fidet bearing should be encouraged by games and sports, and there should be friendly comradeship with the opposite sex.

Summary

The posture and deformity of adolescent scoliosis have an affinity with the attitude of bashfulness. This attitude is the expression of the modesty of puberty; it is defensive in origin, and is dependent on an ancestral postural reflex. In certain cases the modesty of puberty deepens into a morbid self-consciousness associated with an exaggeration of the postural reflex of bashfulness; and the consequent long-continued muscular contraction induces the scoliotic posture and deformity. Recognition of the psychological element increases the scope and effect of treatment.

REFERENCES

- Abercrombie, R. G. (1928). *British Medical Journal*, **1**, 174.
Calvé, J., and Galland, M. (1930). *J. Bone Jt. Surg.*, **12**, 555.
Hauser, E. (1937). *Arch. Surg.*, Chicago, **34**, 1159.

AN OUTBREAK OF PARATYPHOID AND DYSENTERY IN A TRAINING-SHIP

BY

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An outbreak of paratyphoid fever occurred in a Mersey training-ship during September, October, and November, 1937; this was of particular interest in that it happened in a closed community and ran concurrently with a smaller outbreak of Sonne dysentery. The vessel is a third-class cruiser, about fifty years old, used in training boys for the lower deck of the Royal Navy or Merchant Service. The ship's complement consisted of the commander, thirteen officers, and 112 boys; in addition the commander's wife and a maid live in the vessel. A local practitioner is responsible for the medical care of the boys.

On October 5, 1937, the following facts were ascertained by the senior assistant port medical officer:

1. That on September 18 two boys, suffering from pyrexia and malaise, were sent to Birkenhead General Hospital for observation, and were subsequently diagnosed as cases of Sonne dysentery; one of them returned to the vessel on September 29, but was again taken ill, and was readmitted to hospital on October 3 with paratyphoid fever.
2. That on September 19 twelve boys complained of diarrhoea. All recovered in twenty-four hours.
3. That on October 1 one boy, and on October 3 two boys, were removed to Birkenhead General Hospital for observation.
4. That on October 4 the visiting medical practitioner was informed by the bacteriological department of the Birkenhead General Hospital that the patients admitted on October 1 and October 3 were suffering from paratyphoid fever.

On October 5 the medical officer of health for the City and Port of Liverpool received notification of a case of ? paratyphoid fever in the training-ship; the boy was examined by the senior assistant port medical officer and removed to Fazakerley Hospital. Bedding and effects of the patient were collected for disinfection and the ship's hospital washed down and sprayed by an inspector of the Port Health Authority.

General Investigations

The boys returned from summer leave on August 26, 1937, and a number of new boys joined between that date and September 30. The latter group included one (G. R. N.) who will be referred to again later in the report; he joined on September 9, reported sick on September 17 with indefinite symptoms, and remained in the ship's hospital until September 24. The following day he went home on week-end leave and did not return to the vessel, his parents withdrawing him for health reasons. (This boy was subsequently visited at home, and his parents persuaded to allow him to enter hospital.) Except for the aforementioned cases no other sickness was reported.

Water and Food Supplies

Drinking-water is obtained from a hydrant on Rock Ferry Pier four times daily, conveyed to the vessel by water-boat, and pumped into storage tanks on the upper deck. The tanks are used exclusively for drinking-water. River water is utilized for flushing latrines, urinals, and lavatories; there is no possible contamination of the drinking-water from this source. Food supplies are kept in store-rooms used especially for that purpose, and are the direct responsibility of the cook, who has the assistance of four boys in the galley. Milk in bulk is used only for cooking; for drinking purposes each boy receives a pint of pasteurized milk daily in a sealed bottle.

Lavatories, etc.

