

tion of the salt and combination of the silver with the proteid molecule or with some atom acting as a negative ion takes place. In consequence, partial destruction of the tissues ensues as when mercury or any other metal combines with the cell. If enough silver enters into combination, the cell is completely destroyed; if but little combines there is a stimulation of the vital chemistry of the cell by which the damaged portion may be thrown off and regeneration occur. This, he said, seems to be the way in which mercury and iodine compounds bring about the substitution of healthy for diseased tissue in syphilitic degenerations of cells and perhaps in some inflammatory sequelæ. The chemistry of the masked silver compounds to which Professor Puckner referred, Dr. Solis-Cohen said, is to him *terra incognita*. He does not know of any literature on the subject which will enlighten anyone except the expert chemist, although he has seen more or less intelligible statements of the empirical composition of most of these compounds. He has seen therapeutic results, however, which show that some of these preparations at least have value altogether apart from what might be attributed to them from our knowledge of the action of the ordinary inorganic salts of silver. Dr. Solis-Cohen said that he could not explain this, and has seen no explanation which satisfies him; for the present he is content to accept and to utilize the fact. Some of these substances have bactericidal power especially as regards the gonococcus, but one of the most useful of them has little, if any, value as a germicide, yet it reduces inflammatory action and promotes absorption of chronic exudates. As to the colloidal salts in general, it is quite probable that in the organism they may play the part of catalytic agents, similar in many respects to the organic enzymes. The therapeutic value of colloidal silver may thus be largely due to catalytic action in taking up and again yielding oxygen, thus destroying toxins, bacteria or diseased cells—a chemical ambceptor action, to take an illustration made familiar by Ehrlich—and through such an action it may prevent or retard sepsis. It certainly, he said, has a definite therapeutic action and should be employed more extensively in larger and more frequent doses than we have been using. In regard to the external application of nitrate of silver Dr. Solis-Cohen agrees with Fraenkel that the cauterizing action is due to free nitric acid and that hence organic compounds which do not possess an acid element give us equal disintegrating, resolvent and absorbent effect, and in some instance antiseptic action also, without cauterization. In many cases this is to be preferred. The rules laid down by Fraenkel for the ideal silver compound are simple. They are four—two positive and two negative. Positively the compound should contain the largest amount of silver possible and should be soluble. Negatively it should be non-irritating and should not be decomposed by the tissues. There are some cases, however, in which we do wish decomposition of the agent in order to utilize the ionic effect of the metallic atom. Hence there are special uses for each type of compounds described, and Puckner's classification ought to aid us in deciding which class, and which agent of the class, to use in any given case.

Dr. W. J. ROBINSON, New York City, said that while we call collargol soluble silver, the adjective soluble is hardly correct. It does not make a true solution, only an exceedingly fine suspension. True, it is the finest suspension obtainable, but still it is a suspension and not a solution. That this is not merely theory, but fact, can be positively demonstrated by the aid of the ultra-microscope. A "solution" of colloidal silver in water, examined under the ultra-microscope, shows the beautiful, shining particles of silver, as clear and distinct as grains of sand. These can not be seen under the ordinary microscope. Dr. Robinson's opinion is that in acute gonorrhea the organic silver compounds are much superior to silver nitrate. In fact, in the acute stage of gonorrhea, silver nitrate, he thinks, should never be used. In chronic urethritis, however, silver nitrate seems to act best, and is still the remedy *par excellence* in spite of the multitude of organic compounds. Dr. Robinson believes that the nitric acid radical plays an important and hitherto unrecognized rôle. It can not be the silver alone that acts, for there are many compounds with a large

silver percentage that are much less active than other compounds with a lesser silver content. Dr. Porosz of Budapest had been making experiments in treating gonorrhea with very dilute solutions of nitric acid, and he claims very good results. This goes to show the importance of the NO₃ radical.

Dr. C. S. N. HALLBERG, Chicago, said that the relative percentage—amount of silver—ranges from about 10 to about 25 per cent., and he wished to know whether or not the preparations are correspondingly more potent on account of the silver percentage.

