In April last year Walker published a well-illustrated and detailed account of a youth of 18 who dislocated his elbow laterally. The dislocation was reduced, but a subsequent x-ray photograph showed a typical fractured and misplaced epicondyle, together with a persisting lateral subluxation. There was an incomplete ulnar nerve lesion. The parts were restored by open operation, and a swollen contused ulnar nerve was noted at the back of the condyle.

This year Cotton records the last three of a series of ten completed cases met with during the last nineteen or twenty years. His first case was published nineteen years ago in his textbook. In addition, he mentions two others, more recent and not completed. Every one of these cases had an ulnar nerve lesion associated with the fracture, and gave a history of a dislocation treated before the patient was brought to his notice.

ETIOLOGY.

Fairbank, who speaks with great authority on epiphyses, associates the lesion always with dislocation, and makes the manipulative reduction responsible for the displacement of the epicondyle. It is unfortunate that the nature of the dislocations was not always noted in his account. Walker's case had a lateral dislocation followed by an incomplete reduction before he received it. Of Cotton's three described cases, each had a dislocation reduced before he saw them. Two of these are said to have been posterior; the third he found to be a still unreduced lateral subluxation. Cotton considers the lesion the result of manipulative reduction.

In the two cases here recorded no dislocation was known to have occurred, and certainly no manipulation. The cause, therefore, is not necessarily faulty reduction. In one the forearm was subluxated slightly outwards. So far as my histories are of value, it seems probable that the impact met the forearm held forward with the elbow bent; and, acting against a rigid internally rotated shoulder, caused a violent abduction strain at the elbow which tore away the epicondyle and caused the joint to gape. The amount of lateral mobility found at the operation showed that dislocation sideways would be a possible and even likely complication, and it is suggested that when dislocation occurs it is secondary to the tear of the inner part of the capsule. It is noteworthy that out of the four cases detailed (Walker and Cotton) lateral subluxations were found by the operator in two; the two others gave a history of a posterior displacement, but this had already been corrected.

A striking feature of Cotton's cases is the appearance without exception of the nerve block, which is unmentioned in Fairbank's. These were no doubt primary contusions resulting from stretching and friction over the sharp edges of the epicondylar bed at the moment of abduction, rather than compression due to the tension of soft parts, as Cotton seems to suggest. Not infrequently, as Platt has shown, nerve lesions are found in company with epicondylar separation, whether associated or not with dislocation, and these are possibly of similar origin. In the third case detailed by Cotton the nerve was actually found imprisoned between the humerus and ulna. To me this is capable of no other explanation than that wide abduction was produced with tremendous tension of the soft parts on the inner side of the elbow. The epicondyle and capsule giving way at this point, these structures entered the joint more or less in the same way as fascia, and even skin may be found nipped at the inner side of the knee after a severe abduction injury. The escape of the nerve in those cases in which no conduction block is evident is due presumably to an anatomical arrangement well behind the fracture or to the absence of highly energetic manipulations.

CONCLUSIONS.

It is possible that the injury described is distinctly commoner than might be supposed from its scarcity in the literature of elbow-joint lesions.

It is probably caused by a severe abduction strain, and is in the nature of an internal lateral ligament rupture. It is not uncommonly associated with a lateral subluxation of the forearm.

Detachment of the internal epicondyle with its lateral ligament and flexor origins is suggested as an operative approach to the inner side of the elbow-joint.

In conclusion, I must express my thanks to Miss Greg, who has been kind enough to make for me the sketches of the operation and the drawings of the x-ray appearances.

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AGGLUTININS TO *B. DYSENTERIAE* IN THE APPARENTLY HEALTHY.

BY

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My reasons for undertaking the investigation of which details are given were as follows:

1. To obtain an estimate of the number of people now showing agglutinins to *B. dysenteriae* in the absence of a clinical history of the disease, and when the specimens are taken from patients residing in districts in which clinical dysentery is rare.
2. To examine the alleged influence of sex on the prevalence and strength of these reactions.
3. To ascertain the types of the dysentery group most frequently involved.
4. To determine to what extent the occurrence of these so-called normal agglutinins can interfere with the serological diagnosis of dysentery.
5. To compare the agglutinins in healthy people with those of a recent epidemic in order to see if there are any essential differences between them.

Many have investigated the subject, but there is a lack of uniformity in their findings, probably due to different methods of working, variable agglutinability of the cultures, or local epidemiological conditions. A great deal of work was done during the war, when the incidence of dysentery and the number of carriers were above the usual level. It seemed worth while to go into the question again under more settled conditions and with improved methods.