The lavatory accommodation was inspected; it is situated forward, and consists of trough-closets without partitions. The contents of one large tank flushes the system four times a day; a trough-type urinal is similarly flushed. A separate pedestal water-closet and urinal are available for use at night, but are locked during the day. The hospital has a separate water-closet. As the night urinal opened on the sleeping quarters representation was made that it be completely boarded up, and a new scuttle cut into the ship's side for ventilation; this was carried out at once.

Personal Hygiene

The commander undertook that the crew would adhere strictly to the following instructions:

1. That the boys wash and scrub their hands with hot water and soap immediately after micturition or defaecation.
2. That latrines and urinals be flushed every hour, and seats thoroughly scrubbed each day with disinfectant.
3. That handling of food be restricted to the cook and galley staff (four boys); that no other boys be allowed in the galley.
4. That uncooked vegetables, lettuces, etc., shall not be used.
5. That no new boys shall join the vessel during the present term.
6. That no boys be drafted to sea during the present term.
7. All home week-end leave to be stopped.
8. Football fixtures with other teams to be cancelled, but games ashore permitted among the boys themselves.

Sequence of Cases, and Measures taken after October 5, 1937

October 7.—One of the galley boys reported sick, with pain in the left upper abdomen; temperature 100° F.; he was removed to Fazakerley Hospital for observation. Blood was

taken for Widal test from twenty boys who gave a history of pyrexia and/or diarrhoea since August 26. Specimens of faeces and urine from the cook and four galley boys were forwarded to the City bacteriologist.

October 11.—Two boys with pyrexia removed to Fazakerley Hospital for observation. Blood for Widal test taken from the cook and galley staff.

October 12.—Eight boys with pyrexia and/or diarrhoea removed to Fazakerley Hospital for observation. Arrangements made for a daily "temperature parade" of all boys in the ship, and the results reported to the senior assistant port medical officer. All febrile cases, irrespective of symptoms, were drafted to hospital for observation.

October 13 to October 20.—Nineteen boys were segregated during this period.

October 18.—Blood was taken from the six remaining new boys who joined the vessel on or after August 26. Arrangements were completed for the routine examination of faeces from all aboard, and six specimens were submitted daily to the City bacteriologist.

October 31 and November 6.—Three boys on the former and one boy on the latter date were removed to Fazakerley Hospital.

November 8.—Two boys were readmitted to Fazakerley Hospital suffering from severe diarrhoea.

November 12.—A dysentery carrier was isolated from the routine examination of stools and removed to Fazakerley Hospital.

The question of preventive inoculation with T.A.B. was considered, but was rejected on account of the danger of masking future cases and the absence of evidence as to the advantage of such inoculation during the course of an epidemic. It was, however, deemed expedient to obtain permission of parents and guardians for the inoculation of boys should the contingency arise. This was obtained in all cases except those under the care of one voluntary society, which refused.

The total number of admissions to hospital for observation was forty-four (including three readmissions), and the following results were obtained:

Dysentery group	5
Widal +; <i>B. paratyphosus</i> B in faeces and/or urine ..	7
Widal -; <i>B. paratyphosus</i> B in faeces and/or urine ..	4
Widal +; faeces and urine -	4
Widal -; faeces and urine -	24
	44

Investigation and Progress of the Epidemic

The investigation of this epidemic was complicated by the presence of both paratyphoid B and Sonne dysentery; the fact that it was confined to a closed community where strict discipline could be maintained was of material assistance.

Dysentery Cases

A scrutiny of the bacteriological reports (Table I) reveals the isolation of *B. dysenteriae* Sonne from one patient (S. C.) who had no previous symptoms. This boy joined the vessel on July 14, 1937, and the dysentery epidemic began on September 18, when two boys (J. V. and R. W.) were sent to Birkenhead General Hospital. Next day twelve boys complained of diarrhoea, which cleared up in twenty-four hours. These facts were first reported to the Port Health Authority on October 5, following which a routine examination of faeces was instituted. From these examinations a positive return (S. C.) was made on November 9: the boy was removed to hospital, and since his segregation no further cases have occurred. In attacks of mild diarrhoea in two other cases the organism was isolated from the faeces; these patients were admitted to

Fazakerley Hospital, one (W. G.) on September 11 and the other (K. C.) on September 12.

