

# CHINA.

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## IMPERIAL MARITIME CUSTOMS.

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II.—SPECIAL SERIES: No. 2.

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# MEDICAL REPORTS,

FOR THE HALF-YEAR ENDED 31<sup>ST</sup> MARCH 1889.

**37th Issue.**

PUBLISHED BY ORDER OF  
**The Inspector General of Customs.**

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SHANGHAI:

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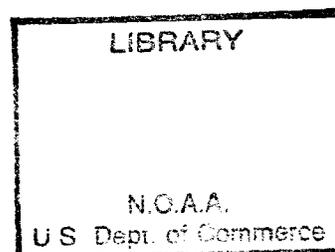
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[Price \$1.]

# **National Oceanic and Atmospheric Administration**

## **Environmental Data Rescue Program**

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December 20, 2000

INSPECTOR GENERAL'S CIRCULAR No. 19 OF 1870.

INSPECTORATE GENERAL OF CUSTOMS,

PEKING, 31st December 1870.

SIR,

1.—It has been suggested to me that it would be well to take advantage of the circumstances in which the Customs Establishment is placed, to procure information with regard to disease amongst foreigners and natives in China; and I have, in consequence, come to the resolution of publishing half-yearly in collected form all that may be obtainable. If carried out to the extent hoped for, the scheme may prove highly useful to the medical profession both in China and at home, and to the public generally. I therefore look with confidence to the co-operation of the Customs Medical Officer at your port, and rely on his assisting me in this matter by framing a half-yearly report containing the result of his observations at.....upon the local peculiarities of disease, and upon diseases rarely or never encountered out of China. The facts brought forward and the opinions expressed will be arranged and published either with or without the name of the physician responsible for them, just as he may desire.

2.—The suggestions of the Customs Medical Officers at the various ports as to the points which it would be well to have especially elucidated, will be of great value in the framing of a form which will save trouble to those members of the medical profession, whether connected with the Customs or not, who will join in carrying out the plan proposed. Meanwhile I would particularly invite attention to—

a.—The general health of.....during the period reported on; the death rate amongst foreigners; and, as far as possible, a classification of the causes of death.

b.—Diseases prevalent at.....

c.—General type of disease; peculiarities and complications encountered; special treatment demanded.

d.—Relation of disease to { Season.  
Alteration in local conditions—such as drainage, etc.  
Alteration in climatic conditions.

e.—Peculiar diseases; especially leprosy.

f.—Epidemics { Absence or presence.  
Causes.  
Course and treatment.  
Fatality.

Other points, of a general or special kind, will naturally suggest themselves to medical men; what I have above called attention to will serve to fix the general scope of the undertaking. I have committed to Dr. ALEX. JAMIESON, of Shanghai, the charge of arranging the Reports for publication, so that they may be made available in a convenient form.

3.—Considering the number of places at which the Customs Inspectorate has established offices, the thousands of miles north and south and east and west over which these offices are scattered, the varieties of climate, and the peculiar conditions to which, under such different circumstances, life and health are subjected, I believe the Inspectorate, aided by its Medical Officers, can do good service in the general interest in the direction indicated; and, as already stated, I rely with confidence on the support and assistance of the Medical Officer at each port in the furtherance and perfecting of this scheme. You will hand a copy of this Circular to Dr. ...., and request him, in my name, to hand to you in future, for transmission to myself, half-yearly Reports of the kind required, for the half-years ending 31st March and 30th September—that is, for the Winter and Summer seasons.

4—

\* \* \* \* \*

I am, etc.,

(Signed)

ROBERT HART,

I. G.

THE COMMISSIONERS OF CUSTOMS,—*Newchwang, Ningpo,*  
*Tientsin, Foochow,*  
*Chefoo, Tamsui,*  
*Hankow, Takow,*  
*Kiukiang, Amoy,*  
*Chinkiang, Swatow, and*  
*Shanghai, Canton.*

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SHANGHAI, 1st *September* 1891.

SIR,

IN accordance with the directions of your Despatch No. 6 A (Returns Series) of the 24th June 1871, I now forward to the Statistical Department of the Inspectorate General of Customs, the following documents:—

Report on the Health of Tientsin, pp. 1-5;

Report on the Health of Canton, pp. 6, 7; each of these referring to the year ended 31st March 1889.

Report on the Health of Wuhu for the eleven months ended 31st March 1889, pp. 8-10.

Report on the Health of Shanghai for the half-year ended 31st March 1889, pp. 11-48.

Clinical Studies of disease as observed in China, pp. 49-87.

I have the honour to be,

SIR,

Your obedient Servant,

R. ALEX. JAMIESON.

THE INSPECTOR GENERAL OF CUSTOMS,  
*PEKING.*

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The Contributors to this Volume are:—

A. IRWIN, F.R.C.S.I. .... Tientsin.  
J. F. WALES, B.A., M.D., CH.M. .... Canton.  
R. H. COX, L.K.&Q.C.P., L.B.C.S.I. .... Wuhu.  
R. A. JAMIESON, M.A., M.D., M.R.C.P. .... Shanghai.

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## DR. A. IRWIN'S REPORT ON THE HEALTH OF TIENTSIN

For the Year ended 31st March 1889.

WITH the exception of an outbreak of cholera, which proved fatal in three cases, the health of the community has been fairly good. None of the fatal cases were seen until collapse had set in and treatment was simply hopeless.

The mortality amongst the native population was very great; and Dr. LIU, of the Viceroy's staff, tells me that amongst quite a number of cases which he saw he only knew of two recoveries. The prevailing characteristic of the epidemic was the suddenness of the attack, the patient vomiting and purging a few times and then rapidly passing into a state of collapse.

During the hot weather a mild form of malarial fever was very prevalent, and change of air as usual proved the best remedy. In the latter part of the autumn an epidemic of whooping-cough set in. About 25 children were attacked. All the cases did well.

In some of the severe ones sulphurous acid fumigation appeared to give great temporary relief, but in none did it appear to cut short the progress of the disease.

An interesting case of empyema, following an attack of right pleuro-pneumonia, came under notice.

In this case the value of frequent aspirations was well shown. Some quarts of pus were drawn off at various times, and the collapsed lung allowed to expand until it filled the pleural cavity. A drainage tube was then put in; and the case ultimately did well.

I am indebted to the late Dr. MACKENZIE for the following interesting notes of cases treated at the Viceroy's Hospital:—

### GANGRENE OF THE EXTREMITIES, RESEMBLING IN ITS NATURE SENILE GANGRENE, BUT OCCURRING IN THE YOUNG AND MIDDLE-AGED; PROBABLY DUE TO CHRONIC ERGOT POISONING.

We have notes of 10 cases of slowly-advancing gangrene, looking in appearance very much like senile gangrene, yet all occurring in men under 50 years of age. There are invariably well-marked manifestations of mal-nutrition. The patients are anæmic, cachectic-looking, and frequently suffer from diarrhoea.

The same symptoms are pretty much common to all. Tingling and numbness of the feet and legs, lasting for months, followed by pain, slight at first, but becoming excruciating as the disease advances. With the pain, redness of the skin and tenderness to the touch are noticed, beginning generally in one of the toes. At a later stage discolouration of the skin is seen, the redness assuming a more dusky aspect, and becoming mottled, green or blue. Then the epidermis separates from the parts beneath, breaks and allows of the escape of a bad-smelling discharge. Finally, the toe or toes become perfectly black and hard—actually mummified. The same state of things continues in the neighbouring parts until in many cases a line of demarcation forms. When they have applied for treatment there is always found

some part perfectly black, hard and insensible, beyond this a discoloured area, and then, around the line of demarcation, a reddened congested portion intensely painful and tender.

As to the cause of the disease, some trace it to walking in flooded fields; and this may be the immediate cause in some cases. One thing seems clear, and that is, that they have been subsisting for a long time upon improper food. Case 2 is a good instance, showing how the disease can be stayed under nourishing food. A young man of 24, he looked when admitted as if he must lose the big toe of his right foot and the middle finger of his left hand; both parts were affected and appeared to have, if not quite, yet almost, lost their vitality; yet under good food the vitality was fully restored.

There is evidently marked contraction of the arteries of the extremities affected. This is shown by the fact that after amputation, say of the fore part of the foot, there may be no vessel requiring ligation, only a general oozing of blood. Even when the entire foot has been removed, perhaps only one vessel, and that a small one, needed ligation. Case 2 brings this out in a very interesting manner. The middle finger of the left hand was involved, though it was not quite dead, and, as might have been expected, the radial pulse on this side was very small; it was perfectly thready, resembling an artery of half the size, while the right radial, where no disease existed, was full and strong. Case 7 is another one in point. Here the index and middle fingers of the right hand were affected 15 months ago. Complete death of the parts supervened; separation took place and the stumps healed. Now, there is distinct atrophy of the right arm as compared with the left, the radial artery is absent from its normal position, while a feeble, thin pulse beats at the back of the radius. He declares upon the authority of Chinese doctors who frequently examined him, and who are no novices at feeling the pulse, that two years ago his right pulse beat in the front of the arm, in the corresponding place to the left, which is normal in every way. They told him that his pulse had changed its position to the back of the arm. This thin pulsating vessel behind the radius I take to be an enlarged branch carrying on the collateral circulation in consequence of the blocking of the narrowed radial by a thrombus.

The redness, always present at some stage of the disease, denotes that venous congestion or dilatation of the veins is an accompaniment of the changes taking place. Indeed the disease appears to spread by means of a low form of inflammation which gradually destroys the vitality of the tissues attacked. I have not noticed any marked œdema. Some of the worst cases suffered from fever.

I have come to the conclusion that the gangrene here described is probably caused by eating grain which has been attacked by the ergot fungus. I have no actual proof of it; but my reasons for so thinking are:—

First, that the symptoms correspond exactly with those present in well-traced cases of chronic ergot poisoning—gangrene from eating ergotised grain having been very common at one time in certain parts of Europe. Ergot attacks not only rye, but wheat, barley, millet, etc. Here in North China the people are great bread-eaters; bread, or some preparation of flour, holding about the same position in the dietary of the people of the north that rice does in the south. Rice being mainly imported from the south is too expensive a luxury for general use.

Again, the people recognise a diseased condition of the grain common in wet seasons or when the fields have been flooded, and they state that this is invariably eaten in common with the good grain, they being too poor to set it aside as unfit for food. The districts from which the patients have mostly come have been impoverished by repeated floods.

CASE 1.—*Gangrene of Right Foot.*—TS'AI CHÊN-LUNG, aged 29; farmer, from Ts'ang-chou.

13th October 1886.—Admitted to hospital with the following history. He had suffered from pain in the right foot for two years. Without apparent cause, the big toe first and then the neighbouring ones became discoloured and very tender. The big toe is black and mummified, and has been so for two months; the other toes are discoloured, cold and bloodless. A line of demarcation is showing itself in the fore part of the foot, near the roots of the toes. Foot red and much congested in the neighbourhood of this line. Pain in the foot very intense.

16th October.—As the pain seemed to be wearing the patient out, and at his earnest request that an operation should be performed, I did PIROGOFF'S amputation of the foot under antiseptic precautions.

22nd October.—Wound clean, but showing signs of a return of the disease in the flap. In great pain, requiring morphia.

23rd December.—The flap has entirely mortified, and is gradually separating. Still needs morphia injections.

24th January 1887.—The slough has wholly come away and the wound is granulating.

13th March.—Wound has cicatrised completely over the end of the tibia, and though not a good stump for walking on, is yet free from pain and without any sign of the old disease.

Left for his home.

26th December.—I saw this man at his father's farm. He is in good health, gets about with one crutch easily, and has no pain or other sign of recurrence of the disease.

CASE 2.—*Gangrene of Left Foot, with Disease commencing in the Right Foot and in Middle Finger of Left Hand; Amputation of Left Leg; Recovery.*—YIN CHÊN-HSING, aged 24; peasant, from Ts'ang-chou.

4th April 1887.—Admitted in the following condition. Left foot:—In the third, fourth and fifth toes the bones are black and bare; the sole of the foot adjacent is black in parts and discoloured in others. There is a large excavation in the heel from which a slough has come away; surrounding this cavity the skin is congested, hot, painful and intensely tender to the touch. The big toe and the dorsum of the foot look healthy. The tibial arteries cannot be felt. This condition has been existing more or less for six months. Right foot:—Four months diseased. The big toe is discoloured, very tender and extremely painful.

The middle finger of left hand is painful and the skin discoloured and shrivelled over the terminal phalanx. The radial pulse on this side is quite thready, while the right radial is full and strong. The difference is very marked.

The patient is anæmic, and requires morphia to relieve the pain.

12th April.—Operated under ether, amputating the left leg above the ankle-joint. Dressed with carbolic gauze and marine lint.

14th July.—General health has greatly improved. He has gained flesh and is looking much stronger. The stump healed without any bad symptom, though the track of the drainage tube healed slowly. The stump is a good one and quite free from pain. The finger is now quite well. The epidermis came away and the part recovered its full vitality. So with the right foot, under good food the toe recovered its normal condition.

CASE 3.—*Dry Gangrene of Big Toe of Left Foot.*—CHANG WÊN-YI, aged 42; farmer, Wu-chiao-hsien.

19th April 1887.—Admitted, with big toe dry and black. Disease of five months' duration. Amputated, removing portion of metatarsal bone at the same time.

24th April.—A small portion of the flap has sloughed.

10th May.—Goes out with a healthy granulating wound.

CASE 4.—*Gangrene of both Feet, two Years.*—AN FÊNG-HO, aged 40; farmer, Tung-kuang-hsien.

9th May 1887.—Admitted. Right foot:—Dry and mummified, leaving only the heel free. Line of demarcation has formed just in front of ankle-joint. Very severe pain. Left foot:—The bones of the toes exposed and bare.

This patient is very badly run down. Has had diarrhœa for some time.

14th May.—His diarrhœa having stopped, removed the exposed phalanges from the left foot by simply separating them from their attachments.

30th May.—The wounds are granulating well in the left foot.

1st June.—The left foot is now well; but he is not in a fit condition to stand the serious operation of removal of the right foot. He suffers much from flatulent distension of the bowels. Patient sank from exhaustion on the 26th June.

CASE 5.—*Gangrene of Right Foot.*—SU TÊ-YUEN, aged 37; farmer, Lao-ling-hsien.

19th May 1887.—Admitted. The fore part of the right foot has fallen off, leaving a large surface of the os calcis protruding. The skin is absent from each side of the ankle-joint. The part is very painful. It commenced in the usual way: numbness for many months, then gradually increasing pain, change in colour, death of the toes first, then of the whole anterior portion of the foot. A line of demarcation formed and the main part of the foot fell off, but the stump was unable to heal. The left foot was attacked 10 years ago. The toes fell off, but the parts cicatrised.

The patient's state of health is very bad. He has had diarrhoea and fever for a long time.

26th May.—Amputated in the lower third of the right leg. Dressed antiseptically.

31st May.—Gangrene returned in the flaps. Diarrhoea has returned.

The gangrene spread steadily up the leg to the trunk.

19th June.—Death.

CASE 6.—*Gangrene of Second Toe of Left Foot.*—WANG HSIAO-HSIEN, aged 34; coolie, from Hêng-shui-hsien.

29th May 1887.—Admitted. Usual history, dating from five months back. Amputated toe; dressed with marine lint.

24th June.—Dysentery set in.

8th July.—Dysentery cured with difficulty. Had to give frequent 20-grain doses of ipecacuanha.

25th July.—Goes out well.

CASE 7.—*Gangrene of Left Big Toe.*—YŪ YIN-CHANG, aged 41; farmer, living 20 *li* from Tientsin.

16th July 1887.—Admitted, with the left big toe in a state of gangrene. It commenced three months ago with intense pain.

The fingers of the right hand have suffered from the disease. The first and second phalanges of the middle and index fingers are absent, but the stumps have healed. There is no right radial pulse to be felt in the usual place, but at the back of the radius a small thready artery can be felt pulsating. His left pulse is normal. He is quite certain that the pulse was normal in the right arm two years ago, as Chinese doctors used frequently to examine it. Five months ago, he says, the right pulse moved to the back of the bone; the native doctors upon examining told him this. The fingers of the right hand were attacked with numbness and pain 15 months ago, and gradually became gangrenous. The stumps healed three months ago. There is atrophy of the muscles of the right arm as compared with the left.

26th July.—Left hospital.

CASE 8.—*Dry Gangrene of Right Foot.*—HUANG CHUNG-YI, aged 32; farmer, Chiao-ho-hsien, 300 *li* from Tientsin.

2nd October 1887.—Admitted. The fifth toe has fallen off. The fourth is black and dry. The skin covering the fifth metatarsal bone is also quite gangrenous. The dorsum of the foot, over the entire metatarsus, is red and intensely painful. He has no freedom from pain. A line of demarcation has formed and a stinking fluid escapes.

6th October.—Performed CHOPART'S amputation of foot. Very little blood in the foot. Divided the tendo Achillis. Dressed antiseptically.

