improper dieting, and a "soil" favourable to the growth of all forms of micro-organisms has been cultivated. Bacteria which are always present and are usually quite harmless become active in these patients, giving rise to conjunctivitis and to ulceration of the cornea. In patients in whom the disease has existed for many weeks, therefore, ulceration of the cornea and all other dangerous symptoms are the result of secondary infection. The eyelids, nose, and the upper lip become swollen, and the skin of the face is covered by an eczematous eruption. Painful fissures form at the external canthus, the side of the nostrils, and round about the mouth. In addition, seborrhoea of the scalp, enlarged cervical glands, nasal and bronchial catarrh, and intestinal disturbances are common. It is all-important to remember that micro-organisms—that is to say "seed"—will only grow upon a suitable "soil." The general make-up of children who suffer from phlyctenular conjunctivitis is such that they offer feeble resistance to every form of infection, consequently they fall a ready prey to the ubiquitous tubercle bacillus. The clinical picture is always that of bovine tuberculosis, and it is very probable that in these patients who are attacked disordered carbohydrate metabolism has paved the way for the onset of the tuberculous infection.

It is probable that in many adults who suffer from toxic amblyopia—the result of over-indulgence in tobacco or alcohol or both—there is disturbance of carbohydrate metabolism, and that a systematic estimation of the blood sugar may prove an important factor both in prognosis and in treatment. A full investigation of this subject offers a promising field for research.

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THE GLUCOSE TOLERANCE IN RHEUMATOID ARTHRITIS *

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It was first demonstrated by Pemberton¹ that in true rheumatoid arthritis there was marked alteration in the metabolism of glucose. He showed that after administration of a standard dose of glucose the blood sugar rose rapidly to well above normal limits and subsequently fell sharply to the base line. The curves thus obtained somewhat resemble those obtained in exophthalmic goitre. The present investigation was undertaken partly to confirm these facts, but mainly (at the suggestion of Dr. R. D. Lawrence) to ascertain whether the normal difference between the sugar content of arterial and venous blood was altered. If this were found to be diminished it would suggest that the cause of the rapid rise of the blood sugar in these cases might be due to a failure of the muscles and other tissues to utilize the sugar, with consequent failure of their nutrition.

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TECHNICAL METHODS

For the estimations the micro-method of Folin-Wu was utilized throughout, at each stage 0.2 c.cm. of blood being taken from the median basilic vein and from the finger-tip of the patient. Blood obtained in this way from the finger-tip may be regarded as being practically arterial in character.

As the patients were all adult and practically all young women, it was decided to adopt a dosage of 50 grams of glucose as a standard; specimens were taken before administration and subsequently at intervals of three-quarters of an hour up to two and a quarter hours. In a few cases samples of urine were taken at the same intervals, whilst in a few others a specimen was collected at the end of the investigation only. The main fact that emerged from the urinary investigation was that the renal threshold for glucose is often abnormally high in rheumatoid arthritis. Some fifty cases were investigated in this manner, a few of these being controls or patients suffering from types of rheumatism not resembling rheumatoid arthritis, two being, in addition, true diabetics.

RESULTS OF INVESTIGATION

The following is a typical result obtained from a normal healthy person.

TABLE I.—Blood Sugar Percentage

	Before Glucose	$\frac{3}{4}$ Hour After	1½ Hours After	2½ Hours After
Artery	0.081	0.145	0.136	0.115
Vein	0.077	0.136	0.120	0.109
Difference...	+0.004	+0.009	+0.016	+0.006
Urine sugar ...	Absent	Absent	Absent	Absent

It will be noted that the arterial blood sugar content is throughout higher than the venous, the difference being least before the administration of glucose and greatest one and a half hours afterwards. In a few control cases greater differences (that is, in the vicinity of 0.025 per cent.) were observed. In some instances it was found that the peak of the arterial curve came earlier than that of the venous curve, with the result that in the one-and-a-half-hour specimens of blood there was often a much higher value in the venous blood than in the arterial. This phenomenon was observed in some of the rheumatoid cases as well as in the controls.

The following result was obtained from a patient, aged 30, with true rheumatoid arthritis.

TABLE II.—Blood Sugar Percentage

	Before Glucose	$\frac{3}{4}$ Hour After	1½ Hours After	2½ Hours After
Arterial	0.133	0.316	0.273	0.180
Venous	0.111	0.288	0.306	0.167
Difference...	+0.022	+0.028	-0.033	+0.013
Urine sugar ...	Absent	A trace	2.5 per cent.	A trace

This table illustrates well the very high peak values obtained, occurring in the arterial blood at three-quarters of an hour and in the venous at one and a half hours and followed by a rapid fall. This failure of the peaks to coincide produces a negative difference of 0.033 per cent. at one and a half hours, but it is already evident that the expected small differences between the arterial and venous values are not forthcoming. Though such small differences were observed in one or two cases they were never found to be constant, and the majority of cases show normal or even greater differences. Similar differences, greater than normal, are not infrequently observed in the high curves found in true diabetes, of

which the following is an example: the patient, aged 40, had true diabetes with neuritis.

TABLE III.—Blood Sugar Percentage

	Before Glucose	$\frac{1}{2}$ Hour After	1½ Hours After	2½ Hours After
Arterial	0.236	0.354	0.526	0.466
Venous	0.207	0.332	0.455	0.434
Difference... ..	+0.0.9	+0.022	+0.071	+0.032

The following figures, obtained from a patient, aged 31, with true rheumatoid arthritis, illustrate the disproportionately small amount of sugar which may be passed in the urine, in spite of high blood sugar values, showing that the renal threshold is altered in cases of this disease.

