increased as life went on, during 22, 39, and 42 years, inducing a stage of acute misery.

All the patients had a high septal deviation, which was probably the reason why the sinusitis originally failed to resolve.

Cure.—The removal of a piece of bone from the nose, followed in a few days by complete relief of symptoms, is a dramatic ending to these long-drawn-out histories of pain and disease, accompanied by so much disability and acute mental anxiety. The possibility of so simple a cure makes it very desirable to devise means whereby an earlier diagnosis may prevent rather than cure such misery.

Prevention.—Childhood's diseases—for example, measles, scarlet fever, diphtheria, and whooping-cough—in which there is commonly acute nasal inflammation, are apt to leave behind them a chronic infection of the sinuses, of which there may be local evidence in "constant colds" and post-nasal catarrh, or the child may show only a general debility, with few or no symptoms of nasal infection. There may, however, be evidence of septic absorption or retention—for example, constant sties, spots on the skin, headaches, rheumatism, and bad teeth; this latent sinusitis may continue to be pathological throughout the rest of life. The main method of prevention, therefore, will be the adequate treatment of these childish diseases and their after-effects.

Since it is probable that, had there been no septal deviation, the sinusitis would have healed in the ordinary course, the persistence of symptoms of sinusitis in a child, in spite of the removal of soft tissues—for example, tonsils and adenoids—suggests a bony obstruction to drainage, the removal of which, unless contraindicated, would save much present and future suffering.

Post-nasal catarrh, even when it has continued so long that the patient has become resigned to it and considers it of no significance, remains nevertheless a constant potential danger.

These cases are not primarily ophthalmic, yet patients and their doctors naturally seek first the help of ophthalmic surgeons, as all of these did, and must rely on them to distinguish these cases from those due to refractive or muscle error.

With such indefinite radiological and clinical signs the rhinologist hesitates to operate, and looks to the ophthalmologist to strengthen his hands. It may be that, with further experience, the fields will enable us, in certain cases, to give a decided opinion.

AN UNUSUAL CASE OF FOOD POISONING.

BY

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THE causation of attacks of food poisoning has for many years been a thing of mystery to the average practitioner, and even for the expert there are many points in the epidemiology and bacteriology of the condition which are still far from clear.

The proof that the infective organism in the case here recorded was *B. aertrycke* was entirely due to the pathological findings, for the clinical aspect was distinctly equivocal. In view of this and the sporadic nature of the case, we felt justified in recording it. The history of the illness is as follows:

A married woman, aged 24, was first seen on September 19th, 1927, and gave a history of having had a rise of temperature (99° to 101° F.) at night for the previous three nights, with a subnormal temperature each morning. She had been going out each day, but complained of epigastric pain and occasional vomiting. There was a history of a fall on the back of the head four days previously, but without loss of consciousness or immediate subsequent vomiting.

When first seen her chief complaint was of severe occipital headache and of "rheumatic" pains in various parts of the body, especially in the back of the neck on the left side. There was creaking in the left temporo-mandibular joint and she

complained of fleeting pains in the hips on movement. There was no diarrhoea and the bowels were acting normally; the appearance of the motions was normal. There was marked hyperaesthesia over the epigastrium, and also, to a less extent, over each renal region. Even the slightest pressure over the epigastrium caused a feeling of nausea; the tongue was clean.

She was given salicylates and aspirin without marked improvement, the temperature still rising at night (101° to 102° F.) and being subnormal in the morning. The possibility of pyelitis was considered, but the urine was acid, contained no albumin, and microscopic examination showed nothing abnormal.

On September 22nd she complained of nausea and occasional vomiting, which latter rapidly became more persistent and uncontrollable, with increasing epigastric pain, especially after swallowing. There was marked tenderness on palpation over the spleen, but at this stage the spleen itself could not be felt.

On September 28th she was seen in consultation with Dr. T. L. Hardy of Birmingham, and the case was regarded as clinically suggesting paratyphoid fever. The long axis of splenic dullness was slightly increased and the spleen was just palpable. The white blood corpuscles were 5,800 in number, and a differential count showed polymorphs 29.5 per cent., lymphocytes 59.5 per cent., mononuclears 10 per cent., eosinophils 1 per cent. A serological investigation at the county laboratory on this date revealed the presence of 1 in 25 agglutinability to *B. aertrycke* Mutton, and complete absence of agglutinins to *B. typhosus*, to *B. paratyphosus* A, B, and C, to *B. enteritidis* Gaertner, *B. aertrycke* Newport, and to the dysentery group.

On September 29th, as a result of the blood examination, the patient was closely questioned as to any article of food she had had which might have caused food poisoning, although previously no suspicion of this had been entertained. The fact was elicited that four days before the onset of the illness she had partaken of some pork pie, and that three other members of the household who had also partaken had suffered from slight malaise, nausea, and vomiting from one to three days after this meal.

