also walls greatly thinned. The liver was large (2,000 grammes), brown in colour, varying to orange yellow, and friable. Sections showed the characteristic Quincke's siderosis both by the ammonium sulphide and by the hydrochloric acid and potassium ferrocyanide tests, with some fatty degeneration. The bile duct was pervious, and a greenish-yellow bile stained all the intestinal contents. The kidneys showed a large cortex, and were pale, fatty, and friable. The bladder was distended with more than 500 c.cm. of dark amber-coloured urine: prostate not enlarged. The spleen was of fair size, firm on section, but it yielded upon being scraped a considerable amount of purplish bloody pulp. The sternal bone marrow was increased in amount, and of a purplish-red colour. There was a right inguinal hernia, the pouch being filled with a large adherent mass of great omental tissue.

Turning now to the circulatory system, there were found slight atheromatous changes in the aorta. The heart was large (370 grammes), the right side being especially distended, indeed relatively enormous, auricle and ventricle being filled with pale very dilute blood, in which floated some soft reddish clot. The left side was smaller, the left ventricle dilated, with slight hypertrophy. The tricuspid valves were distinctly thickened along their free margins, and only admitted three fingers with difficulty. The mitral valves were still more fibroid. The aortic and pulmonary valves were competent and normal.

Of the blood distending the right heart, 300 c.cm. were immediately removed, placed in a clean bottle, and sent up to the Chemical Laboratory of McGill Medical College.

The analysis of the blood serum, made by one of us, gave the following results:

The clear, almost colourless, serum had a specific gravity of 1026.1. This is below the figure usually given as being that of the specific gravity of serum, namely 1027 to 1030. It contained only 5.2 per cent. of proteids (by weight). These proteids consisted of 2.3 per cent. of globulins precipitated by saturation with magnesium sulphate, and 2.9 per cent. of serum albumen proper. There was 0.875 per cent. of ash. It will thus be seen that not only were the total proteids reduced about 40 per cent. below the average normal quantity, but also that the normal ratio of the globulins to the serum albumen was considerably altered, the ash also was about 12½ per cent. above the normal.

The total quantity of iron found in the liver was 0.2433 per cent. by weight calculated to the fresh undried tissue. This is equivalent to about 0.72 per cent. in the dried tissue. The estimation accords fully with the observations of previous observers, as showing the very great increase in the iron contained in the liver in this disease, to which, among English workers on the subject, Dr. W. Hunter has especially called attention.

OBSERVATIONS UPON THE RELATION BETWEEN LEUKÆMIA AND PSEUDO-LEUKÆMIA.

BY

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[From the Medical Clinic of the Royal Victoria Hospital, Montreal.]
(Concluded from page 1636.)

Of all the forms of leukæmia, that which is most akin to Hodgkin's disease is, of course, the lymphatic form, and as exemplifying this the following case is appended, having come to our notice during the past year. The clinical history of our case is briefly as follows, and we are indebted for our abstract from the notes to Dr. Robertson, the resident physician of the hospital.

A French Canadian, aged 18 years, entered Professor James Stewart's wards, November 24th, 1895, complaining of cough and headache, "lumps" over his body, and painful swelling of the left arm. He had been ill for only five weeks, excepting for a temporary swelling of the lip, resulting, he supposed, from using a borrowed flageolet. This had resulted in painful intermittent swellings of the lips for a few days previously, but had quite subsided a day or two before his general illness. The earliest manifestations of disease were glandular enlargements beneath the chin and the angle of the jaw, which in two or three days had so progressed as to involve also the glands beneath the auricle, and those in the posterior triangles of the neck. Before the end of the first week another lump was seen on the forehead, small in size and beneath the skin. Likewise the glands in the groin became involved, and there was pain over the region of the anterior crural nerves of both sides. There was otherwise no distress at the time, but early in the second week of his illness there had ensued great pallor with weakness and dyspnoea, and the patient's symptoms became alarming. He was confined to bed but slept poorly, suffering for the most part from orthopnoea. Epistaxis commenced about the same time and has frequently since recurred. Deafness seemed to have occurred simultaneously, while, on the night before admission, painful swelling of the left arm ensued. Dr. Vipond, who kindly asked one of us to see the case with him, permitted his removal to the hospital, where he was admitted on the following morning.