Prof. W. A. PUCKNER, Chicago, said that he did not attempt in any way to take up the therapeutic effect. The paper is intended as a conservative statement of the present state of knowledge for physicians who may wish to consult it. In reply to Professor Hallberg's query he said that the organic silver compounds vary from 5 to possibly 30 per cent. of silver. He has no doubt at all that their action is largely dependent on the amount of silver present. The silver ion is colorless; the ions of the complex silver compounds, so far as established, are colorless. Professor Puckner believes that the color of colloidal silver solutions is due to reduction processes. On close inspection it gradually shows various colors as the particles aggregate, so the color is due to that. In reply to Dr. Robinson's comment, he said that he tried to make a conservative statement of the present theories; it is generally believed that the silver is there in solution, possibly in the metallic form.

THE INFLUENCE OF X-RAYS IN THE TREATMENT OF LEUKEMIA AND HODGKIN'S DISEASE, WITH A REPORT OF TWO CASES.*

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Since the therapeutic value of x-rays in Hodgkin's disease and leukemia is still in the experimental stage, and requires the report of more cases which have been under careful observation and treatment for longer periods of time, in order to arrive at definite conclusions, the two following cases are submitted with their detailed histories, and results of treatment; together with an account of some experimental observations concerning the action of x-rays on the blood and urine in leukemia.

HODGKIN'S DISEASE: REPORT OF A CASE WITH A SYMPTOMATIC CURE.

Patient.—Mrs. R. came to the medical clinic of Dr. Dock, May 13, 1904, because of nodules in the sides of the neck and pain in the neck and thorax.

History.—The patient's family history is negative. She has had measles, scarlet fever and three attacks of "la grippe." Five years ago she noticed a mass on the left side of the neck above the clavicle. The mass was soft and puffy and movable beneath the skin. It became harder in about six weeks. At first there was no pain, but later she had intermittent attacks of pain of a sharp-shooting character. The skin over the mass became sore to the touch. In the winter of 1903 she had noticed a shortness of breath at times and a sort of a catch on inspiration; so that she breathed with considerable discomfort. During the three weeks before coming to the clinic she had been somewhat hoarse, and had increased difficulty in breathing at night. The patient said that other lumps or masses have appeared since the first one described. The order of appearance was as follows: (1) On the neck above the clavicle, (2) under left arm in axilla, (3) behind angle of the left jaw, (4) on the chest, (5) behind angle of right jaw. The last four occurred within four or five weeks. The patient used to weigh 160 pounds, she now weighs 139. She has a poor appetite, is habitually constipated, has no cough.

* From the Medical Clinic of Dr. Dock, University Hospital.

Examination.—Her frame was of moderate size; there was a fair amount of panniculus. Musculature was small and flabby. The skin was rather sallow, particularly on the abdomen. Linea albicantes were present. A few scratch marks were present. There was slight edema of the ankles. Over the thorax, enlarged superficial veins extend out to each mammary gland. The cervical lymph glands were enlarged on the right side; the largest was the size of a lima bean. Some of them were adherent to one another.

The right submaxillary gland was negative. The left submaxillary gland was the size of a robin's egg, firm and rather freely movable. Above the outer end of the left clavicle there was a nodular mass movable under the skin, hard over the larger nodules, not tender on palpation. The left axillary glands were enlarged; one was the size of a lima bean. The right axilla was negative. Inguinal glands were negative. The thorax was broad and fairly deep. Expansion was small and somewhat diminished over upper left portion.

Percussion: There was a marked relative dullness above the left clavicle caused by the mass described above. Just below the left clavicle down to the second rib, the resonance was diminished. There was a prominence on the upper part of the sternum from $\frac{1}{8}$ to $\frac{1}{4}$ inch above the surface, rounded slightly, more on the left side, due to a thickening felt under the skin. Relative dullness extended over the area. There was a small area of resonance between this and the heart dullness. The percussion of front and sides was otherwise negative. There was good vesicular breathing over front and sides. Over the dull area, the inspiration and expiration were rather harsh. Percussion of back was negative. A few fine râles could be heard at bases on auscultation.

Heart: The apex could not be seen or felt. Sounds were strongest in normal area by stethoscope. There was no increase in dullness. A moderately strong, clear, soft-blowing systolic murmur could be heard along the edge of the sternum. The liver and spleen were not palpable.