14th October.—Diarrhoea has set in. Morphia injection is required twice a day to relieve the pain. A small slough has formed along the line of sutures.

23rd November.—Patient in much better health. Still requires morphia to relieve the pain. Three-fourths of the wound has healed by granulation; the remaining fourth is slowly healing, the granulating surface being healthy. There is no appearance of disease about the foot now.

28th November.—Patient much stouter and in good health. His brother has come to take him home before the river closes. The outer corner of the incision has still to granulate.

CASE 9.—*Gangrene of Middle Toe of Left Foot, dating from one Month ago.*—WANG CHIH-HSING, aged 36; coolie, one of the famine refugees now in Tientsin.

29th December 1887.—Amputation of the diseased toe.

10th January 1888.—Healing by granulation.

CASE 10.—Patient from Ch'ing-yün-hsien came to out-patient department with very advanced gangrene of both feet. Aged about 30. Did not become an in-patient. Similar history to the other cases.

METEOROLOGICAL TABLE, January 1888 to March 1889.

MONTH.	WIND.								BAROMETER.		THERMO-METER.		RAIN-FALL.		SNOW-FALL.	TIDES.				
	Direction.					Force.			Highest.	Lowest.	Highest.	Lowest.	No. of Days.	Quantity.	No. of Days.	Highest.	Lowest.			
	No. of Days N. to E.	No. of Days E. to S.	No. of Days S. to W.	No. of Days W. to N.	No. of Days Variable.	No. of Days Gale.	No. of Days Fresh.	No. of Days Moderate.										No. of Days Light.		
1888.									<i>Inches.</i>	<i>Inches.</i>	°	°		<i>In.</i>		<i>Ft. in.</i>	<i>Ft. in.</i>			
January.....	4	3	6	9	9	1	...	5	25	30.85	30.10	38	6	...	...	11	6	8	0	
February.....	11	5	4	3	6	3	5	7	14	30.70	30.22	37	3	...	...	4	13	6	8	6
March.....	4	8	4	4	11	4	4	11	12	30.60	30.00	60	24	...	...	12	0	7	0	
April.....	4	10	4	4	8	2	6	11	11	30.55	29.85	78	40	5	1.55	13	0	8	6	
May.....	3	9	9	3	7	1	5	18	7	30.40	29.30	101	47	...	...	14	0	8	6	
June.....	8	8	2	3	9	1	6	15	8	30.07	29.75	104	60	4	1.38	13	6	9	0	
July.....	2	7	2	2	18	...	1	11	19	30.02	29.65	102	72	5	4.92	13	6	9	6	
August.....	9	8	6	1	7	1	2	8	20	30.12	29.77	93	66	11	8.77	16	6	10	0	
September.....	8	2	4	7	9	...	4	13	13	30.42	29.90	85	50	3	1.45	13	6	9	6	
October.....	5	1	12	7	6	5	2	9	15	30.52	29.87	75	28	...	...	13	6	7	0	
November.....	7	3	7	5	8	2	1	1	26	30.85	30.05	63	20	...	...	16	6	6	6	
December.....	6	2	5	2	16	2	2	4	23	30.85	30.17	44	20	...	...	1	15	6	6	0
1889.																				
January.....	2	...	2	14	13	3	5	3	20	30.80	30.15	32	5	...	...	2	12	0	8	0
February.....	4	1	3	10	10	2	5	21	...	30.80	30.07	46	8	...	...	2	12	6	7	6
March.....	7	6	3	10	5	2	8	8	13	30.65	29.87	65	14	...	...	2	14	0	7	0

## DR. J. F. WALES'S REPORT ON THE HEALTH OF CANTON

For the Year ended 31st March 1889.

MR. Harbour Master MAY has supplied the appended abstract from the meteorological tables of last year.

### ABSTRACT OF CANTON CUSTOMS METEOROLOGICAL TABLES, April 1888 to March 1889.

MONTH.	WINDS.							WEATHER.			BAROMETER.				THERMOMETER.			
	No. of Days N. to E.	No. of Days E. to S.	No. of Days S. to W.	No. of Days W. to N.	No. of Days Variable.	No. of Days Calm.	Average Hourly Force.	No. of Days Fog.	No. of Days Rain.	Rainfall in Inches.	DAY.		NIGHT.		DAY.		NIGHT.	
											Highest Reading and Average Highest.	Lowest Reading and Average Lowest.	Highest Reading and Average Highest.	Lowest Reading and Average Lowest.	Highest Reading and Average Highest.	Lowest Reading and Average Lowest.	Highest Reading and Average Highest.	Lowest Reading and Average Lowest.
1888.							miles				Inches.	Inches.	Inches.	Inches.	°	°	°	°
April.....	6	9	1	...	14	...	7.21	...	19	12.00	{ 30.120 29.940	29.710 29.880	30.090 29.930	29.700 29.890	89.00 77.43	62.00 70.97	87.00 75.13	62.00 70.20
May.....	2	12	1	...	16	...	6.24	...	22	15.15	{ 30.167 29.996	29.717 29.918	30.117 29.955	29.743 29.892	92.50 84.09	61.90 75.01	93.00 84.04	64.90 74.82
June.....	2	10	4	...	14	...	6.55	...	22	14.85	{ 29.988 29.832	29.500 29.772	29.990 29.850	29.590 29.801	91.00 87.23	63.50 77.21	91.50 85.13	70.00 77.33
July.....	...	15	1	...	15	...	6.50	...	14	15.15	{ 30.009 29.867	29.370 29.802	30.050 29.859	29.400 29.800	101.00 92.20	75.50 82.90	91.00 86.00	76.00 80.30
August.....	...	2	5	2	22	...	5.60	...	14	8.85	{ 30.089 29.882	29.597 29.814	30.047 29.867	29.597 29.810	97.30 90.90	76.00 80.80	92.00 84.90	74.90 78.70
September..	6	4	1	...	19	...	6.10	...	16	4.77	{ 30.191 30.076	29.497 29.979	30.297 30.068	29.747 30.006	96.00 90.20	70.00 79.20	88.00 84.10	69.40 76.50
October.....	12	5	...	...	14	...	5.20	...	9	4.13	{ 30.454 30.223	29.910 30.130	30.410 30.191	29.946 30.142	89.00 83.50	60.00 71.70	81.90 75.90	56.00 68.30
November..	12	1	...	2	15	...	5.40	...	4	1.07	{ 30.418 30.277	29.896 30.182	30.424 30.225	29.928 30.176	87.00 80.00	58.00 66.90	82.90 71.50	53.00 63.50
December..	16	3	...	1	11	...	5.70	...	12	2.37	{ 30.530 30.313	30.000 30.203	30.458 30.255	30.024 30.217	82.50 72.20	51.00 59.60	77.00 64.50	46.00 57.10
1889.																		
January....	18	3	...	2	8	...	6.80	...	9	0.67	{ 30.490 30.348	29.976 30.248	30.440 30.312	30.040 30.265	76.50 60.20	39.00 50.10	70.50 55.40	37.00 49.30
February...	9	8	...	1	10	...	6.70	...	10	0.98	{ 30.600 30.311	29.975 30.223	30.530 30.278	29.930 30.204	79.00 64.80	39.00 52.50	76.00 58.40	34.80 51.00
March.....	5	10	...	...	16	...	6.20	2	19	3.37	{ 30.536 30.234	29.920 30.146	30.520 30.216	29.940 30.162	82.50 68.90	49.00 60.80	75.00 65.80	47.50 60.00

REMARKS.—1888: During April the highest reading of the barometer was 30.120, on the 1st; and the lowest 29.700, on the 8th. The highest temperature was 89°, on the 28th; and the lowest 62°, on the 2nd. Rain fell on 19 days, measuring 12 inches. S.E. winds prevailed, and the strongest was recorded on the 16th, averaging 14.6 miles an hour during 24 hours. During May the highest reading of the barometer was 30.167, on the 11th; and the lowest 29.717, on the 20th. The highest temperature was 93°, on the 10th; and the lowest 61°, on the 24th. Rain fell on 22 days, measuring 15.15 inches. S.E. winds prevailed, and the strongest was recorded on the 21st, averaging 11.1 miles an hour during 24 hours. During June the highest reading of the barometer was 29.990, on the 4th; and the lowest 29.500, on the 17th.

The highest temperature was 91°.5, on the 23rd; and the lowest 63°.5, on the 4th. Rain fell on 22 days, measuring 14.85 inches. S.E. winds prevailed, and the strongest was recorded on the 17th, averaging 4.6 miles an hour during 24 hours. During July the highest reading of the barometer was 30.05, on the 6th; and the lowest 29.37, on the 15th. The highest temperature was 101°, on the 14th; and the lowest 75°.5, on the 16th. Rain fell on 14 days, measuring 15.15 inches. S.E. winds prevailed, and the strongest was recorded on the 15th, averaging 16.8 miles an hour during 24 hours. During August the highest reading of the barometer was 30.089, on the 21st; and the lowest 29.597, on the 16th and 17th. The highest temperature was 97°.3, on the 6th; and the lowest 74°.9, on the 12th. Rain fell on 14 days, measuring 8.85 inches. S.W. winds prevailed, and the strongest was recorded on the 13th, averaging 9.7 miles an hour during 24 hours. During September the highest reading of the barometer was 30.297, on the 10th; and the lowest 29.497, on the 9th. The highest temperature was 96°, on the 20th; and the lowest 69°.4, on the 30th. Rain fell on 16 days, measuring 4.77 inches. N.E. winds prevailed, and the strongest was recorded on the 20th, averaging 25.8 miles an hour during 24 hours. During October the highest reading of the barometer was 30.454, on the 23rd; and the lowest 29.910, on the 18th. The highest temperature was 89°, on the 18th; and the lowest 56°, on the 22nd and 26th. Rain fell on 9 days, measuring 4.13 inches. N.E. winds prevailed, and the strongest was recorded on the 1st, averaging 10.7 miles an hour during 24 hours. During November the highest reading of the barometer was 30.424, on the 30th; and the lowest 29.896, on the 19th. The highest temperature was 87°, on the 1st and 17th; and the lowest 53°, on the 23rd. Rain fell on 4 days, measuring 1.07 inch. N.E. winds prevailed, and the strongest was recorded on the 30th, averaging 14.5 miles an hour during 24 hours. During December the highest reading of the barometer was 30.530, on the 1st; and the lowest 30, on the 30th and 31st. The highest temperature was 82°.5, on the 5th; and the lowest 46°, on the 22nd. Rain fell on 12 days, measuring 2.37 inches. N.E. winds prevailed, and the strongest was recorded on the 19th, averaging 11.1 miles an hour during 24 hours. 1889: During January the highest reading of the barometer was 30.490, on the 7th and 8th; and the lowest 29.976, on the 12th. The highest temperature was 76°.5, on the 1st; and the lowest 37° on the 22nd. Rain fell on 9 days, measuring 0.67 inch. N.E. winds prevailed, and the strongest was recorded on the 7th, averaging 13.1 miles an hour during 24 hours. During February the highest reading of the barometer was 30.600, on the 10th; and the lowest 29.930, on the 25th. The highest temperature was 79°, on the 17th; and the lowest 34°.8, on the 6th. Rain fell on 10 days, measuring 0.98 inch. N.E. winds prevailed, and the strongest was recorded on the 26th, averaging 15.3 miles an hour during 24 hours. Ice in small quantities was observed on two days, the 6th and 7th. During March the highest reading of the barometer was 30.536, on the 13th; and the lowest 29.920, on the 31st. The highest temperature was 82°.5, on the 11th; and the lowest 47°.5, on the 13th. Rain fell on 19 days, measuring 3.37 inches. S.E. winds prevailed, and the strongest was recorded on the 12th, averaging 15.6 miles an hour during 24 hours.

The general health of the residents on Shamien during the above period has been excellent. There were five deaths among foreigners. These were all members of the Customs out-door staff residing on Honam.

The diseases terminating fatally were:—

Suppurative inflammation of the liver . . . . .	2
Malarial dysentery . . . . .	1
Cholera . . . . .	2

The first three cases died in the Hongkong Civil Hospital.

Malarial fevers and mucous diseases, *e.g.*, diarrhoea, dysentery and catarrhal affections of the air-passages, are the prevalent forms of sickness here. The former are somewhat more frequent in the spring and the latter in the autumn. There is also much general disease, especially syphilis. Cases of this complaint do exceedingly well as a rule. This is no doubt due to the prolonged summer; for during the eight months of hot weather, when the skin is bathed more or less in perspiration, specific treatment can be uninterruptedly pursued. On the other hand, cases of gonorrhoea are very difficult to cure. Injections have to be prescribed most cautiously owing to their increased tendency here to excite inflammation of the bladder and testicles; and notwithstanding all means used, the disease frequently lingers till the advent of the cool months.

Dr. KERR, the Principal of the American Mission Hospital, informs me that cholera was epidemic during the summer in and around Canton. It was not in a malignant form, although in some places numerous deaths occurred. Dysentery and malarial fevers were endemic in autumn, and caused much mortality. He regarded the past summer as having been a peculiarly unhealthy one, and consequently he avoided operating in his hospital as much as possible.

## DR. R. H. COX'S REPORT ON THE HEALTH OF WUHU

For the Eleven Months ended 31st March 1889.

THE general health of the foreign community of this port (now consisting of 42 persons) has been fairly good for the period under review. This favourable result has been due in part to the lowness of the river during the summer and, to a great extent, to the improved dwellings of many of the residents.

The absence of an overflow from the river on the plain and low grounds in the immediate vicinity of Wuhu accounts for the few cases of malaria which have come under notice; at the same time the ground available for out-door exercise was for the same reason not diminished.

The better dwelling-houses of many of the residents have contributed, to a great extent, to the general health, and though many still remain unprovided with other than native houses, yet the appearance of this port during the past few years has undergone a decided improvement, and residence here has been rendered tolerably comfortable.

There has been a general tendency to constipation during the first hot months—June, July and August—and towards diarrhoea during the remainder of the year, but both only to a minor degree.

Influenza was prevalent in January and February, and few escaped at least one attack.

Two cases of parotitis occurred on board a gun-boat when stationed here; but the disease did not extend to the shore.

There were two cases of whooping-cough. The infection had taken place in Shanghai. One of the little patients while convalescent developed an attack of laryngismus stridulus; but repeated doses of ipecacuanha, and hot mustard baths gave speedy relief.

A case of serous apoplexy occurred:—

A sexagenarian of good physique and temperate habits, while stepping on a loose stone, sprained his right ankle, the foot turning inwards. This happened about 100 yards from his destination, and for that distance he had to crawl on hands and knees, the native bystanders refusing assistance. On examination a few minutes afterwards the right ankle was found slightly swollen, with great pain below and in front of the external malleolus and on the least movement of the joint. The patient's manner was much excited. He was at once placed in bed, with the affected leg elevated, an evaporating lotion applied and a mercurial purgative given. On the 2nd day the patient was still excited, with flushed face and full, bounding pulse. Had slept little during the night; ankle and foot still swollen, with abnormal tenderness. Bowels had moved twice. Saline purgative was given, and at bedtime 30 grains of bromide of potassium. 3rd day.—Had slept four hours. Bowels acted freely. Still very restless, with occasional delirium. Hyperæsthesia replaced by anæsthesia in affected leg, though movement unimpaired. Applied large blister to the back of the neck and ordered 30 grains of bromide of potassium three times a day. At 4 P.M. had convulsive movements in both arms. Expressed a wish to see a friend; but on the latter's arrival was unable to speak, though conscious. Hot mustard stupes were at once applied to limbs and abdomen,

when the attack passed off, the aphasia lasting half an hour. A minim of croton oil was given in butter, after which a considerable quantity of blood came away in the stool, he being subject to such hæmorrhages periodically. From this time he progressed favourably, the bromide being continued (90 grains in 24 hours), and was able to resume his occupation in a fortnight.

Four months later he came under treatment, having strained the knee of the same leg in a similar manner. The joint was markedly swollen on the inside and very tender at the insertion of the sartorius. Rest and cooling lotions with thorough purgation resulted in recovery without further complication.

The following case illustrates a form of injury common among the lower classes in Europe and Asia alike:—

A. B. received a thrust in both eyes from the extended fingers of an exasperated coolie. On examination an hour afterwards the conjunctivæ were found much congested, tension increased in both eyeballs, with intense photophobia and profuse lachrymation. Neither cornea was injured. The patient was placed in a darkened room and the temples blistered, while an iced solution of boracic acid was applied constantly to the eyes, and occasionally atropine and nitrate of silver solutions. In six days he resumed duty; but after a few days a relapse occurred which assumed the form of syphilitic keratitis. This was treated locally by yellow oxide of mercury ointment and constitutionally by mercurial inunction.

A slight case of sunstroke was met with as the result of violent exertion when exposed to the sun's rays in summer. The continued application of iced water to the head by means of LEITER'S coil—the bowels being freely moved—restored the patient to his usual health in a few days.