His personal history is of interest mainly in that when aged 4 years he suffered from some disease whereby his eyesight was almost permanently lost, leaving his vision up to the present day greatly impaired. The history of this illness is unsatisfactory. His habits were good, his occupation light, and he had otherwise been well up to his present illness. There was no venereal history.

The family history manifested no evidence of tuberculosis nor other hereditary taint.

Condition on Admission.—The patient is a young man, markedly anæmic, unable to lie down on account of cough and dyspnoea. He is somewhat deaf and apathetic, but intelligence seems good; he is rather somnolent, though on account of the dyspnoea he does not sleep well; he has headache, pain in the left elbow and arm. Temperature 101½°; pulse 136; respirations 32.

Lymphatic System.—The lymphatic glands all over the body, so far as can be determined, are enlarged and firm. They are all more or less movable, quite painless, and not tender. There is no evidence of suppuration nor even of acute inflammation or involvement of the skin. This applies to the glands beneath the jaw, in the triangles of the neck, in both axillæ and the inguinal regions, the epitrochlear glands, the occipital glands, and those behind the episternal notch; there is distinct dullness over the manubrium sterni, evidently from involvement of the retrosternal glands.

Locomotor System.—The muscles are fairly well developed; the left arm from wrist to shoulder is much swollen and oedematous. There is universal anasarca, and the skin generally has a rather oily look. There are numerous purpuric spots about the right elbow, and a few upon the back. On the forehead there is a subcutaneous nodule 2 inches in diameter, which is slightly tender and moderately firm. There is slight tenderness on percussion over the long bones and the sternum.

Circulatory System.—The pulse is rapid, fairly full and regular. The apex of the heart beats in the fifth space in the nipple line, to which point the left transverse dullness extends; vertically the dullness begins at the third space above. There is a fairly loud systolic murmur at the apex, transmitted into the axilla and to the back. There is no accentuation of either basal second sound.

Respiratory System.—There is dyspnoea with rapid shallow respirations, frequent cough, and some slight mucoid expectoration occasionally tinged with blood. An examination of the chest reveals a few dry râles, but otherwise no abnormality beyond the dullness over the sternum previously mentioned.

Digestive System.—The lips are dry, the tongue very pale and thinly coated. The teeth are very irregular and covered with sordes. Both tonsils are distinctly swollen, very pale, and on the right side there are a few submucous hæmorrhages. The appetite is fair and the bowels regular. The abdomen is not distended nor tender. The liver dullness extends in the right mammary line from the fifth space downward 4 inches. The organ is not palpable. Splenic dullness extends from the eighth to the eleventh space, but the viscus cannot be felt. There is no ascites.

Genito-Urinary System.—There is no priapism. The testicles appear normal. The urine is straw-coloured, clear, with a creamy, yellowish-white sediment and a few grains of uric acid. The urine is acid, specific gravity 1020, free from albumen and sugar; microscopically a large abundance of urates and uric acid crystals. No casts can be detected.

The Blood.—There is a tendency to hæmorrhage both from the nose and in the expectoration. The blood which flows from the finger on puncture is very pale, and the bleeding is stopped with great difficulty; the red cells 1,310,000, white cells 24,000, hæmoglobin 21 per cent. Stained slides show a very marked lymphocytosis, with an abundance of transitional forms. There is likewise a large number of polynuclear neutrophiles, many of which show undoubted evidence of mitosis. There is some irregularity in the size and shape of the red cells, and many of them are nucleated, in some cases their nuclei showing a breaking up into two, three, or more parts.