Professor Dreyer's technique was used; each serum was tested with standardized cultures of Shiga's bacillus; Flexner's bacillus, Types V, W, X, Y, and Z; and Sonne's bacillus. In addition to saline controls, each specimen was investigated with a standardized culture of *B. abortus* Bang, as this micro-organism was deemed a suitable contrast to the dysentery group. Positive results were verified at least once by different stocks of culture. Serums to the number of 524 were examined from 262 males and 262 females. The results are shown in the following table.

MALES.			FEMALES.		
No. of Specimens.	Types.	Units.	No. of Specimens.	Types.	Units.
2	Positive to Sonne	1	1	Positive to Sonne	6
5	" " "	2	6	" " V	2.5
1	" " "	6	6	" " V	4.5
1	" " V	4.6	3	" " V	11.5
3	" " V	11.5	1	" " Z	9
1	" " V	46			
1	" " W	13			
1	" " Z	10			
1	" " Y	4.5			
246	Negative to all		245	Negative to all	
262			262		

The total 524 serums showed 33 positive reactions—that is, 6.29 per cent. Most of these positive cases came from crowded industrial areas, and only a few from the rural

districts. The 262 males gave 16 positives, or 6.1 per cent., and the females 17 positives, or 6.48 per cent. The males reacted most frequently to Sonne's bacillus, and the females showed a predilection for Type V of the Flexner group. There were no agglutinins within the limits of dilution used to either the Shiga bacillus or Type X of the Flexner group, and the females failed to agglutinate the W or Y types. The serum giving the strongest reaction was from a male—46 units to Type V. There was no explanation of this high titre. The male showing 13 units to Type W was aged 21 years; he had not been inoculated, had not been abroad, and had never suffered from dysentery. All the positive reactors were questioned with a view to obtaining evidence of present or past disease, but in only one instance could a definite history of dysenteric infection be obtained. This man stated that he had suffered from severe dysentery thirty years previously and that he had lived in India for fifteen years. His reaction was 6 units to Sonne's bacillus; no dysenteric bacilli were found in this patient's faeces. Four of the female reactors gave vague histories of periodic diarrhoea, and one woman, with 11.5 units to Type V, had suffered from recent diarrhoea of several months' duration. She stated that during the illness she had passed about seven motions daily, and that slime was present, but no blood. She was now quite well, but a specimen of faeces could not be obtained.

One female serum was positive to *B. abortus*, but no history of illness which could be associated with this micro-organism was obtained. The patient was negative to all the dysentery group. The result is mentioned in view of the recent publications pointing out the pathogenicity of this bacillus for human beings. Several of the positive serums to *B. dysenteriae* were re-examined over a period of four months, and in all except one the titre remained stationary.

A comparison between the results obtained in the above table and the serological findings in a recent small epidemic of dysentery showed that co-agglutinins were absent from the apparently normal series within the limits of dilution of the standardized test, but co-agglutination of closely associated types was common in the patients suffering from acute dysentery. In this epidemic, which was for the most part a Flexner V infection, the strength of the reactions varied from 4 to 114 units, and several specimens reacted in the neighbourhood of 11 units—that is, showed less agglutinins than several of the specimens taken from people showing no clinical evidence of dysentery. The proportion of positives in the epidemic on one test was only 40 per cent., and while this figure contrasts with 6.29 per cent. found in healthy people, it leaves a big residue of negatives.

COMMENT.

Many of the published estimates of the number of healthy people showing agglutinins are higher than on the present occasion. Major Manifold¹ in Poona has recently examined the blood serums of 66 British troops and 121 Indian troops who were not suffering from dysentery, or on the first or second day after the onset of dysentery before agglutination due to the existing attack could become apparent in the serums. He used Professor Dreyer's technique. Of the British 31.8 per cent., and of the Indians 50.6 per cent., were positive to the Flexner group. Flexner V agglutinins were present in a larger percentage and to a higher titre than the agglutinins of the other Flexner strains. The highest titre, 1 in 250, was observed in the Indian troops; the British troops in no instance showed agglutination in a higher dilution than 1 in 125. The high percentage found by this investigator is consistent with local conditions, as Flexner infection is frequent in Poona.

During the war other authorities² found agglutinins to the Flexner group in 91 out of a total of 120 recruits. The positive reactions were present in dilutions varying from 1 in 24 to 1 in 192. These results were obtained with Oxford Flexner cultures. No definite history of dysentery could be obtained from these soldiers, but four had recently suffered from diarrhoea and only three had been abroad. Dysentery convalescents and carriers were more frequent at the time of this investigation than they are now, and the high percentage of positives found may be reasonably attri-

buted to subliminal infection resulting from the conditions of camp life at the time.