The patient's vomiting gradually became less distressing and was eventually controlled by minim doses of tincture of iodine and by glucose by the mouth. Two days later she developed a follicular tonsillitis, but this quickly cleared up with ordinary remedies.

A further sample of blood was taken on October 3rd and gave a similar result to the previous one; a blood culture proved negative. By this time an organism had been isolated from the faeces which gave the cultural reactions of a member of the Salmonella group. It displayed marked flocculation in a dilution of 1 in 25 with *aertrycke* serum (Mutton type) in less than two hours' incubation in the water bath at 56° C., but showed no agglutination with paratyphoid serum after four hours' incubation and standing all night at room temperature. The specific serums for Gaertner's bacillus and for *B. aertrycke* (Newport type) failed to cause any agglutination. When tested against the patient's serum marked flocculation was produced in a dilution of 1 in 25, and granulation was evident in 1 in 50. Highly specific standardized cultures and serums were used throughout, and the diagnosis was fortunately simplified by the absence of confusing coagglutinins, both in the investigations on the patient's serum and in those necessary to establish the identity of the micro-organism.

The interesting and unusual points of this case appear to be: (1) A food poisoning which spent itself upon the upper intestinal tract without giving rise to any diarrhoea or signs of enteritis. (2) The slightly enlarged spleen, which, together with the pyrexia and the blood picture, gave rise to a suspicion of paratyphoid infection. (3) The nocturnal rise of temperature—on one occasion it was as high as 103° F.—which is a very unusual feature of food poisoning cases.

So far as could be ascertained there are few cases on record which bear much resemblance to the case described. In the majority of recorded cases the onset has been acute, with diarrhoea and vomiting, and has therefore at once led to the suspicion of food poisoning. A search of the literature, however, brings several interesting points to light.

Drs. Perry and Tidy¹ report on an epidemic caused by the Newport strain of *B. aertrycke* occurring in a depot in France. These authors describe two clinical types: Type A, characterized by high temperature, general malaise, various pains, but no diarrhoea; Type B, characterized by diarrhoea and vomiting and a normal or slightly subnormal temperature.

It is interesting to note that in Type A the stools from nearly a hundred cases were examined, but in one case only was a bacillus found resembling *B. aertrycke*. The authors therefore concluded that this group was not connected with an infection due to *B. aertrycke*, and was, in fact, an entirely separate epidemic. Nevertheless, it is tempting to suggest that the case above described might quite easily have been classed in Type A, but in no circumstances could it have been classed in Type B.

In Type B the onset was sudden, with abdominal pain

and diarrhoea. Vomiting was common, and chills, sweats, and headaches frequent. In most cases the initial symptoms were the severest, and the patient rapidly improved. The duration of the diarrhoea varied from a few hours in the milder cases to four to seven days in the severest ones. Headache was rare after the first day. In the majority of this group vomiting occurred at the outset, and continuation of the vomiting was the most serious symptom encountered. Pyrexia was unusual, even in the severest cases, and the temperature was often subnormal. There was no splenic enlargement or rash.

These authors conclude, therefore, that the disease varies from an acute gastro-enteritis to a mild diarrhoea. The onset is sudden and pyrexia is exceptional. The course has no resemblance to enteric fever, and the character of the stools is unlike dysentery. They also consider that the infection in this epidemic was by carriers, either acute or chronic.

Dr. Pleasance² describes a sporadic case of *B. aertrycke* infection occurring in a boy aged 3. The onset was very acute, with severe diarrhoea and vomiting; death occurred on the seventh day. *Post mortem* a large splenic abscess was found. Subsequently a Gram-negative, actively motile bacillus was isolated in pure culture from the gall-bladder and splenic pulp, but when first isolated the organism was not agglutinated by the specific serums for *B. paratyphosus* B or *B. aertrycke*. Repeated subcultures were made, and twelve months after isolation the organisms agglutinated with *B. paratyphosus* B and *B. aertrycke* antisera. Absorption tests were then performed and the organism identified as *B. aertrycke*. This illustrates the fact that *B. aertrycke* can at times assume invasive powers, and it is possible that in the case here recorded this occurred to some extent, since from the signs and symptoms it is evident that the organism was not confined to the alimentary tract.

An epidemic is described by Dr. Burgess³ comprising 703 known cases. The incubation period was two and a half to twenty-four hours, and the onset was very sudden, with pain, vomiting, and diarrhoea. There were also pyrexia, headaches, chills, and sweats. The diarrhoea was very severe. The acute stage is stated to have lasted two to ten days, but the average was four to five days, and convalescence was rapid. The outbreak was traced to cream used in the manufacture of cream cakes, and the organism isolated was *B. aertrycke*.

