observation which as yet is improperly understood, although several ingenious explanations have been offered. The one that fits in best with the allergic theory just propounded is that the patient's defence mechanism only comes into full force ten to twenty-one days after the throat infection, and there is a violent reaction. One of the difficulties of explaining the basis of rheumatism through the agency of streptococcal infections is the fact that this organism flourishes equally in all classes of the community. Tonsillitis is endemic to the same degree in the public school as in the council school, and yet the incidence of acute rheumatism is very different in these two institutions. This raises one of the points foreshadowed at the beginning of this paper: that is, the importance of taking into consideration the patient's tissues—the soil, as it were, in contrast to the seed of infection which may become implanted.

Predisposing Causes

Certain environmental features of rheumatism have stood the test of clinical and statistical inquiry so steadfastly that they may now be regarded with some certainty as predisposing causes. One of the chief factors is the atmosphere. Damp has rightly been blamed, but rapid changes of temperature can play an equally important part. Poverty no doubt has much to answer for, but in regard to rheumatism it is probably the overcrowding, improper sanitation, and general lack of hygiene that are at fault. If, as some suggest, diet is a predisposing cause, there is no evidence that the disease appears for lack of food, although its quality may be open to question. Certain debilitated children with chronic ill-health are particularly predisposed to rheumatism. The truest picture of such a child is one whose lymphoid tissues are in a permanently catarrhal state, whose nervous system is easily upset, and whose digestion has been disordered by lack of protein and excess of carbohydrate. The emotional and highly strung nature of rheumatic children is proverbial, and it is therefore not surprising to find a disproportionately high incidence of chorea among Jewish children. The nervous strain of city life must have some effect, and no doubt accounts to some extent for the greater liability to acute rheumatism of the children of large towns as compared with their country cousins. Race and heredity also play a considerable part. Rheumatism certainly runs in families, and the children of rheumatic parents seem often to be born with an inherited predisposition of the tissues to the disease, a state probably best described by the term "diathesis."

In considering these various factors it soon becomes apparent that there is no one predisposing cause, but a combination of many. Together they produce a minor state of ill-health in the patient, so that he is unable properly to overcome the common infections. A bad cold, tonsillitis, or otitis, for example, instead of rapidly clearing up in such children, tends to pass from an acute into a chronic state. The chapter of each acute streptococcal attack remains unclosed, the patient's defence mechanism is continually overworked, and this is probably why his tissues reach that hypersensitive state already described. Along these lines the streptococcal theory and the varied predisposing causes can be brought into harmony, but further research is required before the whole problem is completely elucidated.

RHEUMATOID ARTHRITIS

Fortunately for our theories there are many cases of rheumatoid arthritis in which acute infection is obvious. Still's disease in children, with pyrexia, leucocytosis, enlargement of the spleen and lymphatic glands, and frequently pericarditis at necropsy, is sufficient

evidence of this. Adults may suffer from a very similar acute form, but usually the infective element is not so much in evidence. Nervous strain has been mentioned as a predisposing cause of chorea, and it is interesting to note the same influence in some cases of rheumatoid arthritis. It is perhaps encountered most frequently in young women, who, after some mental shock or anxiety due to domestic or commercial worries, promptly become afflicted by this incapacitating malady. How this is brought about is largely a mystery, but it is thought by some that a disturbed sympathetic or autonomic nervous system plays a part by upsetting the balance of the endocrine secretions. Still the most tenable hypothesis in rheumatoid arthritis, as in acute rheumatism, is again that of bacterial allergy, acting in this case through the more localized agency of hypersensitive joint tissues.

CONCLUSION

In the foregoing remarks an endeavour has been made to correlate some of the salient points about rheumatism and to suggest that the disease may be the outcome of an overacting response on the part of the tissues. There are indications of these excesses of nature, this perversion of the once physiological defence mechanism, in serum disease and anaphylaxis. Viewed in the same light, the exanthemata—and measles in particular—would present a new aspect, and complications such as scarlatinal nephritis and otitis following tonsillectomy might be explained. Graves's disease is another example of the occasional effect of an emergency call precipitating a disaster. In this case, in answer to some alarm or extra exertion, the endocrine and sympathetic nervous system overstep the mark and are not able to return to a normal state of balance.