Abdomen: Negative.

Urine: Examination of the urine was negative.

Blood counts: Red varied from 4,400,000 to 3,600,000; whites from 7,639 to 2,500; hemoglobin from 80 to 90 per cent.

Differential counts, 500 cells, were made as follows:

	May 7, 1904. Per cent.	May 28, 1904. Per cent.	May 18, 1905. Per cent.
Small lymphocytes	13.6	28	21.58
Large lymphocytes	1.4	8.7	8.56
Transitional	4.4	8.3	58.8
Polynuclear	79.0	48.	
Eosinophile polynuclear	1.6	7.	1.72
Eosinophile mononuclear .....		....	.72
Degenerate .....		....	8.

Treatment.—The patient was treated with x-rays every other day over the enlarged glands, from May 6 until June 10.

Course of Disease.—June 10 examination showed that the swelling above the left clavicle had diminished in size. Only two or three glands were adherent, the largest of these being about the size of a small almond. The swelling below the left ear had disappeared. Over the prominence on the upper part of the sternum, the skin was slightly red. The tissue felt thickened. There was no absolute dullness on percussion. The area of relative dullness seemed smaller than before. On the right it extended to the sternal line; downward to the angle of Ludwig, or about 2 inches below the episternal notch; on the left to the parasternal line. The glands in the left axilla could no longer be felt. The patient left the hospital.

July 13: The patient returned to the hospital complaining of a sense of pressure in the region of the sternum. A gland could be felt above middle of clavicle about size of a pigeon's egg. The x-rays were given every other day and arsenic (Fowler's sol.) was administered internally.

October, 1904: The patient was discharged, the glands having returned to normal size.

Jan. 1, 1905: The patient returned to the hospital because of enlarged glands under the left arm and tenderness at times under the upper sternum and in the left supraclavicular space. On examination, the left supraclavicular fossa was found to be obliterated. Just above the left clavicle, there was a gland about the size of a pigeon's egg. Above the middle of the right

clavicle, there was a gland the size of a lima bean with one or two smaller ones. High up in the left axilla, there was a gland about the size of a pigeon's egg and of a soft consistency. The prominence of the skin over the manubrium sterni was much less noticeable than on previous admission. There was still a thickening beneath the skin. The area of relative dullness under the upper sternum had not increased in size. There was bronchial breathing over this area, both on inspiration and expiration. The patient received x-ray treatments eight minutes in length over enlarged glands and upper sternum. A medium hard tube was used. She received 19 treatments, or a total exposure of 152 minutes. She left the hospital Feb. 5, 1905.

May 18, 1905: After an absence of three and one-half months, the patient returned to the hospital. She had been well most of the time during her absence, but in the middle of March the left side of the neck became swollen and the head could not be turned to left. She suffered great pain on swallowing, regardless of the kind or amount of food taken. Hot applications, poultices and blisters were tried without effect. In 3 or 4 days the swelling began to decrease in size and at the end of a week it was normal. This swelling involved the region between the ear and the glands above the left clavicle and extended around to the median line in front. About May 1, 1905, patient had another attack, in every way similar to the first, and lasting about the same length of time.

Examination by Dr. Dock showed the patient looking about the same as before.

About the middle of the left clavicle there was a prominence from $\frac{1}{4}$ to $\frac{3}{8}$ inch above surface, measuring three inches transversely and 1 $\frac{1}{3}$ inches vertically. The skin over it was freely movable. The mass was of a moderately firm consistence, rounded and about the size of a small hen's egg. The lower border seemed to extend under the clavicle. Just above the middle of the right clavicle there was a gland the size of a large white bean. The prominence over the upper end of sternum was more marked than before and measured $3\frac{1}{2}$ inches transversely and $2\frac{1}{2}$ inches vertically. The subcutaneous tissue was thickened and tender on pressure. There was relative dullness corresponding to the prominence. No Wintrich's change of sound could be made out. Just under the left anterior axillary fold there was a gland much larger than at time of previous discharge from hospital. It was the size of a hen's egg, very firm, with a small lobule on its outer side. In the right axilla there was a gland just back of the pectoralis major about the size of a pigeon's egg, and freely movable. Above middle of right Poupart's ligament there was a gland about the size of a pigeon's egg, which was very tender on pressure. On the left side there was a gland about half as large as that on right.