A nearly fatal case of dysentery when far advanced came under treatment, in which recovery was mainly due to the untiring attention and careful nursing of the husband, which enabled the patient to gain strength enough to reach a more bracing climate.

Among the Chinese there has been no epidemic during this period.

Leprous beggars may be seen every day in the streets of the native town with gangrenous limbs exposed as an appeal for alms.

Tinea favosa is the most striking and general disease. From 20 to 30 per cent. of the children of the poorer classes are afflicted with this skin disease, and a large proportion of the adult coolie class are rendered prematurely bald from the same cause. The Chinese know no cure for this disease when far advanced; but in the early stage they keep the head shaved at the seat of disease, which prevents its extension, and by the cleanliness entailed by this procedure cure sometimes results. Treatment by depilation is unknown.

In midwifery the following difficult case was encountered:—

A native woman, aged 26, who had been three days in labour, was found in a very exhausted state, with feeble pulse, clammy skin and dry brown tongue. The left arm and funis of the child were protruding, the arm partly decomposed and showing from its mangled state the violence used by the ignorant native midwives to effect delivery. After brandy and chicken soup had strengthened the patient, chloroform was administered by an assistant. When anæsthesia was complete, an attempt to introduce the hand into the uterus, with the intention of turning, was made; but the undilated condition of the soft parts—the patient being a primipara—and the diminished space caused by the child's arm in the vagina rendered the accomplishment of this a work of extreme difficulty. A leg was then searched for, and when found could not be firmly held, owing to exhaustion from prolonged effort and the cramped condition of the fingers from uterine pressure. After a short rest a second attempt to turn was made. The right foot of the child was grasped within the uterus and traction applied, while the impacted shoulder was pressed upwards by means of the presenting arm, and version was at length accomplished.

The rest of the delivery was easy, the flexed left leg dilating the parts for the after-coming head. The placenta was then removed by the hand in the uterus and ergotine injected subcutaneously. The uterus was washed out with a solution of permanganate of potash, a drachm to the quart, and this solution used for the three succeeding days. The patient made a perfect recovery.

I am indebted to Mr. Harbour Master E. MOLLOY for the accompanying meteorological table for the last 12 months.

ABSTRACT of WUHU CUSTOMS METEOROLOGICAL TABLES, April 1888 to March 1889.

MONTH.	THERMOMETER.			BAROMETER.			RAINFALL.
	Max.	Min.	Average.	Max.	Min.	Average.	
1888.	°	°	°	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>	<i>Inches.</i>
April.....	76	41	57.67	30.43	29.67	30.05	9.61
May.....	88	53	66.99	30.18	29.66	29.96	1.65
June.....	90	62	75.70	30.00	29.68	29.87	0.74
July.....	100	66	82.14	29.99	29.66	29.84	0.97
August.....	101	74	84.16	30.04	29.56	29.86	1.53
September.....	94	61	72.73	30.34	29.92	30.16	1.66
October.....	83	43	68.97	30.30	29.91	29.98	2.00
November.....	75	33	52.41	30.68	29.92	30.28	1.99
December.....	63	28	44.58	30.68	30.06	30.32	0.46
1889.							
January.....	49	18	31.62	30.60	30.08	30.42	2.80
February.....	60	26	37.91	30.58	29.88	31.40	2.79
March.....	74	31	48.53	30.58	29.82	31.10	4.31

## DR. ALEXANDER JAMIESON'S REPORT ON THE HEALTH OF SHANGHAI

For the Half-year ended 31st March 1889.

ABSTRACT of METEOROLOGICAL OBSERVATIONS taken at the Observatory of the Jesuit Mission at Zikawei,  
for the Six Months ended 31st March 1889. Latitude, 31° 12' 30" N.; Longitude E. of Greenwich,  
8h. 5m. 45s.\*

DATE.	Barometer at 32° F.	THERMOMETER.		Amount of Vapour in the Air per Cubic Foot.	Diurnal Mean Hu- midity, 0-100.	Diurnal Mean Ozone, 0-21.	Velocity of Wind per Hour.	Mean Direction of Wind.	Total Evaporation during Month.	Total Rainfall during Month.	REMARKS.	
		Diurnal Mean Tempera- ture in Shade.	Extreme Tempera- ture in Shade.									
1888.												
	<i>Inch.</i>	<i>° F.</i>	<i>° F.</i>	<i>Grains.</i>			<i>Miles.</i>		<i>Inch.</i>	<i>Inch.</i>		
Oct. ....	Max...	30.511	72.8 (14)	85.5 (14)	7.793 (18)	86.6 (25)	14.0	30.7 (22)	N. 67°.2 E.	3.416	3.785	3 rainy days.
	Mean	30.123	63.9	...	4.028	74.5	8.4	10.9				
	Min...	29.735	46.9 (22)	36.0 (22)	1.617 (27)	47.5 (21)	5.5	1.4 (24)				
	Range	0.776	25.9	49.5	...	...	...	...				
Nov. ....	Max...	30.662	69.7 (1)	74.3 (1)	6.247 (5)	88.6 (28)	12.0	32.7 (9)	N. 21°.6 W.	2.020	2.515	2 rainy days.
	Mean	30.228	53.8	...	3.919	79.1	9.3	13.1				
	Min...	29.784	42.0 (22)	34.3 (23)	1.393 (25)	67.9 (30)	6.0	0.0 (14)				
	Range	0.878	27.7	40.0	...	...	...	...				
Dec. ....	Max...	30.659	55.9 (9)	63.3 (8)	4.875 (9)	86.7 (5)	13.7	47.7 (30)	N. 4°.3 W.	1.725	0.949	5 rainy days.
	Mean	30.257	46.5	...	3.369	80.7	8.7	9.7				
	Min...	29.962	38.9 (1)	31.8 (28)	1.788 (31)	73.8 (23)	5.2	1.4 (16)				
	Range	0.697	17.0	31.5	...	...	...	...				
1889.												
Jan. ....	Max...	30.678	42.3 (12)	52.2 (11)	2.875 (1)	95.8 (7)	15.7	38.5 (4)	N. 15°.2 W.	1.071	1.693	Absolute calm was noted on five occasions; 17 rainy days. Hoar frost on the 4th; snow on the 7th.
	Mean	30.364	34.2	...	2.025	82.7	11.9	12.9				
	Min...	29.983	23.0 (5)	19.9 (5)	0.892 (5)	71.5 (31)	6.5	0.0(30,&c.)				
	Range	0.695	19.3	32.3	...	...	...	...				
Feb. ....	Max...	30.571	48.1 (10)	60.4 (16)	3.741 (21)	92.4 (25)	17.5	34.2 (22)	N. 12°.6 W.	1.723	2.265	10 rainy days; storm on the 23rd.
	Mean	30.280	38.1	...	2.557	78.9	11.6	12.6				
	Min...	29.709	29.5 (22)	22.8 (11)	1.281 (27)	61.2 (18)	7.0	1.2 (11)				
	Range	0.862	18.6	37.6	...	...	...	...				
March...	Max...	30.625	63.2 (8)	72.5 (6)	5.893 (8)	97.4 (11)	17.7	36.7 (25)	S. 20°.2 E.	3.108	2.826	12 rainy days; storms on the 9th and 11th.
	Mean	30.155	48.1	...	3.672	77.4	11.9	13.7				
	Min...	29.729	37.8 (12)	29.8 (1)	1.427 (26)	60.7 (30)	6.2	0.0 (14)				
	Range	0.896	25.4	42.7	...	...	...	...				

\* Position of British Consulate-General, Shanghai:—Latitude, 31° 14' 41" N.; longitude, 121° 28' 55" E. of Greenwich.

NOTE.—The figures in parentheses indicate the days on which the observations to which they are appended were made; under the headings "Diurnal Mean Temperature in Shade" and "Diurnal Mean Humidity" they indicate the days on which the *mean readings* were respectively highest and lowest. The monthly barometric means are deduced from four daily observations recorded in the local newspapers. The monthly thermometric means are deduced from the daily maximum and minimum, half the sum of which is taken as the mean for each day. The amount of watery vapour in the air is not observed directly. It has been assumed as an approximation that the amount is a maximum or minimum for a given period when the ratio of the tension of the ambient air to that of dry air reaches its maximum or minimum. The mean humidity is deduced from two daily observations made respectively at 4 A.M. and 4 P.M., the mean of the daily means being taken as the monthly mean. The mean direction of the wind is deduced from two daily observations made at 4 A.M. and 4 P.M. respectively.

For the above abstract I am indebted to the Rev. Père CHEVALIER, S.J., Director of the Zikawei Observatory.

The early winter months were remarkably mild, frost having hardly appeared before January. The last three months were cold and rainy. Snow fell but once, on the 7th January. At Zikawei the lowest temperature registered was 19°.9 F. on the 5th January, and the highest 85°.5 on the 14th October. In the settlements the lowest temperature was 19° F. on the 5th January, and the highest 86° on the 14th October.

The minimum and maximum temperatures respectively for October were 40° on the 22nd, and 86° on the 14th; for November, 41° on the 25th, and 74° on the 1st; for December, 33° on the 1st, and 64° on the 8th; for January, 19° on the 5th, and 52° on the 11th; for February 26° on the 6th and 11th, and 60° on the 16th; for March, 33° on the 1st and 13th, and 72° on the 8th.

The diseases chiefly encountered among foreigners were dysentery and diarrhoea, hepatitis, enteric fever, intermittent fever (of which there was a very large number of cases in October), rheumatism and neuralgia, and catarrhal affections of all kinds. Measles and varicella prevailed among children from December to the end of March, and parotitis was I think more common than usual. Several cases of pleurisy were noted, but none of great gravity so far as I know. Skin affections were remarkably prevalent. Towards the end of February two or three cases of scarlet fever were reported.

The mortality from disease among resident Europeans was exceptionally low. There was no death from small-pox, scarlet fever or cholera, to each of which there had been victims during the previous cool season.

BURIAL RETURN OF FOREIGNERS for the Half-year ended 31st March 1889.\*

CAUSE OF DEATH.	OCTOBER.	NOVEMBER.	DECEMBER.	JANUARY.	FEBRUARY.	MARCH.	TOTAL.
<i>Enteric fever</i> .....	2†	...	1†	...	...	1†	4
"Shanghai fever" .....	...	...	1‡	...	...	...	1
<i>Intermittent fever</i> .....	...	...	...	1†	f 1	...	2
<i>Dysentery</i> .....	...	1†	f 1†‡	1‡	...	...	3
<i>Chronic diarrhoea</i> .....	2	...	...	...	...	...	2
<i>Hepatic abscess</i> .....	1†	...	...	...	...	...	1
Bright's disease .....	...	1†	...	...	...	...	1
Phthisis .....	...	f 1† 2‡	1‡	1	1 1†	1†	8
General tuberculosis .....	...	f 1‡	...	...	...	...	1
Marasmus .....	...	...	...	1‡	...	...	1
Alcoholism .....	1	...	...	...	...	...	1
"Acute mania" .....	...	...	...	1‡	...	...	1
Convulsions .....	...	...	...	...	1	...	1
Dentition .....	...	1	...	...	...	...	1
Cerebral meningitis .....	...	...	1†	...	...	...	1
Cerebro-spinal meningitis .....	...	...	...	...	1‡	...	1
Locomotor ataxy .....	1	...	...	...	...	...	1
"Dilatation of heart" .....	...	...	1 1†	...	...	...	2
"Heart disease" .....	...	...	...	f 1‡	...	...	1
Catarrhal pneumonia .....	...	...	...	f 1‡	...	...	1
Acute bronchitis .....	...	...	...	...	...	f 1‡	1
Enteritis .....	...	...	1	...	...	...	1
Biliary obstruction .....	f 1‡	...	...	...	...	...	1
Sclerema .....	...	...	...	...	f 1‡	...	1
Cancer, thoracic .....	...	...	...	...	...	1‡	1
" " abdominal .....	...	...	...	1†	...	...	1
"Fever" .....	f 1†	...	...	...	...	...	1
Poisoning, accidental .....	...	...	...	...	...	f 1‡	1
Fracture of skull .....	...	...	...	...	1	...	1
Drowned .....	1	...	...	...	...	1†	2
Suicide .....	...	...	1	1†	...	...	2
TOTAL .....	10	7	9	9	7	6	48

\* Not including deaths (if any) among the Catholic religious bodies and the Japanese; exclusive also of premature and still births.

† Non-resident.

‡ Asiatic or Eurasian.

|| Infant.

f Female.

The Causes of Death usually attributed to the climate are printed in italics.

Analysing this table, we find that out of the total of 48 deaths recorded 1 was due to accidental poisoning, 1 to fracture of the skull, 2 to drowning and 2 to suicide. Excluding these, as well as 1 case of "fever" in which death occurred at sea on a voyage to Shanghai and the body was buried here, there remain 41 deaths attributable to disease (32 males and 9 females). There were 8 deaths among children, distributed as follows:—3 of European birth (2 males and 1 female), children of residents; and 5 non-Europeans (1 male and 4 females). The age of the oldest child was 4½ years (catarrhal pneumonia); that of the youngest was 10 days (sclerema). The foreign adult mortality from disease was therefore 33 (29 males and 4 females), or, excluding 11 adults of Asiatic birth, the European adult mortality was 22 (21 males and 1 female). Of these, 14 (13 males and 1 female) were non-residents. The mortality among resident European adults was therefore 8 (all males).

I.—CAUSES OF DEATH FROM DISEASE among RESIDENT EUROPEAN ADULTS.

Chronic diarrhoea . . . . . 2	Alcoholism . . . . . 1	"Dilatation of heart" . . . . . 1
Phthisis . . . . . 2	Locomotor ataxy . . . . . 1	Enteritis . . . . . 1

8 males, against 19 males and 3 females for the last previous corresponding period.

II.—CAUSES OF DEATH FROM DISEASE among the CHILDREN of RESIDENT EUROPEANS.

Intermittent fever . . . . . 1 (female)	Convulsions . . . . . 1	Dentition . . . . . 1
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2 males and 1 female; the numbers for the winter six months of 1887-88 having been 5 males and 3 females.

III.—CAUSES OF DEATH FROM DISEASE among NON-RESIDENT EUROPEAN ADULTS.

Enteric fever . . . . . 4	Hepatic abscess . . . . . 1	Cerebral meningitis . . . . . 1
Intermittent fever . . . . . 1	Bright's disease . . . . . 1	"Dilatation of heart" . . . . . 1
Dysentery . . . . . 1	Phthisis . . . . . 3 (1 female)	Abdominal cancer . . . . . 1

13 males and 1 female, against 13 males during the corresponding period of 1887-88.

IV.—DEATHS FROM DISEASE among CHILDREN of NON-RESIDENT EUROPEANS.

None.

V.—CAUSES OF DEATH FROM DISEASE among NON-EUROPEAN ADULT FOREIGNERS.

"Shanghai fever" . . . . . 1	"Acute mania" . . . . . 1
Dysentery . . . . . 2 (1 non-resident female)	Cerebro-spinal meningitis . . . . . 1
Phthisis . . . . . 3	"Heart disease" . . . . . 1 (female)
General tuberculosis . . . . . 1 (female)	Thoracic cancer . . . . . 1

8 males and 3 females, against 5 males and 3 females in the last corresponding period.

VI.—CAUSES OF DEATH FROM DISEASE among NON-EUROPEAN FOREIGN CHILDREN.

Marasmus . . . . . 1	Biliary obstruction . . . . . 1 (female)
Catarrhal pneumonia . . . . . 1 (female)	Sclerema . . . . . 1 ( " )
Acute bronchitis . . . . . 1 ( " )	

1 male and 4 females, as against 1 male and 1 female during the previous corresponding period.

During 1888 no sanitary work on a large scale was undertaken by either municipality. The usual routine of street and drain cleansing was pursued, very efficiently as regards the main thoroughfares, though with all the stupid and objectionable features which have frequently been pointed out in these Reports. As regards the side streets and alleys, nothing could well be less efficient, many of these being at any hour of the day all through the heat of summer as filthy as the worst quarters within the native city. No attempt has yet been made to limit overcrowding, though sooner or later a heavy penalty will have to be paid for our neglect in this particular. We come near, though happily we do not actually reach, the philosophical frame of mind of the Manila Government in face of the official statistics of cholera mortality during the year ended 31st July 1889. More than 60,000 deaths from cholera in the Philippine Islands were returned for this period, and this is how, according to the *Revue Scientifique*,\* the Government through the *Siglo Medico* comments on the figures:—

The people having now become familiar with the constant presence of this scourge, which has lost its contagious and epidemic character, calmly mind their business, paying no attention to the cholera, which after all is only one out of the numerous diseases of the country, and is not so fatal as malaria and its various manifestations.

The medical advisers, if there are any, of the Manila Government must hold original and remarkable, but fortunately singular, views about contagion.