Innumerable further instances might be given, but a great deal of research will be required along the lines indicated before we can go further than hint at a new conception of disease.

AN UNUSUAL CASE OF LYMPHATIC LEUKAEMIA

BY

W. E. COOKE, M.D., M.R.C.P.

WIGAN

The many points of interest presented by this case will obtrude themselves as the narrative proceeds.

HISTORY OF CASE

A male, 11 years old, was taken by his mother to a doctor's surgery at 7 p.m. on December 24th, 1932. He complained of feeling faint, and vomited some dark material, which was found to contain blood. The doctor ordered him to bed, and visited the boy at 10.40 p.m. the same day; he was asleep, of good colour, and breathing regularly. At 1.45 a.m. on December 25th the boy died. The doctor reported the case to the coroner, who ordered a necropsy. (What follows is an abstract of the mother's statement.)

The boy had never been attended by the family doctor, had always appeared healthy, and had gone to school regularly. On Wednesday, December 14th, he was caned across the buttocks by the schoolmaster. He had not complained, but on December 19th, when his mother asked him about some bruises on his legs, he told her about the caning. After breakfast on the same day he complained of feeling sick and vomited. The vomit contained streaks of blood. He went to school as usual. He vomited once on December 20th and once on December 21st, but attended school. He was sick once on December 23rd and twice on December 24th—at 6 p.m. after a meal which consisted of shredded wheat and milk, and at about 7.40 p.m. in the doctor's surgery. He

was put to bed at 8.30 p.m., complained of feeling tired, and went to sleep. At 1.15 a.m. on December 25th his mother noticed that he was breathing heavily, and he died at 1.45 a.m.

Post-Mortem Findings

At the necropsy, performed on December 27th, the boy appeared well nourished. The colour of the lips, gums, and conjunctivae was little paler than normal. Petechiae were present in the skin of the neck, chest, and abdomen. Numerous small circular bruises, of varying ages, were present on the arms, thighs, and legs. No bruise suggestive of being caused by a cane was found. There was no bruise on the head. The lymphatic glands of the neck, axillae, and groins were palpable, but not prominent.

Petechiae were present in the peritoneum, omentum, and visceral pleurae. The stomach contained blood-stained mucus. The mucous membrane presented innumerable petechial haemorrhages. The liver appeared enlarged and pale. The spleen was almost three times the size of a normal spleen, and, on section, firm. The Malpighian bodies could not be discerned. The convolutions of the left cerebral hemisphere were flattened. The left temporal and occipital lobes were the seat of an extensive haemorrhage, which had ruptured into the lateral ventricle, and had spread to the third and right lateral ventricles. The thymus was bi-lobed and weighed 85 grams. The tonsils, the mediastinal mesenteric and pre-aortic lymph glands, and Peyer's patches were enlarged. The other organs appeared normal.

Histology

Films made from the blood of the right auricle showed enormous numbers of lymphocytes. It is impossible to give even an approximate estimate, but in comparison with other cases the number of lymphocytes present would appear to be more than 150,000 per c.mm. The vast majority of the cells were of the small type, large lymphocytes being comparatively few. The boy had been dead for fifty-eight hours, and most of the cell bodies had undergone degeneration and partial solution, but even in some of the polymorphs, which were extremely scarce, the cell bodies were intact. Many nuclei, especially those of the larger lymphocytes, had undergone partial karyolysis.

In addition to the presence of well-marked periportal lymphomata there was considerable lymphatic infiltration throughout the lobules of the liver. Sections of the kidney showed aggregations of lymphocytes, with marked diffuse infiltration throughout the organ. The structure of the thymus, spleen, and lymph glands was indistinguishable, being obliterated by the lymphatic hyperplasia. In the case of the lymph glands, lymphocytes had invaded the capsule and infiltrated the surrounding tissues.