One case (J. V.) was of particular interest. This patient was discharged from Birkenhead General Hospital on September 28 and readmitted on October 3 with paratyphoid fever; he would therefore seem to have incubated paratyphoid during the course of his dysentery.

Paratyphoid Cases

The Liverpool Port Medical Officer was first notified of paratyphoid fever in the training-ship on October 5, and investigations were proceeded with to find the source of infection. Attention was directed to the water supply, food supply, galley staff, and the possibility of a carrier or missed case.

Water Supply

The storage tanks on the forecastle head and main deck were examined and samples taken by an assistant to the City bacteriologists, with the following results:

	Bacteria per c.cm. at 37° C.	Bacteria per c.cm. at 22° C.	<i>B. coli</i> absent in
Tank, main deck .. 3	114	100 c.cm.	
Tank, forecastle .. 5	143	100 c.cm.	

No organisms of the typhoid group were found in either specimen. After due investigation it was considered improbable that the water supply was the origin of the infection.

Food Supply and Galley Staff

Particular attention was directed to milk and uncooked vegetables, but it was considered unlikely that food was the origin of the outbreak. Samples of blood, urine, and faeces from the cook and four galley boys were submitted to the City bacteriologist. One of these boys (J. L.) was removed to Fazakerley Hospital on October 9 with paratyphoid fever. The blood Widal reaction was positive, and *B. paratyphosus* B was isolated from the faeces and urine. The results from the others were negative.

Carrier or Missed Case

It has already been noted that the boys returned from leave on August 26, and it was ascertained that none of them gave a history of any illness during the vacation. As a number of new boys had joined the vessel between August 26 and September 30 particular attention was directed to this group, and their individual medical histories were investigated. Among them was a boy (G. R. N.) who joined the vessel on September 9; eight days later (September 17) he was sent to the ship's hospital with indefinite symptoms, remaining there until September 24. The following day he returned home on week-end leave, but did not return to the vessel, his parents withdrawing him for health reasons. He was visited at home, and ultimately his parents consented to his removal to hospital. He was admitted to Fazakerley Hospital on October 13, and the next day *B. paratyphosus* B was isolated from the urine; the blood and faeces were negative. On two later dates (see Table I, G. R. N.) *B. paratyphosus* B was again isolated from the urine; both the blood and faeces still remained negative. He was discharged from hospital on November 15; but although at all times the blood Widal was negative and *B. paratyphosus* B was not isolated from the faeces, the fact that the urine was positive on three separate occasions and also that he was a new boy in the vessel seems to indicate that he was the origin of the outbreak.

A urinary carrier with a consistently negative Widal reaction is very rare, but a similar case has been reported by V. Glass and H. D. Wright (*J. Path. Bact.*, 45, 438);