During 1888 there were but few contributions to the literature of cholera. Drs. MACLEOD and MILLES† state that they found KOCH'S comma bacillus in 40 out of 44 cases of cholera in Shanghai (mostly Chinese patients) investigated by them; and they conclude from this fact and from minutely detailed laboratory experiments on guinea-pigs that the comma bacillus is the cause of the disease.

Four deaths occurred from enteric fever during the winter six months, all among non-residents, and all at the General Hospital.

CASE I. Man-of-war's man, aged 21.—*Symptoms previous to admission*.—Shivering; headache; foul tongue; frontal headache; constipation. Temperature reported did not exceed 100°.3.

*Condition on admission* (4th day).—Headache; white tongue; complains of passing restless nights, but sleeps during the day. Had a dark, healthy motion shortly after admission. No cough; sibilant râles all over chest. Respiration 18; can fill chest completely with deep inspiration without inducing any pain. No abdominal distension or tenderness. No gurgling. Complete loss of appetite. Temperature (7 P.M.) 104°. Pulse 72, compressible.

*Course of Disease* (5th day).—Depression; intense occipital headache; characteristic tongue; characteristic stools (two). Afternoon temperature 104°, falling to 103° at night.

7th day.—Delirious. Tongue dry. No appreciable liver or spleen enlargement. Profuse perspiration. Faint systolic murmur in cardiac region, not localised.

8th day.—Restless; trying to get out of bed. Tongue baked. Stools partly solid.

9th day.—Extreme depression; indifference. Taking milk and broths freely.

10th day.—Tongue moist; violently delirious. Sinks towards foot of bed.

11th day.—Asking for food; tongue moist; no delirium. A few doubtful spots round umbilicus. Stools hard. The first sound of the heart is markedly muffled, chiefly at apex.

\* 1889, ii, 733.

† *Lancet*, 1889, i, 416, 468.

Up to this time the maximum daily temperature ( $103^{\circ}.2$  to  $104^{\circ}.2$ ) was reached about 5 P.M., from  $0^{\circ}.5$  to  $2^{\circ}$  fall occurring between that hour and 10 P.M. The early morning temperature varied between  $102^{\circ}$  and  $103^{\circ}.2$ .

12th day.—Temperature range  $101^{\circ}.8$  (7 A.M.) to  $103^{\circ}$  (10 P.M.). General condition deteriorated. Tongue baked and brown. Slight iliac gurgling. No abdominal tenderness.

14th day.—Temperature at 7 A.M.,  $102^{\circ}.6$ ; at noon,  $102^{\circ}$ ; at 5 and 10 P.M.,  $102^{\circ}.4$ . Pulse 90 in the morning, rose to 132 (dirotic) at night. Tongue covered with thick crusts. Sleeping fairly from time to time, with occasional intervals of muttering delirium.

15th and 16th days.—Deaf; extreme prostration; involuntary passages. Maximum temperature (at night)  $103^{\circ}.6$ .

17th day.—Erythematous patch over sacrum. Cannot protrude tongue. Lies with mouth open. Respiration superficial, irregular, abdominal.

20th day.—Constipation. Abdomen swollen, not tympanitic. Sleeps on side, but with eyes half open. Paroxysmal trembling of whole body.

21st day.—In evening, somewhat suddenly, the entire surface became cold. The forearms were strongly flexed on the arms, resisting attempts at extension. Fingers flexed, but not so forcibly.

22nd day.—Temperature nearly constant all day ( $101^{\circ}$  to  $101^{\circ}.6$ ). Arms free. Began to rally about 4 A.M., and seemed to improve until evening, when limbs again became icy cold, though the trunk was warm. Unconscious at night.

23rd day.—Subsultus. Remained unconscious, but surface gradually became warmer.

24th day.—Patient took nourishment when poured into his mouth until 4.30 A.M.; then jerking movements of the wrists began and continued for a couple of hours. Death occurred at 9 A.M.

*Postmortem Examination*,  $7\frac{1}{2}$  hours after death.—Average temperature of air since death  $70^{\circ}$ . Body wasted, skin parchment colour. No ecchymoses except on back. Rigor mortis well marked. No sign of commencing putrefaction. There was no discharge from any of the natural outlets.

The diaphragm was slightly arched into the thorax. There were no pleural adhesions, and the lungs were healthy. There was no fluid in the pericardium or any appearance of pericarditis. The right ventricle was distended with fluid blood; the cardiac muscle was dead-leaf colour; the valves were normal.

On opening the abdomen the transverse colon was enormously distended with gas, its inferior border reaching to within 4 inches of the pubes. There was no general peritonitis. The liver was slightly enlarged and dripped with blood on section; it weighed 65 ounces. The gall bladder was tightly distended with olive-green fluid. The spleen was enlarged and very friable, presenting two large yellow, broken-down pulpy infarcts at the upper end of its posterior border. Kidneys overfilled with blood; otherwise normal. The bladder contained a few ounces of very slightly albuminous urine.

The ileum was injected on its peritoneal surface. The last 6 inches of its mucous membrane was soft and œdematous, ecchymosed in large patches. There was no ulceration or infiltration of PEYER'S groups, but the upper surface of the ileo-cæcal valve and the mucous membrane adjoining it were gangrenous and black. There was no perforation. There were no adhesions round the cæcum. This portion of the bowel was not completely invested with peritoneum. The mucous membrane of the cæcum was deeply injected, and the cæcal surface of the valve was, like the ileac surface, gangrenous. The serous surface of the ascending colon was injected. The bowel contained a considerable quantity of apparently normal fæces. The mucous membrane as far as 2 or 3 inches beyond the hepatic flexure showed extensive patches of ecchymosis.

CASE II. Officer of a steamer, aged 44.—*Symptoms previous to admission*.—"Ill for two weeks. "Fever of irregular type. Has taken several full doses of quinine without apparent benefit. Antifebrin "in 5-grain doses always lowers his temperature quickly when it rises. The highest temperature observed "was  $104^{\circ}$ ."

*Condition on admission.*—States that he had ague in Russia 10 years ago, and since then has had short attacks on and off. “Never intemperate.” Having lived exclusively on milk for a fortnight he is extremely constipated. Tongue moist, covered with brown fur, red at edges and tip. Breath horribly offensive. No appetite. Urine red, and often muddy; does not froth on being passed. Has a short, irritating cough. Sleeps fitfully but fairly. Has had no rigor and no sweating.

Has never had any pain in the right side or shoulder. Has never spat blood. His father died at 68 of “internal cancer.”

Continuous with the liver dulness is an area of dulness occupying the greater part of the region corresponding to the transverse colon. This area is tender to percussion. Everywhere else the abdomen is resonant and painless. There is no yellowness of the skin or conjunctivæ. There are no spots.

Temperature on admission (4 P.M.)  $104^{\circ}.6$ ; at night  $103^{\circ}.2$ . Pulse 100, soft.

*Course of Disease.*—Next day (16th ?), after an enema of castor oil, there was a very copious liquid motion which looked like pure bile. The temperatures taken at 7 A.M., noon, 4 P.M. and 10 P.M. were respectively  $101^{\circ}$ ,  $100^{\circ}.8$ ,  $103^{\circ}$ ,  $102^{\circ}.6$ . The pulse did not rise above 80.

17th day (?).—The temperatures taken at the same hours were  $102^{\circ}$ ,  $104^{\circ}.2$ ,  $103^{\circ}.8$ ,  $104^{\circ}.2$ . The pulse did not rise above 78. The tongue was brown and dry. Skin distinctly yellow. In the morning a solid stool and in the evening one of typhoidal character were passed. Much less flatulence, so that the liver can be mapped out. Hepatic dulness begins  $1\frac{1}{2}$  inch below the horizontal nipple line and ends  $5\frac{1}{2}$  inches below it in a line 2 inches to the inner side of a vertical through the right nipple. In this line,  $1\frac{1}{2}$  inch above the lower limit of dulness, is an exquisitely tender spot. In the vertical through the right nipple the liver dulness extends from  $2\frac{1}{4}$  inches below the horizontal through the nipples to 5 inches below the same line. There is relative dulness for  $\frac{1}{2}$  inch below the tip of the xiphoid appendix. It is not possible to ascertain how far the liver extends into the epigastrium and left hypochondrium. The gland cannot be palpated or in any way felt. Six leeches were applied to the sensitive spot, with considerable relief.

18th day.—The temperatures, taken as before, were  $102^{\circ}.2$ ,  $104^{\circ}.2$ ,  $104^{\circ}.5$ ,  $102^{\circ}.8$ . The pulse rose to 96, and was unsteady.

19th day.—Temperatures  $102^{\circ}.3$ ,  $102^{\circ}.8$ ,  $103^{\circ}.6$ ,  $102^{\circ}.8$ . Pulse varied from 84 to 108. There is now no tenderness, but patient complains of severe pain of neuralgic character shooting along the fifth rib on the left side. A normal stool was passed in the morning, but in the afternoon the passages became liquid, of a dirty-claret colour, and contained flakes of curd. The tongue was normal.

20th day.—Prostration. Temperatures  $104^{\circ}.2$ ,  $102^{\circ}.8$ ,  $103^{\circ}.2$ . Was sleeping soundly at 10 P.M. when temperature should have been taken. Two stools of brownish-yellow fluid, very offensive, containing curd. Complained of severe colicky pain in abdomen. Only over region of gall bladder was there any tenderness on percussion. The abdomen was tympanitic. Tongue baked.

21st day.—At morning visit the temperature was  $98^{\circ}.2$ , and did not rise above this. Extremely severe pain referred to abdomen, relieved by gentle, steady pressure, exasperated by percussion. Face Hippocratic; breath cold. Tongue scaly but moist. Stools frequent, consisting of dirty reddish-brown liquid and yellow sediment. Pulse became gradually more and more miserable, and at night could scarcely be counted. Milk and broth with port wine were taken freely up to midnight.

At 1 A.M. on the 22nd day he became collapsed, fell into a profuse sweat, and vomited about 4 ounces of loosely coagulated blood. He died at 1.30 A.M.

*Postmortem Examination*, 9 hours after death.—Average temperature of air since death  $68^{\circ}$ . Surface of body cold; thorax and abdomen tympanitic. Rigor mortis passing off; no odour of putrefaction. The skin of the face was yellow; purple-brown ecchymoses in supra-clavicular regions, over back and dependent parts and over external genitals. Blood was oozing from the nose and bloody foam from the mouth.

The diaphragm was strongly arched into the chest. There was a little bloody serum in the left pleura. An extensive area of the pleura covering the diaphragm was inflamed, corresponding exactly to a

similar patch on the peritoneal surface. There were no pleuritic adhesions. The lungs were retracted, normal everywhere on section. The pericardium was normal, containing no fluid. Both sides of the heart were empty; valves healthy, no insufficiency; myocardium of average thickness, not softened. The coronary arteries were pervious. No lesion of great vessels. The blood was fluid everywhere throughout the body.

The peritoneal cavity was distended with gas free from faecal odour. On incision there was a profuse escape of turbid, yellow fluid. The diaphragm was arched into the chest; its peritoneal surface deeply injected, and patches of lymph here and there over it. Surface of stomach, of small intestines and of colon injected,—purple. The stomach was enormously distended with gas and fluid. The colon was also much distended. The great omentum was rolled up and tucked under the lower border of the transverse colon. The small intestines were distended, and glued together by flakes of recent and bands of organised lymph. Flakes of thick pus were scattered widely over their surface. The parietal peritoneum was injected, but there was no lymph deposit on its surface. The liver extended from the fourth interspace to the costal border in the nipple line. Its tissue was soft, but not abnormal to the naked eye. It weighed 74 ounces without having been drained but after the escape of a considerable amount of blood during its removal. The gall bladder was empty. The spleen was swollen and soft, covered with lymph in flakes, bathed in pus derived from a partially localised collection behind and internal to it. It weighed 12 ounces. The posterior peritoneal surface of the stomach was deeply injected, covered with flakes of lymph. It aided in enclosing a magma of broken down pus and lymph, serum and effused blood, which was retained by rather loose adhesions between the stomach, spleen and pancreas. The left extremity of the greater curvature was fringed with organised lymph in pieces from  $\frac{3}{4}$  inch to 1 inch long. There were large ecchymoses on both mucous surfaces. The stomach contained a blood-stained turbid fluid. There was no perforation and no ulcer. There was no noteworthy enlargement or hardening of the mesenteric glands. The lower 18 inches of the ileum presented a vast number of solitary ulcers with central slough not yet separated. These were strictly limited by the ileo-caecal valve, in the neighbourhood of which they were most thickly set. There was no perforation (water test under high pressure). There was no ulceration or even infiltration of PEYER'S patches. The small intestine contained, besides an enormous quantity of gas, a little bloody tenacious fluid. The caecum was completely surrounded by peritoneum and had a distinct meso-caecum. Its serous surface was much injected. The appendix vermiformis was normal. There was no evidence of any localised inflammation in the peri-caecal region. The posterior caecal glands were not in any way enlarged or distended. The large intestine was injected on its serous surface. Its mucous membrane was smeared with blood-stained fluid, here having a green tinge; when washed it appeared normal. The kidneys were very slightly congested.

This case if properly diagnosed as enteric fever belonged to a class of the disease which will be discussed in another place.

CASE III. Marine, aged 18.—Sent to hospital without any history. He states that he has been ailing for seven days, but said nothing about it until the day before admission as he was training for a boat race. He believes he got cold, pulling. Nine days ago he was drunk and fell more than once into the water, after which he remained in wet clothes. No history of rigors. Copious watery stools (two or three daily); no appetite; urgent thirst. Sleepless.

*Condition on admission* (7th day).—At noon, 5 P.M. and 10 P.M. his temperature was respectively  $103^{\circ}.4$ ,  $104^{\circ}$ ,  $104^{\circ}$ . Pulse 102, full and soft. Respirations 42. Has a hacking cough with scanty, frothy expectoration. There is slight tympanites. No pain or gurgling or local tenderness. Tongue dry and brown with red edges and tip. The base of the right lung is dull, and over a patch a little larger than a dollar fine crepitation is audible.

*Course of Disease* (8th day).—No delirium; much disorderly muscular action. Sputa rusty. Temperatures, as before,  $103^{\circ}.5$  (7 A.M.),  $104^{\circ}$ ,  $104^{\circ}.2$ ,  $104^{\circ}$ . Respiration 33 to 42.

9th day.—Delirious. Tongue dry; lips parched. There is no flush. No spots. Stools infrequent, large, solid, offensive.

10th day.—Flush on right cheek. Drowsy. Much epigastric pain. Has expectorated some pure blood. The pulse was between 88 and 96 all day; respiration 36; temperatures  $103^{\circ}$ ,  $104^{\circ}$ ,  $104^{\circ}.6$ ,  $104^{\circ}$ .

11th day.—Right lung clearing at base; dulness on percussion, and tubular breathing over lower half of middle lobe. The lower lobe of the left lung is now engaged. In forenoon patient was extremely prostrate. Suddenly a number of minute violet spots appeared on the chin and left temple, lasting about an hour, during which the prostration deepened. They as suddenly disappeared, leaving him somewhat better. The filtered urine gave a copious deposit of chlorides with solution of silver nitrate; a cloud with cold nitric acid disappeared on boiling.

12th day.—Temperatures taken in axilla, as muscular weakness prevented the mouth being long kept closed,  $102^{\circ}$ ,  $103^{\circ}$ ,  $104^{\circ}.8$ ,  $103^{\circ}.6$ . Pulse varied between 92 and 102; respiration between 42 and 48. There is hardly any cough, but there was a menacing paroxysm of dyspnoea this forenoon. No cardiac lesion could be detected. In the evening asked to be allowed to smoke a cigarette.

13th day.—Smart intestinal hæmorrhage, bright scarlet after a hard stool. Delirious, but sleeping much. In the evening bilious, lumpy and stinking stools without blood after a castor oil enema. The violet spots noticed two days ago reappeared to-day for an hour, with the same increased depression as before. They disappeared under pressure and on stretching the skin. They were confined to the chin and the left cheek close to the ear.

14th day.—The evanescent violet spots again appeared for a couple of hours on the same skin areas. Stools (four) frankly typhoidal. When the tongue is protruded for inspection patient does not think of drawing it back again. Temperatures  $102^{\circ}.6$ ,  $101^{\circ}.4$ ,  $102^{\circ}$ ,  $103^{\circ}$ .

15th day.—Had two normal stools. Expectoration scanty, but very thick and bloody (not rusty). Stupid. Pulse full, vibrating, varying between 90 and 96. Respiration between 30 and 38, superficial. Temperatures  $101^{\circ}.4$ ,  $102^{\circ}$ ,  $102^{\circ}$ ,  $102^{\circ}.5$ . Taking nourishment freely. At 7.15 P.M., rapidly one after the other, had three copious hæmorrhages from the bowel, the last unconsciously. The first was immediately preceded by a couple of hard fæcal lumps. The total quantity lost was between 60 and 70 fluidounces, mostly black clots with some scarlet liquid blood. When seen, 20 minutes later, the pulse was 96, full but very soft; face pale; surface warm; respiration 38.