TABLE IV.—Blood Sugar Percentage

	Before Glucose	$\frac{1}{2}$ Hour After	1½ Hours After	2½ Hours After
Finger blood	0.138	0.300	0.247	0.183
Vein	0.121	0.280	0.261	0.150
Difference... ..	+0.017	+0.020	-0.014	+0.033
Urine sugar	Absent	A trace	Faint trace	Very faint trace

Curves similar to the above were obtained in practically all cases of suspected rheumatoid arthritis diagnosed clinically, and as such curves do not occur in any other type of arthritis investigated a glucose tolerance test would seem to be a valuable confirmatory means of diagnosis. Further work is being carried out on this point.

With the subsequent introduction of insulin into the treatment of rheumatoid arthritis^{2, 3} the question arose as to whether, *pari passu* with the manifest clinical improvement, any alterations in the glucose tolerance occurred such as are seen in many cases of diabetes after treatment. In several patients with true rheumatoid arthritis multiple curves were plotted at varying stages, the later curves often being after several months' treatment with insulin (in most instances with great benefit clinically), but in no case was any remarkable improvement in the glucose tolerance curve observed. Indeed, subsequent curves generally showed striking resemblances to those previously obtained. Table V shows the figures obtained in one of the few cases in which there was apparent improvement in sugar tolerance after treatment. The patient was 50 years old, and the interval between the two observations nine months.

TABLE V.—Blood Sugar Percentage

	Before Glucose	$\frac{1}{2}$ Hour After	1½ Hours After	2½ Hours After
Finger... ..	0.121	0.235	0.250	0.133
Vein	0.110	0.190	0.211	0.125
Difference... ..	+0.011	+0.045	+0.039	+0.008
Nine months later				
Finger... ..	0.111	0.166	0.220	0.162
Vein	0.083	0.150	0.181	0.146
Difference... ..	+0.028	+0.016	+0.016	+0.016

We wish to record our thanks to our colleagues on the medical staff of the B.R.C.S. Clinic for rheumatism for permission to investigate and record findings on their patients in addition to our own.

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FATAL STAPHYLOCOCCAL SEPTICAEMIA WITH PSEUDOMYXOMA PERITONEI

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The following case seems worth recording on account of: (1) the abdominal condition: few symptoms or physical signs were evident till the disease was advanced—papillomatous cystadenoma of ovary followed by pseudomyxoma peritonei; (2) the vomiting, acidosis, and unexplained mental upset with subsequent complete restoration of clearness of mind; and (3) the rapid, fatal staphylococcal infection which spread to the brain following what the patient called a "common cold sore" on the upper lip.

History.—The patient, an unmarried woman of 58, consulted me in October, 1930, for indefinite symptoms of headache, fatigue, slight loss of weight, occasional backache, heartburn, and flatulence. She said she had always been subject to gastric trouble, and for several years had been obliged to take aperients. She did not complain of abdominal pain; recently she had not been sleeping well. In 1905 she was operated on for "appendicitis and colitis." A horseshoe kidney was found; the appendix was not removed. Though never a robust individual, she had had no other serious illnesses. Menopause occurred several years past; no discharge since.

On examination I could find nothing definitely abnormal. I prescribed dyspeptic mixtures, and decided to suggest a barium meal if symptoms failed to improve. I saw her on two further occasions before Christmas; while her weight and general condition seemed to have undergone no marked change, she was no better. I next saw her on January 12th, 1931. She had had a slight blood-stained discharge per vaginam on the previous day, and had been passing very little urine. A large cystic abdominal tumour, filling nearly the whole of the right side of the abdomen, was palpable, and I arranged for her admission to the New Sussex Hospital. The blood picture on January 16th was: red cells, 5,152,000 per c.mm.; haemoglobin, 88 per cent.; colour index, 0.86; white cells, 9,800 per c.mm.—polymorphs 60 per cent., small lymphocytes 32 per cent., large lymphocytes 3 per cent., hyalines 4 per cent., and eosinophils 1 per cent.

OPERATION

An operation was performed on January 17th. A paramedian subumbilical incision was made, and the peritoneal cavity was found to contain a pint or more of blood-stained free fluid. A large right papillomatous cystadenoma of ovary, about the size of a cricket ball, was removed after ligation of the pedicle. A left ovarian cyst of similar consistency, although smaller, was also resected. Small nodules of friable pseudo-mucinous growth covered the whole of the broad ligaments, bladder, and uterus, and extended as a widespread jelly-like peritonitis over the pelvic peritoneum, mesentery, mesocolon, omentum, and left lobe of the liver. There were many adhesions, and there was considerable matting together of the intestines. The uterus was normal in size and position. The appendix was enlarged, being 3 cm. in diameter, and was covered with similar growth. An appendicectomy was performed. There was a large horseshoe-shaped single kidney, consisting of a large left and small right; the median part of it curved downwards, the convexity being downwards and forwards.

X-RAY TREATMENT

In view of the marked tendency of the tumours to extend to adjacent parts by implantation and invasion of the surrounding tissues, and of the fact that such pseudomyxoma peritonei may become clinically malignant, it was decided to give intensive x-ray treatment, in the hope of preventing further extension. Accordingly, on March 26th a total depth dosage of 110.6 per cent. was given through two large anterior and two posterior fields; and on July 31st a total depth dose of 94.3 per cent. through one anterior, one posterior, and two lateral fields. A voltage of 186,000 was employed—the focal