The Nervous System.—Apparently normal; special senses. Eyes: So far as can be ascertained the patient seems quite blind to any test: the pupils are widely dilated; there is a constant, rather coarse lateral nystagmus. Dr. Buller, on examination of the fundus, reported a double refinitis pigmentosa of unusual type, the pigment not showing the usual stellate arrangement following the vessels. The discs show indistinct borders, somewhat red, and with a few recent changes due to the present disease, and probably a few hæmorrhages.

Diary of Case.—The treatment adopted consisted in the first place of hypodermic injections of liquor sodii arsenitis, 5 minims daily, progressively increasing the doses by 1 minim every alternate day. Restricted diet was further advised, and some alcoholic stimulants recommended; apart from this the various symptoms were treated as they arose. A few days after admission severe and prolonged epistaxis ensued,

necessitating plugging of the posterior nares, which after some time controlled the bleeding. Another examination of the blood, made a few days later, showed 580,000 red cells, 60,000 white, mainly lymphocytes; hæmoglobin 15 per cent. On December 2nd a little more than one week after admission, the patient appeared much better, and a more accurate examination of the blood revealed the following results: On a large number of slides 1,500 leucocytes were noted, and the percentages of the different varieties were found to be as follows: Lymphocytes, 76 per cent.; polymuclear neutrophiles, 19.5 per cent.; large mononuclears, 1.8 per cent.; transitional forms, 2.3 per cent.; eosinophiles, 0.35 per cent. Considerable difficulty was experienced in making an accurate estimate, inasmuch as very many small, dark, round bodies presented, resembling both in size and staining reactions the nuclei of red cells, free in the circulation; and, on the other hand, while the majority of lymphocytes would show a small zone of protoplasm around their nucleus; in others, again, while the nucleus itself was less deeply stained than that of the red cells, there was yet no evidence of a cell body. All such which were in any way dubious as being either lymphocytes or escaped nuclei were not taken into consideration in the estimate.

Many nucleated red cells were seen, mostly normoblasts, with a few megaloblasts. There was a marked poikilocytosis. The general blood count gave the following result: Red cells, 1,595,000; white cells, 17,300; that is to say, a ratio of 1 white to 94 cells. For several days subsequently there was marked general improvement, and the blood count showed 2,030,000 red cells, 34,000 leucocytes, hæmoglobin 42 per cent. On December 20th the patient, who had for the previous couple of days seemed weaker, manifested some new symptoms. Two rapidly-growing subcutaneous nodules appeared on the forehead, one of them being distinctly tender, and bleeding from the nose again ensued, necessitating plugging.

For the next three days the patient became distinctly worse; severe epistaxis continued, which was barely controlled with the greatest difficulty. The dulness over the sternum increased in size and intensity, larger nodules could be felt in the region of the retroperitoneal glands about the abdominal aorta, and in general the patient's whole condition was that of one moribund. Cultures from the blood were taken, but remained sterile. Examination of the blood on this, the last day of his life, showed a very much more marked leucocytosis, the lymphocytes being almost in excess of the red blood cells. Throughout the whole course of his stay in the hospital the temperature had assumed an irregular intermittent type. The patient died on December 23rd, less than nine weeks from the onset of his illness.

The case, then, as observed, is of interest in more than one particular: in the first place as illustrating the difficulties of diagnosis between leukaemia and Hodgkin's disease. With a leucocytosis, which varies from a proportion of 1 to 75 up to 1 to 120, or even more, it will seem scarcely justifiable to make an absolute diagnosis of lymphatic leukaemia, particularly when we know that occasionally the blood in Hodgkin's disease may assume exactly that condition, the leucocytosis being of the lymphocytic variety. Myelocytes were not present. The presence of numerous nucleated red cells will to many suggest the diagnosis of leukaemia, although such a condition might occur in the most varied forms of disease which produce hæmolytic. Among other points that may be of interest in connection with this case is the mode of onset, which corresponds with that described by Hinterberger¹² and others as showing the essential nature of such processes. In collecting together a large number of cases note has been taken of the large number of instances of acute lymphomatous affections where the onset has followed upon some affection of the alimentary tract, such as stomatitis or ulcerative enteritis or similar conditions, all leading to the suspicion that the disease has risen through the entrance of some toxic or infective agent by way of the alimentary canal. As will be seen from the history of our present case, the symptoms followed directly upon an acute and painful affection of the lips and gums.

