Kramer, Tisdall, and Howland⁷ state that in normal blood the product of the calcium and inorganic phosphate values should be 40 or over, while in rickets it is reduced below this value. György⁹ uses the quotient of the organic phosphate into the calcium values, and states that in normal cases this figure should be 1.95, in rickets 3.5, and in tetany 1.4. Five cases in Group 3 of the present investigation show a lowered product, but a lowered quotient also, due to the lowering of the calcium value, while the phosphate value remained normal. The quotient (with one exception, where it is 1.32), though lowered, is never as low as in cases of tetany, and the significance of this change is not evident.

CONCLUSIONS.

The serum-calcium values found in the group of normal children agree with those of other workers. The values obtained in Groups 2 and 3 show a wider range than the normal, the difference being more striking in Group 3 (hypotonic children) than in Group 2. In Group 3, moreover, the average calcium value is 9 mg., a slightly lower figure than the average of 10.4 found in the normal cases. Five cases in Group 3 have values of 10 mg. or more, and many other of the cases have but a slightly lowered value; and further, inversely, a few cases in Group 2 have lowered values though good tone. It is therefore clear from these two facts that muscle hypotonus is not immediately dependent on the serum-calcium level, as it can occur with either high or low values. A wide range of calcium values is probably constantly associated with this poor tone, even as a similar range has been shown to be associated with rickets, but it does not operate as a causative agent. The fact that Group 2 had a greater range than the normal suggests that such variation occurs in other conditions of ill health.

The inorganic phosphate figures for the three groups, with a few exceptions which occur both in Groups 2 and 3, fall within the limits of the normal and do not differ from each other. In contrast with these findings are those recorded in cases of bony rickets where low inorganic phosphate values are constantly found and are considered by most authorities as typical of the disease. Anderson,⁶ however, as a result of her work on rickets, suggests the need for further investigation of blood phosphates in disease "causing and probably preceded by considerable muscular inactivity and atonicity," before deciding whether a low blood phosphorus is an exciting cause or merely a result of rickets. The normal values found in Group 3 (flabby children) are of interest in this connexion, as they do not suggest any association between lack of muscle tone *per se* and a low inorganic phosphate level in the blood, such as is frequently found in rickets.

The balance between the calcium and the inorganic phosphates, expressed either as the product or the quotient of the phosphate and calcium figures, does not appear to be appreciably altered from the normal in Groups 2 and 3, though there is a slightly greater range in the figures in Group 3, owing to the greater variability of the calcium figures. In fact the chemical findings reported above do not appear to support the hypothesis that muscle hypotonus in children is necessarily an indication of some degree of rickets, though the hypothesis can only be adequately tested by a study of the conditions in which these flabby children live and by the result of carefully controlled treatment.

SUMMARY.

1. The average serum-calcium value in 10 normal children (Group 1) was found to be 10.4 mg. and the range 10.1 to 11.0 mg. per 100 c.cm.; and in 20 cases with inflamed tonsils and adenoids but good muscle tone (Group 2) it was 9.8 mg., and the range 8.7 to 10.6 mg.

2. The average value found in 30 cases with marked lack of muscle tone (Group 3) was 9.0 mg., and the range 6.6 to 10.6 mg. per 100 c.cm.

3. The average value of the inorganic phosphates of the plasma was found to be approximately normal in all three groups (50 cases), and there was no difference in the range of values in Groups 2 and 3.

4. Though the calcium values were more variable in Group 3, no relationship between the calcium level in the blood and muscle hypotonus was established.

5. The blood picture of flabby children is not similar to that of rachitic children, though the calcium variation is the same in both conditions.

In conclusion I would express my thanks to Dr. Donald Paterson for selecting the cases of flabby children, to Mr. Gay French for permission to investigate his cases, and to Dr. Harrison for permission to work in the Biochemical Department, Great Ormond Street, and for his valuable help with this work.

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MIKULICZ'S DISEASE ASSOCIATED WITH ARRESTED MILIARY TUBERCULOSIS.

BY

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The following case seems to be of sufficient interest to merit publication.