TABLE I

Case	Hospital		Faeces		Urine		Blood Widal		Remarks
	Admitted	Discharged	Date	Result	Date	Result	Date	Result	
G. R. N. ..	Fazakerley 13/10/37	15/11/37	14/10/37 17/10/37 17/10/37 20/10/37 21/10/37 22/10/37	Negative " " " " "	14/10/37 17/10/37 17/10/37 20/10/37 21/10/37 22/10/37 25/10/37 1/11/37 4/11/37	B. para. B + Negative " B. para. B + Negative " B. para. B + Negative "	13/10/37 15/11/37	Negative "	Joined training-ship as a new boy 9.9. Sick bay 17/9 to 24.9. Indefinite symptoms. Returned home on 25/9 and did not go back to ship. Admitted to Fazakerley Hospital 13/10 Diagnosis : Paratyphoid B ; Urinary carrier
R. W. ..	Birkenhead General 18/9/37	29/9/37	20/9/37 24/9/37	Occult blood Sonne dys. +			11/10/37	"	Diagnosis : Sonne dysentery
J. V. ..	" Readmitted 3/10/37	"	20/9/37 "	Occult blood Sonne dys. + Several examinations done. All negative (No dates given)			19/9/37 4/10/37 8/10/37	B. para. B 1/25 " 1/2,500	Vomiting, diarrhoea, cough Diarrhoea and headache Diagnosis : (a) Sonne dysentery (b) Paratyphoid B
A. T. ..	Birkenhead General 1/10/37	23/11/37	6/10/37 11/10/37 18/10/37	B. para. B + Negative Examinations since—Negative (No dates given)	6/10/37 11/10/37 19/10/37	Negative " "	4/10/37	" 1/200	Pain in left loin, and rigors Pyrexia—no diarrhoea Diagnosis : Paratyphoid B
W. W. ..	Birkenhead General 3/10/37	"	6/10/37 11/10/37 19/10/37	Negative B. para. B + Negative Examinations since—Negative (No dates given)	6/10/37 11/10/37 19/10/37	Negative " "	4/10/37	" 1/100	Pyrexia and similar symptoms Diagnosis : Paratyphoid B
A. L. ..	Fazakerley 5/10/37	4/12/37	6/10/37 8/10/37 20/10/37 28/10/37 30/10/37 3/11/37 6/11/37 10/11/37 13/11/37 17/11/37	B. para. B + " B. para. B + + B. para. B + " " Negative " "	6/10/37 8/10/37 20/10/37 28/10/37 30/10/37 3/11/37 6/11/37 12/11/37 13/11/37 17/11/37	Negative " " " " " " " "	14/10/37	" 1/20,480 B. typhosus (H) 1/640 B. typhosus (O) 1/20 B. para. B (O) 1/40 Salmonella 1/320	Sickness ; headache ; spleen palpable ; 2.2 rose spots ; general malaise Diagnosis : Paratyphoid B
J. L. ..	Fazakerley 7/10/37	"	9/10/37 20/10/37 23/10/37 27/10/37 29/10/37 3/11/37 6/11/37 12/11/37 13/11/37	B. para. B + " " " " Negative " " " "	9/10/37 20/10/37 23/10/37 27/10/37 29/10/37 3/11/37 6/11/37 12/11/37 13/11/37 17/11/37	" " B. para. B + " Negative " B. para. B + Negative "	9/10/37	B. para. B (H) 1/1,000 Salmonella 1/1,000	Pyrexia Pain in left abdomen Diagnosis : Paratyphoid B
N. E. B. ..	Fazakerley 11/10/37	13/11/37	14/10/37 20/10/37 23/10/37	" " "	14/10/37 20/10/37 23/10/37 27/10/37 28/10/37 29/10/37	" " B. para. B + Negative "	13/10/37	Negative	Pyrexia Diagnosis : Paratyphoid— doubtful
W. G. ..	"	"	12/10/37 18/10/37 21/10/37 25/10/37	Sonne dys. + Negative " "	12/10/37 18/10/37 21/10/37	" " "	12/10/37	"	Pyrexia Diagnosis : Sonne dysentery
K. C. ..	Fazakerley 12/10/37	20/11/37	13/10/37 14/10/37 28/10/37 1/11/37 4/11/37	" Sonne dys. + Negative " "	13/10/37 28/10/37 1/11/37 4/11/37	" " " "	13/10/37	"	Pyrexia Diagnosis : Sonne dysentery
G. H. C. ..	"	28/10/37	13/10/37 18/10/37 22/10/37	" " "	13/10/37 18/10/37 22/10/37	" " "	"	"	Pyrexia Diagnosis—nil
G. B. ..	"	"	13/10/37 18/10/37 22/10/37	" " "	13/10/37 18/10/37 22/10/37	" " "	"	"	Pyrexia Diagnosis—nil
G. H. W. ..	"	"	13/10/37 18/10/37 22/10/37	" " "	13/10/37 18/10/37 22/10/37	" " "	"	"	Pyrexia Diagnosis—nil
A. G. ..	"	"	13/10/37 18/10/37 22/10/37	" " "	13/10/37 18/10/37 22/10/37	" " "	"	"	Pyrexia Diagnosis—nil
D. E. D. ..	" Readmitted 8/11/37 Later Report	"	13/10/37 18/10/37 22/10/37 9/11/37 16/11/37 18/11/37 25/11/37 26/11/37 9/12/37 10/12/37	" " " " B. para. B + Negative " B. para. B + Negative "	13/10/37 18/10/37 22/10/37 9/11/37 16/11/37 18/11/37 26/11/37	" " " " " " "	7/10/37 13/10/37 24/11/37	" " "	Diarrhoea started 6/11 and continued to 8/11 Diagnosis : Paratyphoid B