Whether or not, then, finally, we are justified in recognising in leucocytosis any special type of disease, our knowledge does not at present permit us to decide; but when we consider the difficulty with which author after author endeavours to satisfactorily classify and separate these different affections, it may not for the present seem unreasonable to still maintain under one group all these various forms—the leukaemias in their various manifestations, acute and chronic, lymphatic, splenic, and myelogenous, the similar varieties of Hodgkin's disease, and all such like affections characterised by a hyperplasia of the lymph glandular structures where no primary focus of disease can be found to account for such a condition.

It merely remains for us to record our indebtedness to Professor James Stewart, in whose clinic the patients were observed, and by whose kind permission the material was placed at our disposal.

Since presenting the above paper before the Canada Medical Association, one of us (C. F. M.) had the opportunity of observing and treating a patient in whom the symptoms were

so suggestive of the intimate relationship between leukaemia and pseudoleukaemia, that it seemed to us well worthy of mention in this article. A full report of the case has recently been published in the *Montreal Medical Journal* by Drs. Robins and Argue, resident physicians of the Royal Victoria Hospital.

The patient was a young Canadian, aged 19, and was sent to the Royal Victoria Hospital on August 6th by Dr. A. E. Vipond. For two weeks previously he had been suffering periodically from epistaxis, high irregular fever, progressive asthenia and pallor. There was general glandular enlargement, and his blood condition remained normal, so far as the leucocytes were concerned; in other words, the symptoms pointed definitely to acute Hodgkin's disease.

The blood examination on his admission revealed 3,166,000 red cells, 8,000 white, and 42 per cent. of hæmoglobin. For the first two weeks after his sojourn in the hospital his general condition improved, the leucocytes were not markedly increased at any time, nor were there any other notable changes. Suddenly, however, on the fifteenth day after entry, there was a marked change, with increased fever, recurrent hæmorrhages from the nose, and the blood examination within two days showed over 60,000 white cells to the c.mm. This leucocytosis persisted for a week, his condition otherwise getting progressively and rapidly worse. Life was prolonged for but one week more, and during that period the leucocytes again diminished in number, returning in about two days to normal, and on the day previous to death an estimate showed merely 14,000 to the c.mm. It was observed, too, that the uric acid increase in the urine was coincident with the subsiding leucocytosis.

In the illness then, which lasted in all about six weeks, there was a period where undoubtedly all the typical signs of acute leukaemia were present, while on other occasions the examination revealed the usual classical symptoms of acute Hodgkin's disease. Nor is this merely a sequence of a leukaemia upon that of Hodgkin's disease, inasmuch as later the symptomatology had returned again to that of the original malady.

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THE TREATMENT OF SYPHILIS BY INTRAVENOUS INJECTIONS OF MERCURY.

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THE plan of treating syphilis by intravenous injections of mercurial solutions was originally suggested by Baccelli in 1893, and has since been carried out by many Continental surgeons: in Italy by Jemma, Colombini, Nieddu, Campana, and Bruni; in Germany by Görl, Neumann, and Lewin; in France by Abadie; and in Russia by Stoukovenkoff and Kusel.

Having charge of all the male wards at the only hospital in London devoted to the treatment of venereal diseases, I have unusual opportunities of giving a fair and impartial trial to any novel method of treatment; and, with a view of estimating the value of this plan, I have systematically adopted it in every case of syphilis which has come under my care in the London Lock Hospital during the last nine months, and I can state with conviction that I have formed a very favourable opinion as to its merits, and believe that, with certain reservations, it compares favourably with other methods of treatment, whether it be by inunction, by intramuscular injection, or by internal medication, its special feature being the rapidity with which patients can be brought under the influence of mercury.

The preparation I have utilised throughout has been