E. D., a girl aged 15 years, was admitted to the City of London Hospital, having been diagnosed at her local tuberculosis dispensary as a case of early phthisis. Her history was that three months before coming under our observation she had gradually begun to feel weak and easily tired, developed a slight dry cough, and once brought up a few streaks of blood. At the same time she noticed a marked "puffiness" of the eyelids for which she was treated for subacute nephritis, a trace of albumin having been found in her urine at this time. In regard to her past history, she had been a healthy child except for measles, chicken-pox, and whooping-cough at 3 and 4; at 2, however, she had had a severe illness, the details of which are vague; apparently her chief symptoms were fever and acute pains all over, for which she was kept in bed for about three or four weeks. There was no family history of tuberculosis, and she had two brothers and a sister alive and well. The patient was rather pale, but otherwise did not look particularly ill. She had very little cough, she had no night-sweats, and her temperature was normal.

Repeated careful physical examinations showed a chest apparently little removed from the normal. A radiogram, however, showed the remarkable appearance seen in the accompanying figure, and was suggestive of an acute miliary tuberculosis. A diffuse miliary mottling is observed throughout both lung fields. The possibility that this appearance might have been due to an anthracosis was excluded by the fact that the patient had never been engaged in any dusty occupation. So inconsistent, apparently, was the radiogram with the physical signs and the condition of the patient, that a second film was taken; this showed precisely the same state of affairs. A sputum examination showed tubercle bacilli present; subsequently, however, there have been seven successive negative examinations.

The second point of interest about this case was that there were found to be symmetrical enlargements of the

parotid, submaxillary, and lacrymal glands. The enlargement of these latter had apparently been much greater a few weeks prior to coming under our observation, and had no doubt given rise to the erroneous conclusion that the patient was suffering from kidney trouble. The swellings were smooth, uniform, and not fixed. It was thought that the accessory lacrymal glands were palpable, but not the socia parotidis. The glands of Blandin-Nuhn were distinctly felt as two round hard swellings at the tip of the tongue, as described by Ziegler.¹ The sublingual glands did not seem to be abnormal and the swellings sometimes said to be found on the hard palate were not observed. The liver and spleen were not enlarged; there were lymphatic glands palpable in the neck near the submaxillary glands, but otherwise the lymphatics did not appear to be affected. The tonsils had been removed some years previously. A blood count showed 5,600,000 red cells, haemoglobin 90 per cent., leucocytes 10,000. A differential count showed 62.5 per cent. polymorphonuclear leucocytes, 6.5 per cent. hyalines, and 31 per cent. lymphocytes. The urine was normal.

Since the syndrome of simple lymphomatous hyperplasia of lacrymal and salivary glands was first described by Mikulicz, many cases resembling but not synonymous with this condition have been recorded from time to time in the literature. Von Brunn has attempted to classify the various diseases associated with these symptoms as follows:

1. *Cases without alteration in the blood—*
 - (a) Without symmetrical swellings of the spleen or lymphatic glands.
 - (b) With swellings of the spleen or lymphatic glands.
2. *Cases with alteration in the blood—*
 - (a) Severe aplastic anaemia with lymphatic pseudo-leukaemia.
 - (b) Leukaemia.

Only cases coming under Group 1 (a) appear to be true cases of Mikulicz's disease. Campbell Howard collected 55 cases of this type down to 1909, but since then few, if any, cases have been recorded in the literature. The most recent contribution on the subject which we can find appears to be that of Thursfield in 1914,² and his case appears to have been one of "lymphatic pseudo-leukaemia." Our case certainly comes under Group 1, and, except for two doubtful glands in the neck, the lymphatic apparatus does not appear to have been involved.

The association of our case with a tuberculous condition of the chest is interesting, for whilst the majority of cases appear to be a simple chronic interstitial inflammation, non-tuberculous (Igersheimer and Pollot),³ both tuberculous (Krailsheimer, Pitt, and Napp)³ and syphilitic cases (Lange, Luders, Gutmen, and Jackobaus)³ have been recorded from time to time.

PROGNOSIS AND TREATMENT.