Dr. Dock ordered x-rays given three minutes over each enlarged gland. The patient was treated with x-rays from May 19 daily until July 26, taking in all 50 treatments, each varying from 10 to 35 minutes in length, with a hard tube, 10 inches from the anode. During this time she was exposed to x-rays 1,068 minutes.

July 27: The patient was discharged from hospital, feeling well. The inguinal glands were reduced in size to normal. The gland in the left anterior axilla was small and hard. The right axillary gland was also small and hard. The masses above the middle of the left clavicle had disappeared. The prominence over upper sternum had nearly disappeared, there being still a slight thickening. There was no pain or difficulty in swallowing.

Examination of Gland.—On May 31 a small hard lymph gland was removed by incision of skin and fascia just posterior to the right sternomastoid, and was sent to Dr. Warthin's laboratory for pathologic diagnosis. It was found to be a Hodgkin's gland (lymphadenoma) of the D. M. Reed type. A detailed description of the microscopic sections made by Dr. Butterfield of the pathologic department, read as follows:

"The distinction between follicle and sinus is lost. The abnormal elements of the lymph gland are replaced by uniformly distributed cells and a delicate reticulum. The predominating cell possesses a large oval vesicular nucleus with one, or sometimes two, bright nucleoli. These cells vary somewhat among themselves in size and shape. The largest cells are fully from

three to four times the size of the small ones. The protoplasm is fairly abundant, non-granular and eosin-staining. A few of the nuclei are hyperchromatic, but mitoses are rather scarce, only two or three being encountered in a section. Scattered among them is a relatively small number of lymphoid cells of the usual type.

"Bordering on the reticulum, cells with large vesicular nuclei and protoplasmic processes are occasionally seen. Eosinophiles are not found in the sections examined. The connective tissue fibrils forming the mesh-like reticulum are delicate. Coarse bands and hyaline areas are absent. The capsule of the gland is thin and between its bundles of fibers are cords of cells of the lymphoid type. The periglandular fat is not infiltrated.

The predominating cell is usually regarded as being of endothelial origin and corresponds in all respects with the cells described by D. M. Reed, Longcope¹ and others.² The section resembles those described by D. M. Reed, but differs in the absence of eosinophiles.

This case is of interest owing to the enlarged lymph glands in the upper mediastinum causing difficulty in breathing and in swallowing, due to pressure exerted on the bronchi and esophagus. These pressure symptoms were entirely relieved by *x*-ray treatment, which caused a decrease in the size of the glands. The much enlarged superficial glands likewise were reduced in size, four different times, by application of the *x*-rays. Each time the patient was discharged with her glands normal in size, but without continued *x*-ray treatment, the glands gradually increased in size again. It is quite probable that the present symptomatic cure will be but temporary unless the *x*-ray treatment is continued often enough to prevent the glandular hypertrophy and hyperplasia.

The blood changes also make a further observation of this case of interest. Fully 10 per cent. of atypical lymphocytes were found in a differential count of 500—this pointing to the possibility that we are dealing with a transition from Hodgkin's disease (lymphadenoma of the D. M. Reed type) to a lymphatic leukemia. The lowest leucocyte count was 2,500 and the highest 7,640. So far there has been no further increase.

SPLENOMYELOGENOUS LEUKEMIA: REPORT OF A CASE UNDER X-RAY TREATMENT WITH CERTAIN BLOOD AND URINE FINDINGS.

Patient.—Mr. J. D. came to the hospital March 3, 1905, because of a dull, heavy feeling in the pit of the stomach, belching of gas and swelling of feet and ankles.

History.—The family history is negative, likewise the early personal history.

Present Illness.—During the last three years the patient has had a distressing, heavy feeling in the pit of the stomach, accompanied by belching of gas. During the past year the pain has come on daily and there has been a loss of 25 pounds in weight.

Examination.—Temperature 99, respiration 20, pulse 78. Present weight, stripped, 135 pounds; height, 5 ft. 8 in. The man's frame was of medium size; panniculus scanty. Muscles were of medium size, soft and flabby. The skin was smooth, dry, elastic, pale and slightly sallow. There was slight edema of the ankles, the left ankle being always swollen more than the right. There were no stiff joints, lymph glands were negative. Pupils were equal and reacted well. Both external jugulars were distended; there was moderate pulsation from clavicles to ears.