TABLE I (continued)

Case	Hospital		Faeces		Urine		Blood Widal		Remarks
	Admitted	Discharged	Date	Result	Date	Result	Date	Result	
L. B. ..	Fazakerley 12/10/37		13/10/37	B. para. B +	13/10/37	Negative	13/10/37	B. para. B (H) 1/2,560 B. para. B (O) 1/40 Salmonella 1/320	Pyrexia
			28/10/37	"	28/10/37	"			
			8/11/37	"	8/11/37	"			
			18/11/37	Negative	18/11/37	"			
			25/11/37	"					Diagnosis : Paratyphoid B
A. C. ..	"	27/11/37	13/10/37	B. para. B +	13/10/37	"	11/10/37	B. para. B 1/320 Salmonella 1/2,500	Pyrexia
			28/10/37	"	28/10/37	"			
			8/11/37	Negative	8/11/37	"			
			12/11/37	"	12/11/37	"			
			17/11/37	"	17/11/37	"			Diagnosis : Paratyphoid B
W. A. C. ..	Fazakerley 13/10/37	28/10/37	14/10/37	"	14/10/37	"	7/10/37	Negative	Pyrexia
			19/10/37	"	19/10/37	"	14/10/37	"	
			21/10/37	"	21/10/37	"			Diagnosis—nil
G. H. G. ..	"	"	14/10/37	"	14/10/37	"	"	"	Pyrexia
			19/10/37	"	19/10/37	"			
				"	21/10/37	"			Diagnosis—nil
S. R. S. ..	Fazakerley 13/10/37	2/11/37	14/10/37	"	14/10/37	"	14/10/37	"	Pyrexia
			19/10/37	"	19/10/37	"			
				"	21/10/37	"			
				"	25/10/37	"			
	Readmitted 8/11/37	9/12/37		"	26/10/37	"			
			9/11/37	"	9/11/37	"			Diarrhoea 6/11 to 8/11 : sent back to hospital
			16/11/37	"	16/11/37	"			Diagnosis : Paratyphoid— doubtful
			18/11/37	"	18/11/37	"			
J. S. ..	Fazakerley 13/10/37	27/11/37	12/10/37	"	12/10/37	"	7/10/37	B. para. B (O) 1/80 + Salmonella 1/160 +	Pyrexia
			14/10/37	"	14/10/37	"	27/10/37	B. para. B (H) 1/160 B. para. B (O) 1/160 Salmonella 1/40	
			8/11/37	"	8/11/37	"			
			12/11/37	"	12/11/37	"			Diagnosis : Paratyphoid B
J. G. L. ..	"		14/10/37	B. para. B +	14/10/37	"	7/10/37	Doubtful report	Pyrexia
			28/10/37	"	28/10/37	"	11/10/37	Salmonella + 1/160	
			8/11/37	Negative	8/11/37	"			
			12/11/37	"	12/11/37	"			Diagnosis : Paratyphoid B
			17/11/37	"	17/11/37	"			