16th day.—Delirious all night. No further bleeding. Passed a little albuminous urine. Much subsultus. Pulse 120, with occasional flicker; respirations 35; temperatures  $104^{\circ}.2$ ,  $103^{\circ}$ ,  $103^{\circ}.6$ ,  $101^{\circ}$ . In afternoon asked for and smoked two cigarettes. In the evening had passed 15 ounces of urine in eight hours. It was deep in colour, clear, slightly acid; S.G. 1.021; rich in urates; no albumen.

17th day.—Temperature  $100^{\circ}.6$  (7 A.M.) Pulse uncountable, a mere flicker; respiration 30. Very restless and anxious. At 9 A.M. nails blue; face covered with beads of sweat; groaning from pain referred to the epigastrium, which was swollen and very sensitive. Tongue baked. Takes nourishment eagerly, clutching nervously at whatever is placed in his hands. At noon he complained bitterly of cold, and died half an hour later, retaining consciousness up to 10 minutes before death, when he remarked in a clear voice "It's all over now."

*Postmortem Examination*, 21 hours after death.—Average temperature of the air since death  $40^{\circ}$  F. Temperature of dead-house  $42^{\circ}$ . Temperature of surface of body  $50^{\circ}$ . Body well developed, muscular. Livid patches on neck, abdomen, thighs and ankles, and on back and dependent portions of the body. Abdomen much distended; tympanitic. Eyes closed. Rigor mortis very strongly marked; no sign of commencing putrefaction. No discharge from any of the natural openings. There was a very thin deposit of fat in the areolar tissue. The muscles were red, but exuded no blood on section. The summit of the diaphragm corresponded to the fourth rib. Lungs dark, congested, fallen away from the chest wall; no pleuritic adhesions. The pericardium was normal, but contained 4 ounces of straw-coloured serum. The heart was normal in appearance; the valves and endocardium healthy. The right ventricle contained a large

decolorised solid clot, which passed from the ventricle through the tricuspid valve and auricle into the vena cava. The left ventricle was empty. The left auricle contained a white tenacious clot entangled in the mitral valve. The great vessels were healthy, containing less blood than usual. The blood throughout the body was black and perfectly liquid. The diaphragmatic pleura was deeply injected, especially on the right side. The right pleura contained about 6 ounces of bloody fluid; the left about 4 ounces of citrine-coloured serum. The lower lobe of the left lung was in a condition of red hepatisation. The lower lobe of the right lung was deeply congested throughout, and exuded a semi-purulent fluid on section at the base. There was a large hæmorrhagic infarct on the surface of the right lower lobe.

There was a large escape of odourless gas on opening the abdomen. The stomach and transverse colon were tightly distended with gas. The loops of small intestine were united by recent lymph which, diffused or in flakes, covered and matted together the entire mass. The peritoneal surface of the small intestine was everywhere deeply injected; that of the colon only slightly so. The diaphragm was strongly arched into the chest. The liver, in its normal position, was coal-black on its surface. The parietal peritoneum was almost universally injected. The peritoneal cavity contained a large quantity of citrine-coloured fluid. The true pelvis was full of this fluid along with coagulated lymph; the cæcum was buried in a mass of loosely aggregated yellow false membranes. The omentum was injected, covered with lymph, and rolled in under the transverse colon. There had been no escape of fæces. The liver was very friable, but showed no special abnormality on section. It weighed 68 ounces. The gall bladder was not distended; the bile ducts were normal. The spleen was enlarged in all its dimensions, very soft, its pulp reduced to mere putrilage. It weighed  $13\frac{3}{4}$  ounces. The œsophagus was normal. The posterior mucous surface of the stomach was deeply injected; the vessels were full almost to bursting. The mesenteric glands were enlarged, some indurated, some softened; the larger and softer contained semi-purulent fluid. The duodenum was deeply injected on its mucous surface; it contained a dead lumbricoid worm, as also did the ileum. The jejunum was slightly congested for its upper 4 inches; below this it looked healthy. The ileum down to within 3 feet of the valve was healthy. The last 3 feet was studded with large deep ulcers, mostly solitary, three of which had perforated all the coats. The entire small intestine was full of yellow fluid fæces with a few lumps. The walls of the bowel were greatly thickened and softened. The ulceration was strictly limited by the ileo-cæcal valve, which was almost eaten through from its ileac aspect. There was not a drop of blood anywhere in the intestinal tract. The cæcum was slightly injected; the cæcal surface of the valve thickened and softened, but not ulcerated. The appendix was very vascular on its serous surface, buried in lymph, but otherwise normal. The posterior cæcal glands were remarkably large and hard; suppuration was beginning within many of them. The colon and rectum were healthy, and contained a few hard fæcal lumps.

The left kidney weighed 6 ounces; it was easily decorticated; congested, bleeding freely on section, otherwise normal. The right kidney weighed  $4\frac{1}{2}$  ounces; normal to naked eye.

CASE IV. Sailor, aged 28.—“Ill for a fortnight; laid up six days ago, chiefly on account of constipation and severe headache. Was purged, but no change occurred as regards headache. Five days ago night temperature was  $102^{\circ}.2$ , and thence out night temperature varied between  $102^{\circ}.8$  and  $104^{\circ}$ . “The morning temperatures have oscillated round  $101^{\circ}$ . The pulse has never been over 90. Patient had “no appetite; was fed on milk and broth.” Patient states that his illness began with shivering fits. He is now five days without a stool. Has very severe frontal headache, and some intolerance of light. He is sleepless; has never been delirious. He has no cough.

*Condition on admission* (14th day).—Tongue red and rather dry. Skin yellowish. Liver normal as to size. Spleen reaches to 1 inch below the costal border. Some tympanites; a few very doubtful spots. No gurgling or tenderness in the right iliac fossa. Temperature (4 P.M.)  $103^{\circ}$ . Nothing to be noted as regards heart or lungs.

*Course of Disease* (15th day).—After a castor oil enema, which induced several large semi-solid horribly fetid stools, there was considerable relief from headache. The stools then became characteristically

typhoid, and a number of unmistakable spots were observed. Face flushed; much depression; dozing with eyes half open. The pulse was 96 all day. Temperatures at 7 A.M., noon, 4 P.M. and 10 P.M. were respectively  $101^{\circ}.8$ ,  $103^{\circ}$ ,  $103^{\circ}$ , and  $103^{\circ}.2$ .

16th day.—Pulse miserable, varying between 102 and 116. Temperatures, taken as before,  $103^{\circ}$ ,  $103^{\circ}.2$ ,  $103^{\circ}.2$ ,  $103^{\circ}.4$ . Delirium; restlessness; prostration. Tongue dry and brown. No iliac tenderness or gurgling. Spots disappearing. Stools (three) typical. No cough.

17th day.—Pulse varying between 114 and 132. Temperatures  $103^{\circ}.2$ ,  $103^{\circ}$ ,  $105^{\circ}$ ,  $105^{\circ}$ . Lies equally well on each side and on back. Tongue white, moist, loaded. Pupils contracted, only slightly sensitive.

18th day.—Very little sleep; delirious only at night; then violent, but not mischievous. Pulse 120, dicrotic, all day. Temperatures (in axilla)  $103^{\circ}.6$ ,  $103^{\circ}$ ,  $104^{\circ}$ ,  $104^{\circ}.4$ . Tongue brown, coated, dry down the middle. Stools (four) very copious and quite characteristic. Tympanites increasing. Distinct iliac gurgling, but no marked tenderness. In the evening the pupils were widely dilated, but sensitive.

19th day.—Semi-comatose; livid. Stools unconsciously; they are now brown liquid, extremely fetid. Pupils dilated, very slightly sensitive. No distension of abdomen. Quite delirious; articulation very defective. Tongue moist, brown, thickly loaded; patient keeps it out after being with difficulty induced to protrude it for inspection.

20th day.—Pulse running. Respiration 42. Dilated, insensitive pupils. Tries to protrude tongue, but cannot. Speech unintelligible.

21st day.—Pulse running. Respiration between 48 and 56. Temperatures  $101^{\circ}.8$ ,  $103^{\circ}.6$ ,  $103^{\circ}$ ,  $103^{\circ}.4$ . Pupils dilated; when exposed to a bright light they contract, and then (the light remaining) dilate again. Very considerable dysphagia. Seldom recognises anyone approaching his bed. Skin livid. Abdomen distended. When his arms are at rest the forearms are rigidly flexed, but occasionally he extends them without visible effort. At night, muttering; paroxysmal sweats.

22nd day.—Pulse from 132 to 144. Respiration from 42 to 48. Temperatures  $102^{\circ}$ ,  $102^{\circ}.4$ ,  $102^{\circ}.4$ ,  $102^{\circ}.4$ . Slight cough, with a little mucous expectoration. Less dysphagia; is taking milk and soup freely. In the evening there was greatly increased rigidity of the arms. The interior of the mouth, as well as the tongue, baked, of which he is evidently not conscious.

23rd day.—Respiration 60. Temperatures  $102^{\circ}$ ,  $102^{\circ}$ ,  $102^{\circ}.6$ , not taken at night. Lying unconscious on back. Forearms extremely rigidly flexed. Hiccough; collapse. Liquid poured into his mouth is not swallowed. Involuntary evacuations had continued since the 19th day.

24th day.—At 2 A.M. he drank a little milk, and at 2.30 A.M. died.

*Postmortem Examination*, 14½ hours after death.—Average temperature of air since death  $40^{\circ}$ . Body muscular; very slight lividity of neck, back and posterior surface of arms. Eyes half open. Rigor mortis strongly developed. No odour of putrefaction. No discharges from any of the natural openings. No bleeding from the skin or muscles on section; muscles red, dry.

The diaphragm was strongly arched into the thorax. Pleuræ, lungs and pericardium normal, the latter containing a few drops of serum. The right side of the heart was empty; the left full of fluid blood. The stomach was much distended with gas, but was otherwise normal. The great omentum was gauzy, adherent by recent inflammation to both iliac fossæ. The cavity of the peritoneum contained about 6 ounces of turbid serum. Slight hyperæmia of peritoneum lining the true pelvis. The serous surface of the last 30 inches of the ileum, the cæcum and the ascending colon was much injected. The liver was gorged with blood; otherwise normal; weighed 72 ounces. The gall bladder was distended with green bile; bile ducts normal. The spleen was considerably enlarged, and reduced to a pultaceous mass; it weighed 15 ounces. The pancreas was normal. The mesentery was hyperæmic throughout; the glands large, hard or suppurating. The small intestine was normal up to within 3 feet of the valve. The mucous membrane then showed minute ulcers, at first thinly scattered, then more numerous, equally distributed over the surface corresponding to the mesenteric attachment and that opposite to it. As the valve was

approached extensive ulcers surrounding sloughing glands came into view. The ileo-cæcal valve had been greatly thickened, but was almost eaten away by ulceration from the ileac surface. Ulceration had attacked the free border, but had not encroached on the cæcal surface. The cæcum was distended, and contained a little yellow liquid faeces. Its mucous membrane was deeply injected, but was nowhere ulcerated. The appendix vermiformis was normal. There was no meso-cæcum, the posterior surface of the bowel being here uncovered by peritoneum. The retro-cæcal lymphatic glands were enormously enlarged, hard or suppurating. The mucous membrane of the ascending colon was deeply congested, soft, but not ulcerated. Both kidneys were symmetrically enlarged; otherwise normal. Weight together, 15 ounces.

I make no apology for the minute detail of these postmortem examinations. The information they give is exactly what is required to enable us to come to a conclusion as to the nature of the morbid processes which we class together as enteric fever, but which are certainly wanting in uniformity. It may not as yet be possible to classify these processes; but it is only by means of accurate observation of symptoms, scrupulously careful autopsies, and rigorous comparison of each clinical history with the corresponding anatomical appearances that we shall eventually arrive at materials for a scientific classification. How far treatment will benefit is a different question. The profound and rapidly developed lesions above recorded would appear fated to defy any treatment known at present.

I was once present at the autopsy of a case of enteric fever which proved fatal on, as well as could be made out, the 15th day. The patient had been indefinitely ailing for four or five days, after which his temperature curve was of typhoid character. The course of the disease was apparently benign. On the 13th day, after a large spontaneous evacuation of the bowels without hæmorrhage, there was intense collapse with symptoms of perforation. Death occurred 48 hours later. The peritoneal cavity was full of gas and liquid faeces. The coils of small intestine were enormously distended, injected, dry and rough on the serous surface. There was a large quantity of pus and lymph, with recent adhesions in the right iliac fossa. There were only two altered patches in the ileum, of which one was merely congested, but in the middle of the other, 12 inches from the valve, there was one solitary ulcer which had perforated by a pin-hole aperture. The mucous membrane of the cæcum was congested and soft, but was nowhere ulcerated.

This case serves to illustrate one form of the painful surprises which apparently benign enteric fever often has in store for us.\*

The following abstracts of fatal cases offer special points of interest although they are not completed by postmortem reports. They do not belong to the half-year now under consideration.

CASE I.—*Enteric Fever. Low Temperatures. Mania. Convulsions. Ulceration of Cornea. Death.*—Chinese male, aged 34. Admitted to St. Luke's Hospital under my care 21st May 1887. He had been ailing for 10 days, and had been treated with purgatives and large doses of quinine. His passages were frequent, typically typhoidal, and he was sleepless. In the evening he became acutely maniacal. During the three following days he was extremely violent when not confined in a strait waistcoat. His highest temperature was 100°.9 up to the night of the 12th day. On the 13th day he had frequent involuntary evacuations.

\* Long ago RILLIET and BARTHEZ, and HENOCH, when treating of typhoid fever in young children, described cases wherein, although all the most characteristic symptoms of enteric fever were present, the postmortem signs were limited, so far as the abdominal viscera were concerned, to enlargement, softening or disintegration of one single PEYER'S patch, or to a superficial and apparently trivial inflammation of the mucous membrane of the large and small intestines (*entérite typhoïde*; R. and B.). "We must, therefore, conclude that pathological alterations may be very slightly developed, or even "altogether absent, without this fact authorising us to deny that a given case was one of typhoid" (HENOCH).

14th day.—Quieter; complains of severe abdominal pain. Abdomen tympanitic; gurgling on light pressure in right iliac fossa. Skin is very dark, so that it is impossible to say whether spots are or are not present. Tongue baked. Temperature, morning and evening respectively, 99°·5, 101°·2.

15th day.—Both corneæ ulcerating at margins. Temperature, as before, 99°·8, 99°·5.

16th day.—Tongue moist. In the evening general convulsions; wheel movements of arms; tendency to rotate to the left round vertical axis of body. Temperature 99°, 99°·8.

17th day.—Intense excitement with extraordinary contortions. Temperature 98°·6, 103°.

18th to 22nd day.—Gradually deepening stupor. Swallows milk when poured into mouth. Frequent involuntary passages of brown liquid, extremely fetid. No hæmorrhage; no tendency to formation of bed-sore.

23rd day.—Death.

CASE II.—*Enteric Fever. Rapid course without Hæmorrhage. Death.*—A European female, aged 42. Admitted to the General Hospital under my care on the 24th May 1887. Was well up to the 21st May, when she experienced a violent rigor, followed by severe headache, and pain between the scapulæ. She had taken a sedative and followed this with a dose of quinine, as she had often suffered from malarious fever. Next day it was noticed that her tongue was dry and brown. During the two following nights she was sleepless and delirious; her skin was burning.

4th day.—Too restless on admission to have temperature taken. Skin pungently hot; tongue brown and dry. Two large characteristic stools in evening. At night the axillary temperature was 102°·7. She was violently delirious.

5th day.—Half unconscious; muttering in sleep; searching for things under the bedclothes. Pulse 96, soft and fairly full. Took milk freely. In the evening extreme violence; tearing night-dress and bedclothes; capturing vermin; catching flies above her head. Temperature at 8 A.M., noon and 10 P.M. respectively, 102°, 102°·8, 102°. No stool all day. Coma-vigil at night.

6th day.—Less violent. Intense pain in dorsal muscles on movement. Sweating profusely. Tongue baked. No thirst, but drinks milk and broth freely when offered. Respiration 60; pulse 108. No cough. In the evening was quiet; had had two very copious typhoid stools involuntarily. Pulse 120; respiration 45. Is very deaf, but answers rationally when she hears a question. Temperatures, as before, 103°·6, 105°, 103°·6.

7th day.—Snatches of sleep during night. Pulse running. Respiration 60, mere panting. Lies mostly in a doze, but can be roused, and then speaks naturally. Retains great strength, and twice to-day struggled out of bed and walked across the room. Tongue moist; swallowing easily. At 4 P.M. respiration 72; she cannot be roused; nails blue. Temperatures 103°·5 in the morning and 105°·2 at night, taken carefully in the axilla.