According to Thursfield,² prognosis is bad in the leukaemic and pseudo-leukaemic, but appears to be good in true cases of Mikulicz's disease. Arsenic and potassium iodide are usually recommended in treatment. The results of operative intervention appear to have met with different results in the hands of different observers. Ziegler records how removal of one of the enlarged glands has resulted in great increase in the size of the rest. Elliot, on the other hand (*Ophthalmoscope*, 1911),³ has recorded a case in a Hindu woman in which operation on the lacrymal glands was successful and was followed by diminution in the size of the parotids and submaxillaries. In view of the uncertain results of the cases recorded we have not thought operation justifiable in our case, especially as the swellings are giving rise to no unpleasant symptoms; we are simply giving arsenic and potassium iodide. X rays have met with success in some cases.

In regard to the remarkable chest condition revealed by the skiagram such cases have been recorded before. H. K. Dunham and J. H. Skavlem⁴ say:

"Many cases of healed miliary tuberculosis are being found by our more general use of the x-ray chest studies. This diagnosis is only justified when the subject gives no history of work in a dusty trade. Lungs of anthracite miners most nearly simulate miliary tuberculosis. The x-ray picture is that of fine, sharp, discrete studdings, more or less evenly distributed throughout all lobes. . . . Most peculiarly these patients seldom, if ever, give any history suggesting serious lung infection."

The undiagnosed illness with which the patient was affected at the age of 2 is not without interest, however, although its significance is difficult to estimate. Opie⁵ has noted in several necropsies extensive calcified tubercles of the lung and lymph nodes, so that "a grave infection must have existed at some time previous—even though there had been no history of corresponding symptoms, there was doubtless at some period imminent danger of death from tuberculosis."

Prognosis is necessarily uncertain from lack of experience of similar cases. Dunham⁴ considers that such patients are likely to go downhill rapidly if they become subsequently infected.

We are indebted to Dr. Clive Riviere for permission to publish this case; to Dr. Sparks, who took the x-ray film; and to Dr. D. S. Page, who did the blood count.

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Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

HERPES ZOSTER AND VARICELLA.

As the relationship of herpes zoster and chicken-pox is still undecided, I desire to place the following case on record.

On December 19th, 1924, a woman developed herpes zoster. On January 3rd, 1925, her son, aged 5 years, was covered with a typical rash of chicken-pox. The following facts seem to point to some relationship between the two diseases:

1. The boy had not been away from his own home for several weeks.
2. There is not a case of chicken-pox in his neighbourhood, so far as I can ascertain.
3. The child slept in a cot in his mother's room.
4. The fourteen days' interval between the onset of the two diseases agrees with the incubation period of chicken-pox.

On the other hand, if there is any relation between herpes zoster and chicken-pox, it is strange that the coincidence of the two diseases should be so infrequent. This is the first occasion that I have seen them occur in the same family at the same time.

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RUPTURE OF ABDOMINAL WALL WITH PROTRUSION OF UNINJURED INTESTINE.

THE interest of the following case appears to me to lie in the fact that a crushing injury of the abdomen could produce a rupture of the abdominal wall and protrusion of the intestines without injury to the intestines or other viscera, as is usually found.

A boy, aged 16, was admitted to hospital on October 3rd, 1924. He had been crushed between the buffers of two railway wagons, and it was found on examination that about three feet of small intestine protruded through an opening below the tenth rib in the mid-axillary line.

The patient was anaesthetized and several small lacerated wounds were found in the skin, through one of which the intestine was protruding. On incising the skin there was a gap, four inches in length horizontally and two inches wide, in the muscular layers and peritoneum of the abdominal wall, with great laceration of the tissues. The intestine appeared to have escaped injury, and was replaced within the abdomen. The eleventh and twelfth ribs were fractured and the distal portions of these were removed. After excising all damaged tissues the layers of the abdominal wall were brought together with difficulty and closed. A laparotomy through a left paramedian incision was then performed to exclude injury to abdominal viscera, but nothing abnormal was discovered except some retroperitoneal haemorrhage, not extensive.

The boy made an uninterrupted recovery and his abdominal wall is now perfectly sound with no bulging at the site of the injury.

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