Thorax: The thorax is well formed, of fair length and breadth and epigastric angle of 90 degrees. Auscultation and percussion of lungs were negative.

Heart: The apex was visible and palpable in fourth intercostal space, one inch outside of the parasternal line. Dullness was found to begin on the third rib, within 1 cm. of apex, and to extend to the left edge of the sternum. Apex sounds

were clear; a soft blowing systolic murmur could be heard over the pulmonic valve, weaker over aortic. The second pulmonic sound was reduplicated.

Abdomen on level of ribs: There was a slight fullness in the left epigastric region between the nipple line and the ensiform appendix, extending to the left sternal line.

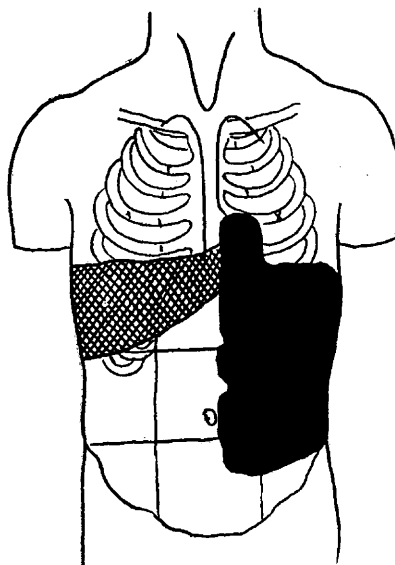
Palpation: The abdominal walls were rigid; the right side was negative; the edge of the liver could not be felt. On the left side a firm hard mass could be felt extending from the costal margin; the surface was smooth, border presented a somewhat rounded edge, and the mass descended with respiration. Two notches could be felt on the anterior edge. The mass extended over to the left and down to the level of the anterior spine of the ileum in the left parasternal line. This tumor extended into the left flank and could be felt almost to the midaxillary line where it became indistinct. The outline is shown in diagram. The splenic dullness began at the seventh intercostal space in the midaxillary line and extended straight around to the nipple line, filling Traube's space and being continuous with the dullness over the mass described above. No friction sounds could be heard on auscultation over mass.

Blood count: Reds, 2,500,000; whites, 135,000; hemoglobin, 70 per cent.

Differential count: Small lymphocytes, 2 per cent.; large lymphocytes, 0.4 per cent.; transitional, 2.2 per cent.; polynuclear, 42.6 per cent.; eosinophile polynuclear, 0.2 per cent.; eosinophile mononuclear, 0.8 per cent.; myelocytes, 45.6 per cent.; mast cells, 5.4 per cent.; degenerates, 0.6 per cent.

Diagnosis.—Splenomyelogenous leukemia.

Treatment.—*X*-ray treatment was begun March 20, 1905. The spleen alone and later the spleen and long bones were alternately treated. A hard tube was used, and the area treated placed 10 inches from anode. Each exposure varied from 7 to 15 minutes. During the course of treatment the patient was exposed to *x*-rays about 2,800 minutes. The leucocyte counts



taken from time to time are shown in Table 1.

Course of Disease.—The blood condition was rapidly becoming worse at the time of patient's admission to the medical clinic of Dr. Dock; the leucocyte count increasing from 135,000 to 188,000 in four days, without treatment. Notwithstanding the treatment with *x*-rays, the leucocytosis increased until at the end of one month it reached a maximum of 365,000, and at the end of three months' treatment the count returned to about 135,000 again. The condition did not change much for the remainder of the year, the leucocyte count during that period never falling below 100,000 per c.mm. Then the count gradually diminished, falling from 146,420 to 57,320 in one month.

At this time it was deemed advisable to give Fowler's solution in conjunction with the *x*-rays. The Fowler's solution was given for two months, starting with 5 gtt. t.i.d. and gradually increasing until gtt. 15 t.i.d. were given. During this period the leucocytosis dropped from 57,320 to 4,680.