R. M. H. ..	"	27/11/37	12/10/37	"	12/10/37	"	7/10/37	B. para. B Type 1/80	Pyrexia
			14/10/37	"	14/10/37	"	27/10/37	B. para. B (H) 1/80	
			8/11/37	"	8/11/37	"			Diagnosis : Paratyphoid— doubtful
			15/11/37	"	15/11/37	"			
			17/11/37	"	17/11/37	"			
B. D. ..	Fazakerley 14/10/37	28/10/37	15/10/37	"	15/10/37	"	7/10/37	Negative	Pyrexia. For observation
			26/10/37	"	26/10/37	"			Diagnosis—nil
W. L. J. ..	Fazakerley 15/10/37	"	16/10/37	"	16/10/37	"	18/10/37	"	Pyrexia
			26/10/37	"	26/10/37	"			Diagnosis—nil
A. E. H. C. ..	"	"	16/10/37	"	16/10/37	"	"	"	Pyrexia
			26/10/37	"	26/10/37	"			Diagnosis—nil
C. S. L. ..	Fazakerley 16/10/37	"	18/10/37	"	18/10/37	"	"	"	Pyrexia
			25/10/37	"	25/10/37	"			Diagnosis—nil
D. W. E. ..	"	2/11/37	18/10/37	"	18/10/37	"	7/10/37	"	Pyrexia
			25/10/37	"	25/10/37	"			Diagnosis—nil
J. B. ..	Fazakerley 18/10/37	"	19/10/37	"	19/10/37	"	"	"	Pyrexia
			25/10/37	"	25/10/37	"			Diagnosis—nil
J. T. ..	"	28/10/37	19/10/37	"	19/10/37	"	"	"	Pyrexia
			25/10/37	"	25/10/37	"			Diagnosis—nil
E. J. S. ..	Fazakerley 19/10/37	2/11/37	20/10/37	"	20/10/37	"	20/10/37	"	Pyrexia. For observation
			25/10/37	"	25/10/37	"			Diagnosis—nil
R. E. G. ..	"	"	20/10/37	"	20/10/37	"	"	"	Pyrexia. For observation
			25/10/37	"	25/10/37	"			Diagnosis—nil
A. E. S. ..	"	"	20/10/37	"	20/10/37	"	"	"	Pyrexia. For observation
			27/10/37	"	27/10/37	"			Diagnosis—nil
B. J. N. ..	"	"	20/10/37	"	20/10/37	"	"	"	Pyrexia. For observation
			27/10/37	"	27/10/37	"			Diagnosis—nil
C. S. S. ..	Fazakerley 20/10/37	5/11/37	21/10/37	"	25/10/37	"	22/10/37	"	Pyrexia. For observation
			25/10/37	"					Diagnosis—nil
D. B. C. ..	Fazakerley 31/10/37	9/12/37	22/10/37	"	1/11/37	"	7/10/37	"	Pyrexia. For observation
			1/11/37	"	1/11/37	"	1/11/37	"	
			4/11/37	"	4/11/37	"			
			16/11/37	"	16/11/37	"	24/11/37	"	Diagnosis—nil

TABLE I (continued)