8th day.—Unconscious all night. Died quietly in early morning. Temperature immediately before death 105°.

CASE III.—*Enteric Fever, second attack after four years. Rapid Course. Death.*—An Englishman, aged 30; old syphilitic case. Four years previously he had passed through a severe attack of typhoid fever which was complicated by frequent and profuse hæmorrhages from an ulcer on the left side of the back of the pharynx.

Had been out of sorts for five days, dosing himself largely with quinine. On the 4th day he got a very severe "stitch" in his right side which yielded to a dose of Dover's powder. Had been sleepless since beginning of illness, and prickly heat, which had previously been out thickly on his body, disappeared on the 2nd day. Constipation; anorexia; foul tongue; profuse sweating; severe occipital headache.

He was seen at 7 A.M. on the 5th day. Dizzy from quinine. Abdomen distended, slightly sensitive; no distinct gurgling. A simple enema brought away a large horribly fetid evacuation. Skin

yellow. Hepatic region sensitive, but no appreciable enlargement of the liver. Spleen could barely be felt and was not tender. Pulse which was rapid and unsteady in the morning, became quiet and full (96) towards night. Temperature (morning)  $102^{\circ}8$ ; (evening)  $103^{\circ}6$ .

Delirium declared itself on the 7th day; photophobia with violent irritability of temper on the 9th; deafness on the 10th with stupidity and yet constant agitation, a condition recalling delirium tremens; vermin-hunting on the 10th and 11th; coma-vigil through night of 12th to 13th. Sleep was never good; it was got in snatches broken by visions of the most terrific kind. The pulse was weak and irregular at the beginning, but became fairly good, soft, regular, not dicrotic, on the 10th day when all the nervous symptoms were at their worst. It was a mere flicker for 36 hours before death. No cardiac bruit was at any time audible. The tongue was variable, the notes describing it as "dry," "baked," "moist," "black," on successive days; on the 11th day it was so tremulous that it could not be protruded. On the 7th day there was marked hepatic tenderness, and probably enlargement, but palpation and percussion were alike impossible. At first there was disgust for food, replaced by voracity from the 8th to the 11th day. No complaint was ever made of thirst. Sweating was profuse throughout. A faint eruption of about half a dozen pinkish spots was seen close to the umbilicus on the 8th day. Severe bilious vomiting occurred on the 8th day, but was not repeated. The stools varied. After evacuation on the 7th day of a passage "containing hard lumps, loose stuff, and a mass of putrid muco-purulent half-pulpy material" they became characteristic. From the middle of the 11th day they were passed unconsciously. Tympanites did not become distressing until the 11th day. Right iliac tenderness first became marked on the 6th day, and gurgling on the 8th. The surface and extremities were icy-cold for several hours before death, which occurred at daylight on the 13th day.

The maximum temperature recorded was  $104^{\circ}6$  on the 9th night; the lowest was  $102^{\circ}3$  on the 8th morning. The evening temperature was never below  $103^{\circ}6$ , and was above  $104^{\circ}$  every night after the 6th. The temperature rose steadily from morning to night, and began to fall about midnight.

CASE IV.—*Enteric Fever, diagnosed as "Typho-malarial." Overdosing with Quinine. Death.*—In the case of a Shanghai resident who at another port contracted what was diagnosed as "typho-malarial fever," but which from the description given was certainly enteric, during which there was intense prostration, delirium, and subsultus; tympanites, gurgling, and iliac tenderness; and which proved fatal, the diagnosis was reaffirmed after the event, on the grounds that "as there were no spots and as the stools were sometimes brown the disease could not have been typhoid." The patient swallowed between 60 and 70 grains of quinine daily for more than a fortnight, a treatment certainly in nowise calculated to further recovery.

The occasional occurrence of such cases as this justifies the tediousness with which by means of minute descriptions I endeavour to emphasise the extreme variety in the symptoms and in the grouping of symptoms encountered in undoubted typhoid. A rigid (and unlucky) treatment is likely enough to be the outcome of a rigid (and mistaken) diagnosis.

The combination of dysentery with enteric fever is particularly fatal, not only on account of the double strain brought to bear on the victim's vital powers, but on account also of the grave hepatic complications which (I think) always present themselves when the two diseases occur simultaneously or run into one another. Without attempting to lay down any rule, I will simply say that in almost all the instances which I have observed the dysentery has preceded the enteric fever. It is not uncommon to discover ulceration of the colon in cases of apparently frank enteric fever, and ulceration of the lower end of the ileum in cases of seemingly uncomplicated dysentery. But there are groups not yet sufficiently studied in which

enteric fever is grafted on to dysentery, and conversely. Of the former the following case is an example:—

CASE V.—*Enteric Fever following immediately on Dysentery. Death.*—A foreign missionary, aged 32, four or five years in China, of robust physique and good family history, without any suspicion of malarious infection, was first seen on the 29th September 1882. For several days he had had diarrhœa, becoming more and more urgent. Two days previous to seeking advice he noticed blood in his stools, and since then he had had an evacuation of blood, mucus and flocculent stuff at least every hour. There were intense tormina before each movement of the bowels, and very painful tenesmus. The total daily loss of blood was considerable. Treated with ipecacuanha, the number of stools rapidly diminished to four in 12 hours, but without any change in their character. There was copious vomiting of green tenacious stuff. Improvement progressed, and by the 7th day of treatment the stools (two) were “loose, slightly orange, not dysenteric, very fetid.” The tongue was slightly stripped; “the liver region is sensitive to percussion, and there is very slight upward enlargement, and to the left.” Until this day the temperature had not exceeded 99°, but on this (which I shall call the first day of the fever) it rose to 101° at night. On the 3rd day the note is as follows: “Stools frequent, and of frankly typhoid character, smelling horribly. Delirious last night, nearly sleepless. Slight tympanites. The hepatic tender area is continuous with a strip of tenderness in the right iliac region. Rigor in early morning. Profuse sweating three times during the day. Pulse (96 to 98) fairly good. At night some gurgling, difficult to make out on account of sensitiveness. Tongue dry; sordes on teeth.” Rose spots presently appeared. During the course of his illness physical prostration was intense, and dorsal decubitus was maintained from the 6th day out. Sacral bed-sore was threatened early, but was averted by the use of a water cushion and frequent applications of camphorated spirit. There was no mental depression however. The patient was almost always cheerful, and constantly announced that he was better. On only one day (10th) was complaint made of severe occipital headache. On the 13th day the sense of hearing was morbidly intensified, and there was much irritability about trifling noises. He was frequently delirious, with intervals of complete freedom; he began to mutter on the 9th day. General consciousness was preserved up to 12 hours before death. Sleep, which was occasionally fairly good, was generally broken by horrible dreams, or was replaced by mere drowsiness, during which vivid visions passed before his eyes. Violent rigors occurred on the 4th, 7th, 9th and 13th days, and a paroxysm of profuse sweating without rigor on the 11th. The pupils were dilated from the first, and speedily became insensitive to light. There was marked subsultus from the 10th day out; large movements of the hands on the 16th, and vermin hunting on the 18th. All through the illness any food swallowed caused intense but not long continued pain in the umbilical region; and on the 14th day the patient described a sensation as of “something tearing deep down in the abdomen, midway between his heart and his navel.” The pulse became dicrotic on the 4th day, but soon lost this character, the expansion of the vessel being generally markedly slow, even when the complete cycle was a short one (*pulsus lentus et frequens*); it was running from the 14th day onward. Cardiac action was extremely feeble, and no bruit, muscular or other, was at any time audible. There was slight cough with expectoration of blood-stained mucus on and after the 10th day, and the bases of both lungs were dull to percussion (hypostatic congestion). A severe paroxysm of dyspnœa occurred on the 16th day, with lividity of the lips and threatened collapse. The tongue varied largely in character, sometimes normal, sometimes moist with dry and brown tip, sometimes baked; it was tremulous from the 9th day onward, and after the 15th day could not be protruded. Complaint was frequently made of sore throat; the tonsils, pillars and soft palate were congested throughout. On the whole, thirst was moderate, but on two days it was noted as urgent. There was much difficulty about nourishment; for days at a time the patient had an utter disgust for milk, soup, arrowroot or jelly, and would make no attempt to take anything but scraped raw beef. The skin became yellow on the 10th day, and it was noted on the 14th that “skin and conjunctivæ are lemon colour and the mucous membrane of the mouth extremely pale.” The whole surface was during the last three days of life bathed in cold

sweat. The stools were frequent, occasionally, but rarely, accompanied by straining, generally characteristic, sometimes containing solid faecal lumps, often horribly fetid. They contained increasing quantities of blood clot on the 8th, 9th, 14th, 15th and 17th days, and on the last three days of life were of gangrenous odour and passed unconsciously. Vomiting of brown liquid containing blood clots occurred on the 12th day, and there were severe hæmatemeses on the 14th and 17th days. The urine was rather scanty (22 to 30 ounces) throughout, but contained nothing of note until the 13th day, when it became porter-like, in part from disorganised blood. This condition persisted to the end. Tympanites was an early symptom; it varied, diminishing on the 10th and 11th days, suddenly disappearing on the evening of the 14th day for a short period, during which it was ascertained that the liver was sensibly enlarged in all directions, but so sensitive to percussion that accurate mapping was impossible. The abdominal distension was, however, generally very great, and became distressing on the 14th day; but although it increased from the 15th day until it was enormous it was not subsequently complained of. Whenever the right iliac region could be explored it was found to be extremely sensitive, with distinct gurgling. There was in particular one spot, just above the centre of POUPART'S ligament on the right side, which was exquisitely tender to the slightest touch.

1st to 5th day . . .	Max., 103°.8 on the 2nd night . . .	Min., 99°.4 on the 4th morning.
6th „ 10th „ . . .	„ 102° „ 7th „ . . .	„ 97°.5 „ 8th „
11th „ 15th „ . . .	„ 104°.5 „ 14th „ . . .	„ 100°.5 „ 11th „
16th „ 18th „ . . .	„ 105°.3 „ 17th „ . . .	„ 100° „ 17th „

Death occurred on the 18th day.

No postmortem could be obtained, but the symptoms pointed clearly to the presence of pyæmic abscesses, probably in large number, in the liver. In such cases where hæmatemesis occurs I am disposed to attribute it to rupture of varices of the lower œsophageal venous plexuses, which offer a ready receptacle for the blood of the portal system hindered in its passage through an encumbered liver. During inspiration there is a derivation of venous blood to the thorax, but under normal conditions this is relieved by the bronchial, azygos and phrenic veins, which are in communication with the coronary vein of the stomach. When, however, the strain on the œsophageal veins is, as in cirrhosis of the liver and presumably in widespread suppuration, vastly increased, this relief may easily prove insufficient, the œsophageal varices may give way, and hæmorrhage into the stomach be produced.

The following is an instance of the second form of this disastrous combination, in which the course was extremely rapid.

CASE VI.—*Enteric Fever running rapidly into Dysentery. Death.*—A foreign lady, aged 43, had been ailing indefinitely for a few days, but had not been ill enough to stay away from an afternoon party, at which she danced several times. Next day she laid up, this being probably the 4th or 5th day of the fever. It was subsequently remembered that a peculiarly nauseous odour had occasionally exhaled from her skin during the four or five days previous to her lying up. There was a story (afterwards verified) of cattle disease existing at the dairy whence her milk supply was derived, and she had in fact been in the habit of drinking a moderate quantity of unboiled milk, generally diluted with aerated water. No other cases of illness were, however, traceable among the customers of the establishment in question. Her first serious complaint was of diarrhœa accompanied by intense bladder irritability. This latter symptom yielded immediately to alkaline treatment, and after the first day was in no way a feature of the illness. There was no rigor at any period, but paroxysmal sweating fits occurred (the weather was intensely hot), the odour of the sweat being very marked, resembling that of stale meat until the 8th day, after which it lost its offensive character. Intense prostration came on suddenly, and persisted from

first to last, with dorsal decubitus. It was noteworthy that the catamenia appeared on the 7th day (due date) and continued, ending on the 9th day, quite unaffected by the general condition.

The onset of marked symptoms was extremely sudden and their course very rapid. With the exception of a few hours of cheerfulness now and then, there was deep mental depression throughout, with anxiety about the progress of her case. On the 7th day, although when roused the patient was perfectly collected, there was incessant drowsy talking; on the 8th, muttering; on the 9th, incessant wandering. She was conscious up to the 10th day, but the 10th night and 11th day were passed in a condition of coma-vigil. The pupils were noted as widely dilated and insensitive on the 9th day. Hiccough was distressing from the 8th day out; subsultus and large movements of the hands occurred on the 9th day, and she began picking the bedclothes on the 10th. Deafness came on suddenly on the 9th day. Very little genuine sleep was obtained at any time, but she was drowsy throughout, disturbed however by visions. The pulse averaged 108, varying between 100 and 144, at first rapid with lingering expansion, then after the 8th day dicrotic, a mere flicker for the last two days. Cough with expectoration of blood-stained mucus was noticed on the 8th day, the effect of hypostatic congestion, which was kept in control by frequent passive movements from side to side. The heart's action was so feeble from the first that no abnormal bruit could be detected; distressing dyspnoea, no doubt of cardiac origin, occurred on the 10th day. The tongue was very variable. Already on the 5th day it was brown, dry and hard; it subsequently became moist at the tip and edges, loaded with white fur on the surface; towards the end it and the whole mouth became dry and black. It was tremulous, and power of protruding it was lost on the 10th day. On the 9th day the lips were cracked and the teeth covered with sordes. Throughout there was marked disgust for food, and usually vomiting after any attempt to swallow. Vomiting was from the first most distressing. On the 5th day it was incessant, the vomit consisting of yellow and green mucus which subsequently changed to brown or yellow liquid with stringy mucus; on the 9th day it ceased without any assignable cause. On the 8th day the skin and conjunctivæ were yellow. On the 8th also a few livid spots were detected in the umbilical region, supplemented by others on the 9th. The stools were characteristically typhoidal on the 5th day, extremely fetid; on the 6th day they consisted of almost pure blood; on the 7th day blood disappeared for some hours, and a few small faecal lumps were observed in the yellow deposit from typical discharges; on the 8th they were made up of blood and blood-stained pulpy lumps of mucus and faeces, evacuated without straining; on the 9th they were frankly dysenteric with much tenesmus; on the 10th and 11th they were liquid, involuntary, gangrenous. Meanwhile, in spite of the rapid development of dysenteric symptoms, there was no bladder distress, and the bladder could be emptied without any desire to evacuate the bowel. As regards frequency, there were six stools on the 5th and on the 6th, nine on the 7th, 11 on the 8th and 10th, 13 on the 9th. Urine was copiously secreted; it at first contained no albumen, but after the 8th it contained a great deal, due to the diffusion through it of much altered blood, no doubt of renal origin. At no time was there any tympanites; on the contrary, excavation of the anterior abdominal wall was noted on the 9th day. Gurgling in the right iliac fossa, with exquisite tenderness, was marked on the 5th day; the hypersensitiveness disappearing two days later. On the 7th day the spleen could be distinctly felt; the liver on the same day was found to reach the upper edge of the sixth rib. Its lower border could not be defined on account of general abdominal tenderness. A couple of days later, when the abdominal wall could be palpated with more freedom, its lower edge was  $1\frac{1}{2}$  inch below the costal arch in the nipple line. The highest temperature noted was  $102.5$  at noon on the 7th day and on the 10th morning; the lowest was  $99.2$ , registered on the 6th morning. Death occurred on the 11th day, that is to say, exactly a week from the day on which the patient felt ill enough to take to her bed.

Many years after the cases just related had been observed I had an opportunity, through the kindness of Dr. MARTEL, of the French Navy, of studying the history of a case of dysentery immediately followed by enteric fever which proved fatal.

CASE VII.—*Enteric Fever following immediately on Dysentery. Death. Liver riddled with Abscesses.*—

The patient was 24 years old. His illness had begun with ordinary diarrhœa, neglected for several days until mucus and blood were observed in the stools. For 16 days ipecacuanha, sulphate of soda, and nitrate of silver in enema were tried in turn without any satisfactory result, the stools ranging in number from 12 to 15 in 24 hours, and consisting of mucus, epithelial debris and blood. There was no fever until about the 19th day of the disease, but after this and until the end the temperature varied between 100°.5 in the morning and 103°.3 at night. Ipecacuanha was very badly borne. The tongue was stripped of epithelium, and here and there was fiery. On the 23rd day (5th day of the fever) pus appeared in the stools, which however were not fetid. They became thin, yellow, very frequent, contained a considerable quantity of altered blood, blood-clot and clots of mucus, and were generally accompanied by tenesmus. The anterior abdominal wall was retracted. Paroxysms of colicky pain, chiefly after food, caused much distress. These pains were referred to the hypogastric region. There was much *left* iliac tenderness, and the descending colon could be mapped out, thickened and knotty. Meanwhile prostration and depression became marked. The temperature followed a typical typhoid curve, but the pulse was regular and the skin soft and natural. There was obstinate sleeplessness. There were no bladder symptoms. On the 20th, 21st and 22nd days of the fever profuse intestinal hæmorrhages occurred, amounting to from 50 to 60 ounces on each occasion. There was no hæmatemesis. Death on the 23rd day.