The count has remained normal for over one month, no medicines being given except gr. x. ferrous carbonate for the general condition. It is probable that the leucocyte count would have returned to normal without the use of arsenic, but in this case, as in other cases reported, arsenic seems to have been a valuable adjuvant to *x*-ray treatment.

1. Longcope: Bulletin Ayres Clin. Lab., Vol. 1.

2. MacCallum: "Specificity of Endothelium," Bull. Johns Hopkins Hosp., 1903; Johns Hopkins Hosp. Rep., 1904.

During the course of treatment, a series of differential blood counts were made at stated intervals after *x*-ray exposure, in order to study the immediate effects of the *x*-ray on the blood. The results are tabulated in Table 2.

TABLE 1.—LEUCOCYTE TABLE.

Date.	Whites.	Hbg.	Date.	Whites.	Hbg.	Date.	Whites.	Hbg.
1905.						1906.		
3-16	135000	70	7-15	145150	70	2-12	101860	..
3-18	168000	70	8-26	153750	..	2-13	152783	..
3-19	184000	70	9-9	235000	..	2-14	178250	70
3-22	188000	..	9-20	235000	..	2-15	157870	..
3-26	270000	70	10-17	244400	..	2-16	150240	..
3-27	242000	..	10-22	228300	..	2-18	143875	..
3-28	248000	65	10-31	202000	70	2-19	129840	..
3-29	297000	..	10-31	178000	..	2-20	145150	..
3-30	248800	70	11-27	188440	..	2-21	146420	..
4-1	282000	..	12-8	140155	..	3-14	109500	70
4-2	282000	..	12-9	164230	..	3-15	94120	..
4-3	305000	70	12-11	181000	..	3-21	71300	..
4-5	310000	..	12-14	210000	72	3-22	61120	..
4-6	248000	..	12-14	187000	..	3-23	57320	..
4-7	311000	..	12-16	176000	..	3-27	54750	..
4-9	297000	..	12-17	192000	..	3-28	38195	..
4-12	360000	..	12-19	192255	..	3-29	36925	..
			1906.					
4-15	363100	..	1-1	131000	..	4-4	25464	..
4-16	378000	..	1-10	115860	..	4-5	16552	..
4-17	365500	70	1-12	98400	..	4-6	17061	80
4-18	342500	..	1-15	99125	70	4-9	13243	..
4-19	330500	..	1-26	165266	..	4-10	10443	..
4-20	294200	..	1-29	168170	..	4-11	8405	..
5-1	282000	..	1-30	270460	..	4-12	8150	..
5-15	274000	..	1-31	285230	..	5-16	4680	80
6-6	260000	70	2-2	140055	..	6-1	4800	..
6-26	252000	..	2-7	124000	..	6-10	5220	..
7-7	133900	..	2-10	132415	..			
6-28	163500	..	2-7	101860	71			
7-11	165380	..	2-11	115865	..			

* Fowler's sol. given 5 gtt. t. i. d., 1 drop increase a day.

† Fowler's solution, gtt 15 t. i. d.

‡ Fowler's solution discontinued.

TABLE 2.—RESULTS OF X-RAY TREATMENT.

Date.	Time.	Time of Exposure.	Leucocytes Total.	Lymphocytes per cent.	Polynuclears per cent.	Eosinophiles per cent.	Basophiles per cent.	Myelocytes per cent.	Degenerates per cent.
3-27	9 a.m.	8.15	244400	2.4	48.2	1.	5.6	39.6	4.2
	11 a.m.	15 min.	282000	2.5	47.5	1.3	6.2	37.8	4.7
	1 p.m.	.....	300000	2.3	48.0	.5	4.0	36.2	9.0
	3 p.m.	.....	296800	2.8	46.0	.3	5.0	37.2	8.7
	8 p.m.	.....	282000	1.5	50.0	.7	6.0	35.8	6.0
3-28	9 a.m.	None.	248000	2.3	50.0	1.4	5.7	35.5	4.7
4-16	9 a.m.	8.3	278000	2.1	56.4	.7	5.0	32.2	3.6
	11 a.m.	30 min.	300000	2.6	54.8	.4	3.5	32.4	6.3
	1 p.m.	.....	302000	2.5	51.2	.3	4.2	34.0	7.8
	3 p.m.	.....	296000	2.6	54.6	.4	4.4	31.0	7.
	8 p.m.	.....	285000	2.8	53.8	.9	4.7	32.0	5.4