COMMENTARY

The blood films and sections point to the diagnosis of chronic lymphatic leukaemia, and support the view held by many that even in children these cases are often not seen until late in the disease. For how long the boy would have continued to attend school and take part in rough-and-tumble games if the most unusual complication—cerebral haemorrhage—had not occurred, it is impossible to say. But it is a fact that he did attend school up to a few days before his death with the disease well advanced, and was apparently healthy and vigorous up to December 19th, or even later.

The almost complete absence of symptoms was a remarkable feature. The only symptom was vomiting, due most probably to the cerebral haemorrhage; but he vomited only six times in six days, and on one of these days did not vomit at all. The vomiting did not appear to be cerebral in type, but had a direct relation to food; this was definite on two occasions—December 19th and 24th—and probably also on the 20th and 21st, when, according to his mother, he "vomited," but "attended school." Presumably this vomiting occurred after breakfast and before school time. Many cases of leukaemia

bruise very readily, and the presence of so many bruises on the legs and arms suggests that the case was of that type. The unobserving mother, her attention focused on the boy only when he vomited, ascribed the bruises to maltreatment. Fortunately for the master concerned she was specific in her charge—"he was caned across the buttocks." This statement was corroborated. If, on the other hand, a general charge of maltreatment, including, say, a smack on the head or "rough handling" in any degree, had been preferred, the master would in all probability have been confronted with an indictment for felony. The difficulties of the defence to a charge of manslaughter in such a case are, from a medical standpoint, obvious.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

RECURRENCE OF PAPILLOMA OF THE BLADDER TWENTY-FIVE YEARS AFTER OPERATION

In May, 1907, a man aged 30 years was sent to me at the Royal Victoria Hospital, Belfast, suffering from haematuria. On cystoscopy, a villous growth composed of a large number of tentacles could be seen at the left side of the internal urethral orifice. The growth did not involve the trigone. The bladder was somewhat trabeculated. A portion of the growth was washed out by catheter, and a microscopical examination showed the typical appearance of a simple papilloma.

On July 4th, 1907, the bladder was opened suprapubically, and a villous tumour about the size of a horse-chestnut was removed from its wall a little to the left of the internal meatus. The tumour was sessile, and was dissected out with an elliptical area of surrounding mucous membrane. The resulting wound in the mucous membrane was closed with catgut sutures. Convalescence was uneventful, and I heard nothing of the patient till he presented himself on January 9th, 1933, with a recurrence of haematuria. He states that since his operation he had no urinary symptoms whatever until January 3rd, 1933, when he noticed dark-red blood, with clots, in his urine. Cystoscopy showed a typical sessile papilloma, about the size of a hazel-nut, medial to, and posterior to, the left ureteral orifice. A minute baby papilloma was seen just medial to the main mass. Both of these growths were apparently simple. The bladder wall elsewhere was healthy except for slight trabeculation. The papillomata were destroyed by fulguration.

I have called this a recurrence, but it may be a new development and quite unconnected with the growth I removed from this man's bladder twenty-five and a half years ago. The first operation was performed before the discovery by Beer of the value of diathermy in these cases.

Belfast.

ANDREW FULLERTON.

NECATOR SUILLUS AS A HUMAN INFECTION

The occurrence in the pig of hookworms, designated *Necator suillus* by Ackert and Payne in 1923, has given rise to several attempts to infect pigs experimentally with the closely related human species, *Necator americanus*. Although with one exception (cf. Goodey, 1923) such attempts have not been quite conclusive, the general belief is that the pig is not a suitable host for *N. americanus*, and therefore not an important factor in the spread of hookworm disease. I attempted the converse of these experiments—namely, the production of a human infection with *N. suillus*—in Trinidad during the summer of 1932, with a positive result.

In order to make a pure culture of infective larvae of *N. suillus*, numbers of the adult worms were collected from