From the foregoing it will be realized that a patient suffering from dysentery may give a negative agglutination reaction, whereas a person without symptoms of disease may show agglutinins. This paradox is not so misleading as it appears to be, for in an epidemic a bacteriological examination of the faeces soon settles the matter, and, anyway, some of the patients suffering from acute infection may show strong agglutinins with a rapidly changing titre sufficient to give a useful lead when waiting for the isolation of the micro-organism. It is in the isolated case, or when the patient is suffering from mild and protracted diarrhoea, that difficulty arises, and then it is unwise to frame a diagnosis on the agglutination test alone unless the titre is convincing. The Medical Research Council have suggested a standard as indicative of active infection. Their report³ states that 10 standard agglutinin units per cubic centimetre of serum in a man and 20 units in a woman are, for all practical purposes, diagnostic of an active bacillary dysenteric infection caused by the bacillus agglutinated, and that 6 to 8 units in a man and 12 to 16 units in a woman justify a strong suspicion of dysenteric infection, provided that the patient has not previously had the disease or has not been inoculated. This standard is a great help, especially in so far as it refers to the higher titres, which are definitely stated to be diagnostic, but it is not infallible, and active dysentery cases may not reach the required titre and apparently normal people may exceed it.

When considering the source of these so-called normal agglutinins it should be remembered that, though widespread serious Flexner epidemics are rare in this country among civilians leading an ordinary existence, there is every reason to believe that mild infections are commoner than is generally supposed. Even when patients show definite clinical signs the causal bacillus may be concealed and outgrown by streptococci and *B. coli*. Streptococci are often present in abnormal numbers in Flexner infection. This fallacy is encouraged by faulty technique. Very frequently mild diarrhoea is ignored by the patient and never comes to diagnosis, and further loopholes are left by irregular fermenting types and the various paradyenteric bacilli.

The ease with which dysentery may occur in institutions shows that the micro-organisms are ubiquitous and that they only need some contributory factor to produce typical disease. Shiga infections are rarer in this country than Flexner and associated types, and it seems to be more than a coincidence that agglutinins to Shiga's bacillus were absent from the blood serums of the healthy people under review. The evidence, then, that most of these so-called normal agglutinins are due to subliminal or mild infection may be summarized thus:

(a) Shiga infections are rare in this country; agglutinins to this micro-organism are also rare in healthy individuals.

(b) When dysentery infections were more frequent in this country the percentage of healthy people showing agglutination was higher than that revealed in the present series.

(c) In countries where dysentery is now frequent the percentage of healthy people showing agglutination is much higher than in England. These results have been obtained by up-to-date standard methods, and should be comparable with the present series.

(d) Mild attacks of diarrhoea are often ignored by the patient, and do not come under the observation of the physician.

(e) Most of the positives in this investigation were obtained from people residing in thickly populated industrial districts.

(f) Normal agglutination is absent at birth.

We have a parallel in diphtheria of virulent micro-organisms producing serological changes with transient or unrecognizable disease, and it is now generally admitted that the natural antitoxin found in a large proportion of the population is the outcome of "larval" infection with the diphtheria bacillus. A more lasting antitoxin is produced by this mild diphtheria than by one acute typical attack. Although antitoxin and agglutinins are two

different things, it may be that similar factors are at work in dysenteric infections, and may explain the absence of lasting agglutination in some acute cases and its persistence in those people who can give no history of dysentery.

CONCLUSIONS.

1. Agglutinins to *B. dysenteriae* were present in 6.29 per cent. of 524 serums taken from individuals only one of whom gave a history of dysentery, thirty years previously.

2. The series consisted of an equal number of males and females. The males showed 6.1 per cent. positive and the females 6.48 per cent. The highest titres were found in specimens from males.

3. The males reacted most frequently to Sonne's bacillus, but the highest titres were to Types V, W, and Z of the Flexner group. The females reacted most frequently to Type V Flexner.

4. The presence of these "normal agglutinins" may interfere with serological diagnosis, as they sometimes come within the range of the standards laid down as indicative of active infection; besides, in active infections agglutinins may not always reach these suggested standards.

5. There is sufficient evidence to suggest that these so-called normal agglutinins are the outcome of subclinical or mild infection with homologous or associated micro-organisms, and that the term "normal" when applied to this reaction is a misnomer, and should be avoided.

My thanks are due to Dr. F. M. Rowland of Lichfield for revising the manuscript.

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A CASE OF CONJOINED TWINS.

BY

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RARE as are conjoined twins, still rarer are cases in which one twin is normal and the other has a parasitic foetus attached. The case recorded below seems, therefore, worthy of publication.