In Table 2 it will be seen that the exposure to *x*-rays, at one time 15 minutes and another 30 minutes, was followed by a gradual increase in the number of leucocytes which reached its maximum about 5 hours after the exposure. The number of degenerates increased in one instance from 4.2 per cent. to a maximum of 9 per cent. and in the other from 3.6 per cent. to a maximum of 7.8 per cent. Nearly all degenerates are disintegrating myelocytes, in many cases consisting only of a remaining network of fibrils. The increase in the number of degenerates seems related to the general leucocyte increase after exposure.

URINARY FINDINGS.

The quantitative estimation of the total phosphates and earthy phosphates was carefully made, in order to determine whether or not the destructive action of the *x*-rays on the white cells and tissues caused an increased elimination of earthy phosphates. As the table below shows, the quantity of earthy phosphates is, if anything,

slightly diminished. This may be due to the fact that the calcium salts are partly deposited in the kidney tissue, and may be the explanation of the calcification found by Warthin³ in the kidneys of leukemic patients, treated for long periods with *x*-rays.

TABLE 3.—URINARY FINDINGS.

Date.	Amount in U. Cn. 24 hours.	Gms. Total Phosphates.	Gms. Earthy Phosphates.	Albumin.	Casts.
3-19	800	1.60	0.32	Trace.	Few granular.
3-20	750	1.40	0.38	Trace.	Few granular.
3-21	1500	1.25	0.40	Trace.	Few granular.
3-22	1250	1.8	0.29	Trace.	Few granular.
3-24	700	1.18	0.12	Trace.	Few granular.
3-25	1075	1.69	0.10	Trace.	Few granular.
3-27	700	1.78	0.20	Trace.	None.
3-28	1000	2.3	0.40	None.	None.
3-29	925	1.99	0.30	None.	None.
3-30	1175	.90	0.17	None.	None.
3-31	700	1.00	0.16	None.	None.
4-1	870	.70	0.17	None.	None.
4-6	1400	1.4	0.12	None.	None.
4-8	925	.85	0.20	None.	None.
4-10	1200	1.5	0.20	None.	None.
4-14	1050	1.4	0.11	None.	None.
4-18	1250	1.3	0.12	None.	None.

SUMMARY.

1. The beneficial therapeutic value of *x*-ray treatment in Hodgkin's disease is well demonstrated in the case reported. The decrease in the glandular enlargement was comparatively rapid, but the enlargement will probably recur unless *x*-ray treatment is persisted in.

2. In the case of leukemia, for a long time the *x*-ray treatment did not inhibit the further progress of the disease process, as is indicated by the great increase in the leucocytosis for three months after treatment was begun. After using the *x*-ray treatment systematically for over one year, the leucocyte count finally returned to normal. This was not accompanied by much decrease in the splenic enlargement. The use of arsenic as an adjuvant to *x*-ray treatment seemed of much benefit.

3. The immediate effect of *x*-ray treatment is to increase the number of leucocytes in the general circulation. This increase is accompanied by a large increase in the number of degenerate cells, most of which are disintegrating myelocytes. No toxic symptoms have developed during the long course of treatment. Although the leucocyte count has remained normal for a period of two months, the patient was advised to continue the use of the *x*-rays at intervals to prevent a recurrence of the blood condition.

Cornwell Place.

POLYCYTHEMIA.*

WILLIAM ENGELBACH, M.D.

AND

ORVILLE HARRY BROWN, M.D.

ST. LOUIS.

In 1892 Rendu and Widal reported the discovery of a peculiar condition characterized by the rare combination of chronic cyanosis, enlarged spleen and increased number of the erythrocytes occurring with primary tuberculosis of the spleen. In 1899¹ they reported two similar

3. International Clinics, Vol. V.

* Read before the St. Louis Medical Science Club.

† From the Jewish Hospital Dispensary and St. Louis University.

1. Rendu and Widal: "Splénomégalie tuberculeuse sans leucémie avec hyperglobulie et cyanose," Bull. Soci. méd. des hôp., III Ser., 1899, p. 528.