The autopsy revealed innumerable small abscesses in the liver, varying from the size of a pea to that of a Brazil-nut, so that any piece of the gland when thoroughly washed presented the appearance of a very coarse-meshed sponge. The colon was ulcerated throughout its entire extent, and contained a considerable quantity of altered blood. An ulcer in the cæcum had perforated. The lower end of the ileum was sown with circular ulcers in the midst of infiltrated areas, some of which had not broken down, corresponding to PEYER'S patches.

CASE VIII.—*Enteric Fever. Pyæmia. Temporary Aphasia. Death.*—A Japanese merchant travelling. First seen 22nd May 1887, supposed to be the 16th day of his illness. About the 7th May, at Hongkong, shortly after arriving from Formosa, he began to have fever. Next day there was a distinct rigor, followed by heat and sweating; he began to cough, and the fever became continued. On the 11th May ulceration of the throat with external swelling and dysphagia. On the 14th May, being still in this condition, started for Japan in the *Menzaleh*, which began to founder during the night of the 19th May. In the middle of a storm he was exposed to cold during three hours while being transferred to another steamer. Arrived in Shanghai on the 22nd May.

His servant states that burning heat alternates with profuse sweating. Sleep has been disturbed all along, but there has been no distinct delirium. Since the 17th May (11th day) the bladder and bowel have been evacuated unconsciously. The stools are described as yellow, semi-liquid, stinking. Has lately complained of pain and tenderness in left shoulder-joint. On arrival here the left shoulder and left knee were red, swollen, hot, sensitive to pressure and spontaneously painful.

It is not known whether he has had syphilis. Absence of Ricord's rosary from groins. Nothing known about his treatment; no temperature record.

16th day.—At noon patient had a severe rigor, and shortly afterwards coughed up some blood-stained mucus. After the rigor he was aphasic for about an hour. There were no other paralytic symptoms, but he remained stupid. Urine could not be collected for examination. Shortly after noon when he was seen, the temperature was 104°; pulse 96; respiration 24. Tongue dry, skin yellow, gums anæmic. No notable enlargement nor any tenderness of either liver or spleen. At 5 P.M. temperature was 100°; at 8 P.M., 104°; and at midnight, 96°. He was now able to recognise his friends. Pulse extremely compressible; lower extremities cold; tongue clean, slightly dry. The usual cardiac bruit simulating that of pericarditis was present. The lungs could be explored only with great difficulty; there was fine crepitation at the left base, and perhaps elsewhere. Abdomen swollen, resonant. Special tenderness with gurgling in the right iliac fossa. Two well-marked rose spots near the umbilicus.

17th day.—Subsultus; no delirium. Had had snatches of sleep during the night. Temperature at 7 A.M., noon and 7 P.M. respectively,  $103^{\circ}.6$ ,  $102^{\circ}.3$ ,  $102^{\circ}.1$ .

18th day.—Temperatures, taken at the same hours,  $101^{\circ}.8$ ,  $103^{\circ}$ ,  $105^{\circ}.4$ . Much distress caused by tympanites.

19th day.—Temperatures  $101^{\circ}.2$ ,  $103^{\circ}$ ,  $104^{\circ}$ . Sinking.

20th day.—Death.

This last case would appear to have begun as what is known as "Tamsui fever," a malarious remittent so far as my observation of many imported cases goes. But that either it passed into typhoid, or that typhoid supervened upon it, or that there is no generic difference between the two diseases, is certain. Had I been fortunate enough to secure a post-mortem some clue would possibly have been discovered to that mysterious connexion between remittent and typhoid which has given origin to the compound term "typho-malarial fever." However convenient this term may be to cloak lack of knowledge and to satisfy ignorant and pretentious relatives or friends, it is radically objectionable inasmuch as it crystallizes a pathological doctrine which in all probability is utterly wrong, and suggests a line of treatment which is distinctly hurtful. The ordinary conception of enteric fever as a pathological species of the same value as small-pox must I conceive be widened, and if there really be a species causally characterised by EBERTH'S bacillus it will eventually I am confident be, at least temporarily, assigned a place in a mixed group of "Enteric Fevers."

During the period under review 16 cases of enteric fever which terminated in recovery came under my observation in the Shanghai General Hospital and in private. Of these, 15 were European males, and one was a Chinese female married to a foreigner. Their ages were as follows:—

European males, between 10 and 20 years . . .	2	both residents.
"    "    "    20 " 30 " . . .	9	1 resident, 8 visitors.
"    "    "    30 " 40 " . . .	4	3 " 1 "
Chinese female, aged 16, resident.		

I summarise these cases in the same form as was adopted in my last Report.

CASE I. 4th October 1888. Chinese female, aged 16; nursing a three months old baby.—*Symptoms previous to admission.*—Rigors; intense muscular pains; sleeplessness; vertigo. Profuse purging after a small dose of castor oil.

*Condition on admission* (5th day).—Tongue brown, hard, with red edges. No special abdominal tenderness; some gurgling. Urgent thirst. Temperature, noon,  $104^{\circ}$ ; 9 P.M.,  $103^{\circ}.7$ . Stools frequent, small, liquid, yellow, with flocculent sediment, very offensive.

*Prominent Symptoms during course of Disease.*—No delirium; severe temporal headache, lasting for several days; a reasonable amount of sleep obtained throughout with an occasional dose of chloral; milk and soup taken freely. Breathlessness on exertion, but nothing discoverable in heart or lungs to account for it. Stools characteristic, varying from five to nine in 24 hours. Distressing tympanites and general abdominal sensitiveness until the 12th day. Scattered eruption on abdomen and lower part of thorax on the 10th day. Milk secretion diminished, but not arrested. Tongue generally white, loaded, with red edges and tip, but occasionally normal. The temperature fell to normal on the 18th day, after which it was subnormal every morning until the 22nd day. After the 22nd day it did not rise above  $99^{\circ}$ . The highest temperature was  $104^{\circ}$  on the 5th, 7th, 12th and 14th days. The maxima declined rapidly after the 16th day. No sequelæ.

CASE II. 4th October 1888. British man-of-war's man, aged 20.—*Symptoms previous to admission.*—Pains in head and limbs; sore throat; slight right iliac tenderness; tongue white, loaded. Temperature gradually rising from 100° on the first night to 104° on the fourth morning. No diarrhoea; motions dark.

*Condition on admission (4th day).*—Sleepless or restless, with horrible visions. No headache; no cough or any heart or lung trouble; no noticeable enlargement of liver or spleen. Marked tenderness, but no gurgling in right iliac fossa. Dulness and resistance along colon. A soap enema brought away an incredible quantity of fetid solid brown and black faeces.

*Prominent Symptoms during course of Disease.*—Severe muscular pain in back and legs; headache not marked. A reasonable amount of sleep was obtained with a sedative now and then. Occasional subjective feeling of cold, but without rigor. Delirious only on 12th, 24th, 33rd and 34th days. On the 12th day there was subsultus, which passed off. Constipation, necessitating frequent simple enemata. The stools very fetid, consisting generally of a couple of hard lumps followed by a characteristic "pea-soup" evacuation. Tongue generally white and moist, occasionally dry. Dicrotism of pulse detected by sphygmograph on the 6th day, appreciable to the finger on the 8th day. On the 12th day there was marked retraction of the abdomen, which disappeared after a few hours. No spots observed at any time. He took food freely.

On the 25th day, the morning temperature having fallen to 99°.4, he sat up for some time in his bed uncovered. When seen shortly afterwards he had had a violent rigor; his axillary temperature was 105°, and he was in a condition approaching collapse. No permanent harm followed this adventure. On the 27th day a mass of enlarged and indurated glands was discovered surrounding the left saphenous opening. The temperature first fell to normal on the 28th day, after which it varied between very wide limits, and in a seemingly capricious manner, up to the 38th day. Thus, without marked alteration in the general condition, it reached 105° in the early morning of the 31st day, not falling below 103° for 24 hours. After two days of almost normal readings the thermometer registered 103°.6 at noon on the 37th day and 104°.6 at 5 P.M. On the 56th day there was a sudden afternoon rise to 101°. All these rises were treated with acetate of ammonia and quinine, and speedily disappeared. Apart from the fugitive incident on the 56th day, the temperature remained normal after the 38th day. Some subsequent trouble was experienced from œdema of the left leg, connected probably with persistency of the glandular enlargement before mentioned. The patient was discharged well on the 71st day.

It was a question with me whether the intercurrent attacks of fever during convalescence were not of malarial character. But the patient had never lived in a malarious district, and had been but a short time on the China coast.

The following case was not under my care during his attack of enteric fever. The history is one of a somewhat grave sequela.

CASE III. 8th November 1888. Clerk, aged 36.—Patient was in hospital from the 25th March to the 28th April 1888 with severe enteric fever. Before leaving he had pain in the lower left chest wall anteriorly, followed by a swelling which burst about the beginning of June, and has ever since gone on draining two or three fluidrachms of serous and flaky pus daily. He has frequent attacks of fever of short duration, and the discharge increases before these attacks come on. His complexion is waxy and features puffy. Neither liver nor spleen is sensibly enlarged. Appetite good, bowels regular. Has not suffered seriously from his lesion until a few weeks ago, since which time it appears to him to cause slight attacks of spasmodic dyspnoea. Tongue brown, loaded. Temperature normal. Urine neutral; S.G. 1.015; straw coloured, with slight mucous cloud. Filtered, it gave no deposit on boiling or when treated with nitric acid in the cold. Boiled with nitric acid it turned a delicate and permanent pink.

Half an inch to the left of the middle line of the sternum and  $3\frac{1}{4}$  inches above the tip of the ensiform cartilage there is a fungating ulcer. The probe entering by the side of the excrescence passes

backwards and outwards at an angle of  $30^\circ$  with the surface for  $2\frac{1}{2}$  inches, when it enters a smooth cavity. No dead bone felt. The exploration was very painful.

There was no sign of deposit in the lungs, and this, along with the history and the patient's general appearance, seemed to negative the suggestion of a tubercular abscess.

A semi-circular flap, 3 inches in radius, with its convexity downwards and its base extending horizontally from the inner edge of the left mammary gland to the middle of the sternum, was with the areolar tissue and muscle raised from the thoracic wall. The internal intercostals between the fifth and sixth costal cartilages were divided, when an abscess cavity was opened, of which the posterior wall was formed by new tissue matted over the pleura and pericardium. The fifth rib was carious for about an inch from its articulation; it was resected. The upper half of the anterior inch of the sixth rib was also carious, and was chipped and scraped away. The sixth cartilage was found to be calcified, and was excised. An abscess cavity was now found in the lower third of the gladiolus, containing much débris and pus. This was cleared out with a sharp spoon, and a counter-opening made into it from the front of the bone. The cavities were thoroughly rubbed with iodoform, drained, and the flap replaced. Recovery was uneventful, but healing was not complete before the expiration of 10 weeks.\*

CASE IV. 9th November 1888. English missionary; five years in Yunnan, where he acquired malarial fever, which generally assumed the tertian type. Since his impregnation with malaria he has suffered much distress from cardiac palpitation on any exertion.

*Symptoms previous to admission.*—Fever; severe occipital headache with spinal and articular pain; general muscular aching; profuse sweating; sleeplessness; rapid pulse (generally from 120 to 132); fair appetite; bowels regular and normal; tongue brown but moist; no cough. On the evening of the 4th day his temperature was  $105^\circ.1$ . After this the tongue became dry, and during the 5th day the temperatures were:—

1 A.M., $104^\circ$	1 P.M., $103^\circ.2$	7 P.M., $104^\circ$
7 " $104^\circ$	5 " $104^\circ$	10 " $104^\circ.1$
8 " $103^\circ.3$		

The patient was now much excited, but not delirious. General muscular tremor. Tympanites, but no marked iliac tenderness. On the 6th day he was delirious.

*Condition on admission (6th day).*—Heart and lungs normal; liver not sensibly enlarged; splenic dulness extends to mid-axillary line, but the spleen cannot be felt beneath the ribs. Tongue brown and dry; intense subjective sensation of cold. No gurgling or tenderness; abdomen moderately distended. Temperature at 4 and 9 P.M. respectively,  $103^\circ.7$ ,  $104^\circ.3$ .

*Prominent Symptoms during course of Disease.*—Intermittent delirium up to 11th day. Sleep scanty and much disturbed by dreams up to end of third week. Sudden and plentiful eruption of rose spots on the abdomen on the 11th day. Tongue extremely variable in appearance; sometimes normal, then white and loaded, then brown and baked, or moist with a hard brown strip down the middle. The stools were also variable in character; sometimes solid, sometimes consisting of brown serous liquid with or without fecal lumps, generally characteristic, always frequent and very fetid. The pulse became markedly dicrotic on the 11th day. On this day also the patient became deaf, and for the first time complained bitterly of thirst. There was a copious secretion of thick yellow mucus from the pharynx, which caused a good deal of distress in hawking it up. Throughout the disease there were frequent short sweating fits, in no way periodic. The temperature first fell to normal on the 23rd day, and did not rise above  $99^\circ$  after the 24th day. The highest temperature registered was  $105^\circ.1$  on the 4th night. No sequelæ.

\* Whether EBERTH'S bacillus would have been found in the abscess cavities I do not know; it was not looked for. But it has now been often demonstrated in sequential osteoperiosteal abscesses, pleural exudations, etc.

This case, if by chance it had come to a postmortem, would have offered an opportunity of obtaining light on the connexion between a certain form of malarial intoxication and a certain form of enteric fever, which was unfortunately lost in the case reported on page 27.

CASE V. 17th November 1888. French man-of-war's man, aged 21.—*Symptoms previous to admission.*—Chill; repeated rigors; cough, with bronchitic expectoration and an occasional streak of blood. Diarrhœa. Morning temperature after the first day varied between  $103^{\circ}.2$  and  $104^{\circ}$ ; evening temperature,  $104^{\circ}.2$ . Sleeplessness.

*Condition on admission* (4th day).—Somewhat dusky; orthopnoea; cough; scanty, frothy expectoration; relative dulness of right side of chest posteriorly. No crepitation; dry râles everywhere; respiration 20; breathing puerile on left. Heart sounds healthy but feeble. Tongue brown, red tip and edges. Temperature all day  $104^{\circ}$ , with a run up to  $105^{\circ}$  between noon and 1 P.M. Pulse 100, of good character. Complains now of constipation. There is no sensible enlargement of liver or spleen.

*Prominent Symptoms during course of Disease.*—Delirium first declared itself on the 9th day, with a sudden fall of the temperature to normal and tendency to collapse. It persisted to the 42nd day, and was occasionally of violent character, but more usually muttering. The pupils were for the most part widely dilated, and but slightly sensitive to light. Subsultus was first noticed on the 21st day, and disorderly muscular movements, chiefly of the head, a little later. There was no fly catching. Spinal pain was not complained of, but headache was often severe, and general muscular aching appeared to be constant, as was inferred from the patient's almost perpetual groaning. Deafness was observed on the 7th day, and persisted until after convalescence was fully established. The amount of sleep obtained was variable; the patient sometimes slept quietly with eyes firmly closed for four or five hours at a time, and at other times was completely wakeful, or was roused by horrible visions from short snatches of sleep, in spite of moderate doses of sedatives. The circulation was miserable throughout, the pulse varying between 96 and 132. The chest cleared gradually, yet occasionally without any corresponding physical sign fits of irregular and laboured respiration came on, the breathing rate rising to 40 or 42, and so remaining for an hour or two. The tongue, which was usually dry and brown, was often perfectly normal for a few hours at a time. On the 13th day sordes began to collect on the teeth, and the lips were dry and fissured. Profuse sweating, with nothing to explain it, occurred on the 15th and 48th days. Generally the skin was dry and parchment-like. The eruption came out plentifully on the 10th day, and followed the usual course. Enormous quantities of bile were vomited on the 5th day, but subsequently the stomach was quiet. The stools were extremely variable; sometimes solid, at other times loose and bilious; olive-coloured or black and oily; yellow, frothy, liquid, with much sediment; but generally characteristic. They were passed involuntarily on the 23rd day, not afterwards. They varied in number from four to eleven in 24 hours, and were always horribly offensive. The condition of the abdomen varied; it was occasionally tympanitic, but was strongly retracted on the 24th day; there was sometimes marked iliac tenderness, often none; always gurgling. Smart hæmorrhage (black and clotted) occurred on the 19th and 22nd days, but seemed to be effectually controlled by watery extract of hamamelis in large doses (4 fluidrachms every second hour). The temperature was never excessive, and followed a curious curve, which may be followed in the accompanying table:—

1st to 10th day . . . . .	Max., $105^{\circ}$ on 4th day . . . . .	Min., $98^{\circ}.4$ on 9th day.
11th „ 20th „ . . . . .	„ $102^{\circ}.7$ „ 18th „ . . . . .	„ $99^{\circ}$ „ 12th „
21st „ 30th „ . . . . .	„ $102^{\circ}.2$ „ 22nd „ . . . . .	„ $98^{\circ}$ „ 29th „
31st „ 40th „ . . . . .	„ $100^{\circ}.6$ „ 31st „ . . . . .	„ $96^{\circ}$ „ 34th „
41st „ 50th „ . . . . .	„ $103^{\circ}$ „ 50th „ . . . . .	„ $98^{\circ}.4$ } frequently.
51st „ 60th „ . . . . .	„ $103^{\circ}.2$ „ 51st „ . . . . .	„ $98^{\circ}$ }

No sequelæ.