It will therefore be seen that, with the exception of Perry and Tidy's Type A, all the cases described by these authors had an acute onset with diarrhoea and vomiting, and as a rule pyrexia was not a marked feature of the condition.

Dr. Savage and Mr. Bruce White⁴ consider that Salmonella food poisoning is due, in the majority of instances, to *B. aertrycke*, and they assert that, in this country at least, this organism is responsible for three-quarters of the outbreaks. These authorities point out that they have failed to find any evidence of the ability of *B. paratyphosus* B to produce an ordinary attack of food poisoning, though they admit that paratyphoid fever may at times have a sudden onset which may temporarily simulate it. The converse is, however, illustrated by this case, in which at the onset the irritation symptoms so characteristic of *B. aertrycke* infection were so slight as to lead for a short time to a tentative diagnosis of paratyphoid fever.

Not infrequently the serums of patients suffering from *B. aertrycke* infection show coagglutinins for *B. paratyphosus* B. If such serums are sent for diagnosis for typhoid or paratyphoid fever, and if the investigations are restricted to the diagnosis of these infections, it may happen that such coagglutination may lead to a wrong diagnosis of paratyphoid fever; or if, as in the present case, coagglutinins are absent, a negative result for the typhoid-paratyphoid group is worthless. We therefore strongly urge that when sending blood samples to a laboratory for examination when typhoid or paratyphoid fever is suspected, and more especially when the clinical signs and symptoms are not typical, a full investigation as regards the Salmonella group and the associated organisms should be required; when multiple agglutinins occur their relative

importance must be established by absorption tests. We have reason to suggest that, should such comprehensive agglutination tests be more generally adopted, sporadic cases of *B. aertrycke* infection will be found to be more frequent.

We should like also to emphasize the importance of the bacteriological examination of the faeces in every case, as the isolation of the organism definitely clinches the diagnosis. This, however, takes some time and, provided that proper cultures and technique are utilized, examination of the patient's serum in the first instance is a valuable aid to rapid diagnosis; it may help in tracing the source of the infection, which may not be available by the time the organism has been recovered and proved.

To a few workers these statements may appear commonplace, but we know from our own experience and that of others that in routine work, both clinical and bacteriological, the Salmonella food-poisoning organisms are seldom considered, except when a typical and serious outbreak forces them on our attention.

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- ³ Burgess, W. L.: *Proc. Roy. Soc. Med.*, Section of Epidemiology and State Medicine, p. 61.
- ⁴ Savage and White: Medical Research Council, Special Report Series No. 51.

A COMPARISON OF THE WASSERMANN, KAHN, AND SIGMA TESTS.

BY

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For this purpose 2,019 serums were taken and submitted to all three tests. The greater number were from cases of treated syphilis. The remainder included cases in which the diagnosis was clinically doubtful and cases in which the first test carried out gave a doubtful result or one contrary to the clinical findings.

Technique.

The Wassermann test was No. 1 method, as described in the Medical Research Council, Special Report Series No. 14. Results were recorded as ++; +±; +; ±; and negative. For diagnostic purposes + was considered positive and ± doubtful (in treated cases ± = positive).

The Kahn test was carried out as laid down by the author,¹ but after the first few tests the first tube of each was omitted and only two tubes used—that is, those containing 6 and 12 parts of serum respectively to 1 of antigen. Results were read by artificial light with a ×6 hand lens, and were recorded as positive (P), negative (N), or doubtful (D), one letter being employed for each tube.

Positive is indicated by PP, but a DP result was considered positive in cases under treatment. DD = doubtful and NN or ND = negative.

The Sigma test was carried out as described in the Medical Research Council, Special Report Series No. 78; only five tubes were used, and the reading was taken at from twenty to twenty-two hours. A reading of 1.5 units and upwards was taken as positive, 1 to 1.5 as doubtful (positive in treated cases), and below 1 as negative.

Of the 2,019 serums examined 1,401 showed absolute, and 403 relative, agreement with all three tests, which is almost 90 per cent. Of the 215 serums which showed disagreement 205 were from cases of syphilis, either treated or untreated. Of these 205:

The Kahn test appeared to be most correct in	... 72
" Wassermann "	... 32
" Sigma "	... 5
" Kahn and Sigma "	... 57
" Kahn and Wassermann "	... 31
" Sigma and Wassermann "	... 8

Thus it would appear that the Kahn was most correct 160 times, the Wassermann reaction 71 times, and the Sigma test 70 times.

Of the remaining 10 there were 6 apparently false Kahn tests. In 2 there was agreement with the Wassermann