A multipara, aged 35, living near Durban, Natal, gave birth to male twins on November 12th, 1928. The labour was, on the whole, easy. The first child, a head presentation, was normal in every respect, and weighed 7 lb. The second child, a breech presentation, had a parasitic foetus attached to it. I was called half an hour after the delivery, as the midwife, finding an unusual bulging in the umbilical region of the second twin, was afraid to cut the cord. When I arrived I found the placenta in the bed, and after cutting the cord I noticed a hernia-like protrusion of the bowel in the umbilical area.

Family History.

The father is 38 years of age, a factory employee of poor physique, below the average height and weight, and of intemperate habits. The mother is a healthy woman, and is of average height, weight, and physique. Three other children (two boys and a girl), aged respectively 7, 5, and 3, are normal in every respect. There is no history of miscarriages or of difficult labour.

The Autosite.

The autosite, a small baby weighing 5 lb. 8 oz., was poorly covered, had deficient muscle tone, loose skin, a Hippocratic facies, and a feeble cry. It was alert, cyanotic, especially about the feet, and had normal powers of suction and deglutition. The head was normal, except that the cranial bones were unusually soft. The lungs, the upper and lower extremities, the abdomen, and the anal orifice were normally developed, and hearing, sight, and intelligence appeared to be normal. On the other hand, a bruit was heard in the heart, due, probably, to a patent foramen ovale, and the genito-urinary system was abnormal. The left testis was undescended, and metrorrhagia occurred at independent times from the penis of the autosite and from that of the parasite.

The Parasite.

The parasite was attached to the autosite by a pedicle the circumference of which was about that of half a crown. The pedicle was partly bony and partly muscular. The upper bony part was attached, slightly to the right, to the lower end of the sternum of the autosite; the lower part of the pedicle was muscular, and joined to the upper part of the abdominal wall.

The chest of the parasite was undeveloped, and contained no heart or lungs. Its upper extremities were rudimentary; the

right arm was longer than the left, and each hand had one rudimentary metacarpal, finger, and nail. The lower extremities were well developed and equal in size, but they were flexed to a right angle, and could not be straightened or bent any further. The ankles were stiff; each foot had five well-developed toes. There were no testes in the scrotum, but the penis was well formed, and the parasite passed water over the autosite. There was no umbilicus and no anal orifice, though a distinct dimple marked the place of the latter. The parasite displayed no movement, but when its skin was pinched or pricked with a needle the autosite winced and uttered a feeble cry.

Operation for Umbilical Hernia.

On November 13th, when the child was one day old, I opened the abdomen, removed the hernial sac, returned the intestines to the abdomen, and closed the wound.

The child made an uninterrupted recovery, the cyanosis disappearing almost at once and its general condition improving. Waterproof material was used to protect the wound from the parasite's urine. Healing took place by first intention, leaving a clean scar.

I considered that the child's condition did not justify an attempt to remove the parasite, and decided to wait a little before undertaking this operation. Later, however, when he was 10 weeks old, I found him looking extremely ill, and was able to induce the father to allow me to remove the parasite at once.

Removal of Parasite.

The operation was performed on February 6th under light chloroform anaesthesia. I made an incision round the pedicle, and on opening the abdomen I found that there was free communication between the abdominal cavities and between the bowels themselves. The peritoneum of the autosite was continuous with that of the parasite, but the latter's bowel had an independent mesentery attached to its posterior abdominal wall. The intestines of the parasite were very thin and narrow; they originated from the autosite's small intestine and ended in its lower bowel. The parasite had one small right kidney, but no liver or spleen. Large blood vessels and nerves passed from the autosite to the parasite. I ligated and cut the vessels passing into the parasite, and then decided to cut through the bowel of the parasite, taking care not to endanger the intestines of the host. Keeping as close to the parasite as possible, I clamped the bowel, removed it as one would an appendix, and returned the host's intestines into his abdomen. I closed the abdomen in the usual manner and brought the edges of the skin together, by interrupted silk-worm-gut sutures. The operation lasted fifteen minutes, and except for a little sloughing of the wound the child made an uneventful recovery. The parasite weighed 8 ounces.

The child was breast-fed at three-hourly intervals, and twelve hours after the operation he had a normal stool. The fact that thereafter the stools were of normal colour and consistency assured me that his intestines had not been damaged at the operation. He began to improve steadily and gained in weight, and a month after the operation he was still alive and doing well.

A, The conjoined twins at the age of 2 months. B, The parasite immediately after the operation. C, The autosite at the age of 3½ months.