Case	Hospital		Faeces		Urine		Blood Widal		Remarks
	Admitted	Discharged	Date	Result	Date	Result	Date	Result	
C. E. W. ..	Fazakerley 31/10/37		1/11/37	Negative	1/11/37	Negative	18/10/37 1/11/37	Negative B. para. B (H) 1/160 B. para. B (O) 1/20 B. para. B (H) 1/80 B. para. B (O) 1/20 Salmonella 1/20	Pyrexia. For observation Diagnosis: Paratyphoid—doubtful
E. W. B. ..	"	27/11/37	21/10/37 1/11/37 4/11/37 16/11/37 23/11/37	" " " " "	1/11/37 4/11/37 16/11/37	" " "	1/11/37	Negative	Pyrexia. For observation Diagnosis—nil
C. J. S. ..	Fazakerley 5/11/37	"	22/10/37 8/11/37 15/11/37 17/11/37	" " " "	8/11/37 15/11/37 17/11/37	" " "	8/11/37	"	Pyrexia. For observation Diagnosis—nil
J. A. V. ..	Fazakerley 6/11/37		29/10/37 6/11/37 8/11/37 15/11/37 17/11/37	" " " " "	8/11/37 15/11/37 17/11/37	" " "	8/11/37	"	Pyrexia. For observation Diagnosis—nil
S. C. ..	Fazakerley 12/11/37		9/11/37 15/11/37 29/11/37 3/12/37 6/12/37	B. dys. Sonne + " Negative " "	15/11/37 29/11/37	" "	15/11/37	"	Dysentery carrier. Joined vessel 14/7; leave, 1/8 to 20/8. No history of any illness Diagnosis: Sonne dysentery carrier

TABLE II.—Paratyphoid Cases, including Doubtful Cases

Sept. 17 (G. R. N.)							
Oct. 1. (A. T.) Oct. 3 (J. V.) Oct. 3 (W. W.) Oct. 5 (A. L.) Oct. 7 (J. L.)							
Oct. 11 (N. E. B.)	Oct. 12 (L. B.)	Oct. 12 (A. C.)	Oct. 13 (S. R. S.)	Oct. 13 (J. S.)	Oct. 13 (J. G. L.)	Oct. 13 (R. M. H.)	(?)
Oct. 31 (C. E. W.)							
Nov. 8 (D. E. D.)							

had the organism been isolated on one occasion only, suspicion would naturally have fallen on the technique employed in collecting the specimen, but it would appear more than unlikely that the specimens of urine from this particular patient could be contaminated accidentally on three different dates. On October 1—that is, fourteen days after this boy first entered the ship's hospital—a case of paratyphoid was removed to Birkenhead General Hospital.

Table II shows the incidence of the paratyphoid cases, including doubtful ones, and it will be observed that, assuming G. R. N. to be the origin of the epidemic, a group of five cases occurred between October 1 and October 7; another group of seven cases between October 11 and October 13; one doubtful case on October 31; and the last one on November 8. This seems to indicate that the removal of the original source of infection, plus the rigid carrying out of the personal hygiene instructions, was successful in cutting short the outbreak. In addition twenty-four boys who at the daily "temperature parade" had shown a rise were sent to hospital for observation; repeated examinations of blood, faeces, and urine of this last group were negative. The type of infection was not severe; there were no deaths; one patient was seriously ill but subsequently recovered; the remainder had an uneventful convalescence.

Summary

1. This is the record of an outbreak of intestinal infection in a training-ship, due to *B. paratyphosus* B and *B. dysenteriae* Sonne.

2. The first case of illness was that of a new boy, shown to be a urinary carrier of *B. paratyphosus* B: although blood and faeces were negative the organism was isolated from the urine on three separate occasions. A similar case is reported by V. Glass and H. D. Wright.

3. Of a total complement of 128, eleven boys were definitely paratyphoid and four doubtful; two of the latter had positive Widal reactions, but *B. paratyphosus* B was not found; the blood Widal's in the others were negative, and *B. paratyphosus* B was isolated from only one specimen in each case.

4. Mass inoculation with T.A.B. vaccine was considered but decided against. Preventive inoculation of new boys has been advised.

5. Routine examination of faeces revealed a Sonne dysentery carrier as a possible cause of the dysentery outbreak. The organism was isolated in four other cases which showed dysenteric symptoms.

6. Instructions in personal hygiene were issued and stressed early in the epidemic.

7. It was decided to reconstruct the entire lavatory accommodation on modern lines before the end of Christmas leave.

8. Bacteriological investigation of faeces from the personnel has been completed and the epidemic is presumed to be over.

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