CASE VI. 7th December 1888. Officer of steamer, aged 25; recently arrived in China; has never had fever of any kind.—*Symptoms previous to admission.*—Chill; general malaise; severe lumbar pain;

no headache; loss of appetite; yellow, liquid, painless diarrhoea. Violent epistaxis on the 6th day of his illness, up to which time he was being ordered 15 grains of quinine five or six times daily. No headache; no cough. Urine porter-like. Sleepless.

*Condition on admission* (8th day).—Tongue loaded, brown in centre. No pain or gurgling in right iliac fossa. No spots. Stools infrequent but characteristic. Nothing to be discovered as regards thoracic or abdominal viscera.

*Prominent Symptoms during course of Disease.*—Intense prostration throughout; severe abdominal pain without tympanites. Sleep generally fair. Pulse always slow (65 to 72) and hammering. The tongue was variable; often normal, generally white with red tip and edges, or dry and stripped of epithelium. Stools generally characteristic, infrequent; once or twice dark oily diarrhoea. Rose spots appeared on the 11th day. Iliac sensibility was never marked; it was first observed on the 10th day. The maximum temperature recorded was 103° at noon of the 9th day. The temperature fell to normal on the 13th day, and did not rise above that point after the 19th day. No sequelæ.

CASE VII. American naval officer, aged 23.—*Symptoms previous to admission.*—Malaise for seven days; rigors; evening temperature has risen to 103°.5. Has been dosed with aloes, digitalis and quinine. Constant uneasiness in bowels without diarrhoea.

*Condition on admission* (8th day).—Flushed. Temperature (1 P.M.) 102°.8. Tongue brown, with bright red edges. Pulse fairly strong. No appetite; no pain. Abdomen slightly distended; no gurgling or tenderness in the right iliac region. Pupils widely dilated, insensitive. No notable increase in size of liver or spleen. Heart and lungs normal.

*Prominent Symptoms during course of Disease.*—The pupils continued widely dilated and insensitive up to the 25th day. No headache or other pain was complained of except frequent abdominal cramp (colic). There was no deafness. Sleep was variable; occasionally sound, but usually disturbed by dreams, and the eyelids were frequently half open. The pulse was often intermittent, was once or twice dicrotic, but was never miserable. There was occasional slight cough with frothy expectoration. The tongue varied from a normal condition to extreme dryness. The pharynx was congested. Thirst was never urgent, and nourishment was taken well throughout. Very heavy sweats occurred on the 16th day without producing any effect on the temperature. For the first time, on the 18th day, an eruption (plentiful) of rose spots was observed on the abdomen. This had been carefully looked for every day. The stools were usually characteristic, occasionally lumpy; infrequent. Tympanites, which was marked at first, gradually disappeared. There never was much abdominal tenderness, and gurgling was first obtained on the 18th day. The maximum temperature recorded was 104°.2 on the afternoon of the 9th day. The temperature fell to normal on the 17th, 19th and 25th days, and after this last day it was always normal in the morning. It did not exceed 99° after the 24th day. There was a gradual declension after the 17th day. On the 42nd day a herpetic eruption was observed on the reflexion of the prepuce.

CASE VIII. 29th December 1888. Marine engineer, aged 38.—Admitted on the 12th day of mild enteric fever. Temperature varied between 100° and 101°.5. There were, however, severe headache and sleeplessness, anorexia, frequent characteristic stools; marked gurgling and slight iliac tenderness. The tongue was normal throughout. All the special symptoms cleared away by the 15th day, but the patient was left profoundly anæmic; white lips and gums; breathlessness; obviously hæmic murmur at apex and base of heart; lungs normal; no marked loss of muscular strength. There was slight œdema of the ankles, and a faint cloud of albumen in the urine. Discharged well on the 26th day.

CASE IX. 3rd January 1889. American naval officer, aged 26.—*Symptoms previous to admission.*—Indisposed for a week. Rigors; severe pain in lumbar region and extremities; thirst; anorexia; sleeplessness. Temperature on 6th day at 1 P.M., 3 P.M., 6 P.M. and midnight respectively, 102°, 102°.7, 103°.8, 102°.

*Condition on admission* (8th day).—Pulse 100, vibrating. Tongue loaded. Abdomen tympanitic; no iliac tenderness or gurgling. No enlargement of liver or spleen. Heart and lungs normal; no cough, headache or prostration. Some lumbar pain.

*Prominent Symptoms during course of Disease.*—Delirium occurred on the 10th and 11th days. After the 10th day until convalescence was fully established the pupils were widely dilated. Sleep was tolerably good throughout. The pulse remained large, soft and regular. The tongue varied; sometimes normal, generally white and loaded; never dry. There were very frequent sweating fits. The skin and conjunctivæ became yellow on the 12th day, gradually clearing by the 17th day. The urine during this period was porter-like, yet the stools continued bilious. The stools were occasionally solid, generally characteristic, infrequent, fetid. There was never any tympanites, tenderness or gurgling. On the 10th day three spots were observed, but when these disappeared there was no fresh eruption. The maximum temperature recorded was 104° on the 7th night. The temperature fell to normal on the 11th day, and did not subsequently rise above 99°. The general course of symptoms was not, however, in any way affected by the lowered temperature. No sequelæ.

CASE X. 15th January 1889. British man-of-war's man.—*Symptoms previous to admission.*—Malaise for eight days, beginning with a severe rigor; "rheumatic" pains in loins, extending down thighs. Restless nights. Anorexia. Rising temperature (9th morning, 103°.6). No diarrhœa. Tympanites. Has been taking quinine in 10-grain doses three times daily.

*Condition on admission* (9th day).—Marked prostration; indifference. Temperature at noon 104°.4. Pulse 102, full and soft. Pharynx congested. No cough or hurry of respiration. No special iliac sensitiveness; no gurgling. The liver is not enlarged. The convex border of the spleen can be felt beneath the ribs. No tenderness. Heart and lungs normal.

*Prominent Symptoms during course of Disease.*—Marked prostration throughout. The fever appears to have developed a latent syphilis, dating back several years. On the 44th day a distinct coppery eruption appeared on chest and forearms, and on the following day specific sore throat declared itself, with œdema of the soft palate, ulceration of the left anterior pillar, and dysphagia. But what specially characterised the case was the frequent occurrence of intestinal hæmorrhage. On the 12th, 17th, 18th, 19th and 20th days small quantities of blood were seen in the stools. On the 21st day three hæmorrhages occurred, amounting to 80 ounces of scarlet blood, which speedily coagulated. The patient was blanched by the bleeding, but showed no signs of collapse. The temperature, which had been 104° on the night of the 20th day, was on the 21st, 99°.5 (7 A.M., four hours after the first hæmorrhage), 99°.6 (noon), 99°.8 (5 P.M.), 100°.2 (10 P.M.). It rose again on the 22nd day. Three hæmorrhages, amounting to 17 ounces, occurred on this day, mostly black clots, but had no effect on the temperature. Again, on the 24th and 37th days there were small bleedings. Whether in consequence of, or independent of, the administration of hamamelis, there was a rapid arrest of the menacing bleeding of the 21st day after lavish use of the drug. Three lumbricoid worms were expelled during the illness, two by the bowel and one by vomiting. Apart from complications, the symptoms observed were as follows: Sluggishness of the pupils from the first, which became wide dilation and absolute insensitiveness to light on the 19th day. Much muscular tremor, which, oddly enough, disappeared after the hæmorrhage. Back pain, which was distressing in the beginning, speedily disappeared. Deafness was marked after the 15th day. Sleep was variable. The patient often slept with his eyes half open, and was often sleepless, but in general a fair amount of sleep was obtained. There was at first a curious back stroke immediately after each beat of the pulse; it then became vibrating, and afterwards dicrotic, but the dicrotism disappeared after the hæmorrhage. The usual systolic bruit at base and apex was present after the 13th day. There was occasional cough, with nothing in the lungs to account for it; it was due probably to pharyngeal inflammation. As early as the 15th day there was deep injection of the pharyngeal mucous membrane, and much distressing hawking of blood-stained mucus. Paroxysmal attacks of sighing respiration came on now and then without assignable cause. The condition of the tongue was variable; often normal, then dry, or brown and baked

without obvious connexion with other symptoms. It was frequently tremulous, but without fibrillary twitching. The breath was offensive throughout, due probably to the condition of the pharynx. Paroxysms of profuse sweating often occurred, but had no effect on the temperature. The cheeks were now and then deeply flushed; from the 44th to the 47th day the skin was yellow, as also were the conjunctivæ. At the same time there was no hepatic tenderness, and the stools though constipated were not deficient in bile. Severe bilious vomiting occurred on the 45th and 46th days. Twelve spots of rose-rash were counted round the umbilicus on the 13th day. On the 44th day, as mentioned before, a syphilitic eruption appeared on the chest and arms. The stools were variable; occasionally dark and solid, or characteristically typhoid, or brown liquid; from one to nine in 24 hours. From the 38th day onward constipation was troublesome. Tympanites was sometimes present, generally absent. Tenderness and gurgling were present from the 10th to the 30th day. The following table shows the course of the temperature:—

8th to 10th day	. Max., 104°.4 on 9th day	. . . . .	Min., 102°.4 on 10th day.
11th ,, 20th ,, . . . ,,	104° frequently in afternoon	. . . . .	101°.5 ,, 18th and 20th days.
21st day . . . . .	102°.2 ( <i>hæmorrhage</i> )	. . . . .	99°.5.
22nd to 24th day . . . . .	104°.6 on 22nd day	. . . . .	100° on 24th day.
25th ,, 30th ,, . . . ,,	99°.8 ,, 25th and 30th days	. . . . .	97°.5 ,, 28th ,,
31st ,, 40th ,, . . . ,,	104°.3 ,, 37th day	. . . . .	98°.8 ,, 32nd ,,
41st ,, 50th ,, . . . ,,	104°.2 ,, 44th day ( <i>syphilitic eruption</i> )	. . . . .	99° ,, 50th ,,
51st ,, 55th ,, . . . ,,	98°.6 frequently	. . . . .	96°.8 ,, 53rd ,,

There were no sequelæ.

CASE XI. 19th January 1889. American sailor, aged 24.—*Symptoms previous to admission.*—General malaise; shivering; night sweats. Pains everywhere; no appetite; no sleep, or only short snatches disturbed by horrible dreams. Constant trembling.

*Condition on admission* (4th day).—Temperature 101° at 10 A.M. Tongue dry; pupils dilated; pulse vibrating; no distension or tenderness of abdomen; stupid.

*Principal Symptoms during course of Disease.*—Severe pain in the legs was constantly complained of. The pupils, with an inexplicable interval between the 22nd and 26th days, during which they were sensitive, were widely dilated. Sleep was generally disturbed by horrible dreams. The pulse presented a back stroke after each beat, difficult to describe, but different from ordinary dicrotism,\* or it was dicrotic; from the 8th to the 21st day it was remarkably slow—40 to 66 per minute, the slowness being due to prolonged expansion of the artery.† There was slight cough, with nothing discoverable in the chest to account for it. The tongue was variable; from time to time noted as “dry,” “baked,” “brown,” “white and moist,” and normal, these changes occurring in the course of a few hours. Sweating was frequently profuse. Three spots of rose-rash were discovered on the 12th day. Food was taken freely. The stools were frequent, consisting at first of inky fluid, then generally characteristic with occasionally olive lumps, or brown fluid with yellow sediment. Slight gurgling was observed on the 7th day; there was at no time marked tenderness. The maximum temperature was 104°, recorded on the 4th day. The temperature fell to normal on the 14th day, and never again rose above it, although the general course of symptoms proceeded in the usual way to the 30th day, when convalescence was established. No sequelæ.

\* It closely resembled, if it was not identical with, the “pulsus bisferiens” of aortic stenosis, but I could find nothing to explain it.

† The “pulsus tardus” or “lentus” of old authors, as opposed to the “pulsus rarus” or “infrequens,” with which it is frequently confounded in mistranslation. The true meaning is “lingering.” Thus:—

Media fert tristis sucos tardumque saporem

Felicis mali.

VIRG., *Georg.*, ii, 126.

—the lingering flavour;

Artius atque hedera procera adstringitur illex,

*Lentis adhaerens brachiis.*

HOR., *Epod.*, xv.

—in lingering embrace.

**CASE XII.** 22nd January 1889. American man-of-war's man, aged 44.—*Symptoms previous to admission.*—Malaise for 14 days; no appetite; sleepless; violent headache; constipation; temperature for last two days  $101^{\circ}$  in morning,  $103^{\circ}$  at night.

*Condition on admission* (exact period of disease not known).—Tongue dry, flat, fiery red. Pulse dicrotic. Pupils dilated but sensitive. Severe headache; no muscular pain. Slight tympanites, gurgling and sensitiveness. Temperature on admission (noon)  $102.6^{\circ}$ . Pulse 72, full and soft. No eruption. Nothing discoverable in chest. Liver extends slightly below costal border. Spleen not sensibly enlarged.

*Prominent Symptoms during course of Disease.*—Intense prostration from the first, with early and prolonged delirium. Pupils were dilated and usually insensitive until convalescence was established. There was no marked headache, backache or muscular pain. He became deaf on the 10th day after admission. The respiration from time to time became superficial, rapid and laboured, without cause discoverable on examination of the heart and lungs. Sleep was variable, generally disturbed. The pulse continued dicrotic until near the end of the fever and long after the temperature had fallen. During the first six days of the intermediate fall of temperature, as noted below, the pulse rate was remarkably slow (48 to 60), due to prolonged expansion of the artery. The tongue changed rapidly through all degrees of dryness, with normal intervals; transverse fissures were often observed. It was notably tremulous on several days. All through nourishment was well taken. Sweating occurred frequently and was profuse. There was no rose-rash at any time. The stools were infrequent, generally characteristic, sometimes lumpy, varnishy, brown and watery. Constipation had occasionally to be overcome by enemas. On the 7th day after admission there was a hæmorrhage to 44 ounces, mostly black clots. This had no effect on the temperature and did not recur; it was treated with hamamelis. Tympanites was present throughout; it was sometimes considerable. There was not much local tenderness, but iliac gurgling could at all times be produced by gentle palpation. The temperature course was instructive. The fever had practically disappeared for some days, when on the 30th day after admission the patient obtained possession of and ate some food which had been served to a ward companion. The effect was immediate in causing a return of fever, which, however, could not justly be considered a true relapse.

1st to 12th day after admission .	Max., $104.2$ on the 2nd day .	Min., $99.2$ on the 11th day.
13th „ 30th „ „ „ . . . „	$99.8$ „ 30th „ . . . „	$95^{\circ}$ „ 20th „
31st „ 43rd „ „ „ . . . „	$104.2$ „ 39th „ . . . „	$98.4$ „ 32nd and 33rd days.

There were no sequelæ.

**CASE XIII.** 29th January 1889. British man-of-war's man, aged 26.—*Symptoms previous to admission.*—Rigor four days ago; headache and severe backache; sleeplessness. Rising temperature, reaching  $104.2^{\circ}$  at night. Diarrhœa; dry and coated tongue; epigastric distension and tenderness.

*Condition on admission* (4th day).—Pale; prostrate; severe frontal headache, and lumbar pain on any movement; exquisitely sensitive area the size of a dollar, with its lower limit 2 inches vertically above umbilicus. Tongue moist, covered with white fur. No iliac tenderness or gurgling. No perceptible enlargement of liver or spleen. Heart and lungs normal.

*Principal Symptoms during course of Disease.*—Prostration and mental depression were marked throughout. The pupils were constantly dilated, generally insensitive, with one or two intervals; they did not become permanently normal until the 42nd day. There was subsultus for three or four days after the 8th day, and a severe paroxysm of general muscular trembling on the 31st day. Headache, chiefly referred to the back of the orbits, was severe; there was no spinal or muscular pain, but for eight days there was an extremely sensitive spot in the epigastric region. The patient was never deaf. Sleep was variable; sometimes sound, but generally for the first fortnight, and afterwards during successive days of high temperature, disturbed and obtained with the eyes half open. The pulse became dicrotic on the 7th day, and so continued until final convalescence. Respiration was paroxysmally oppressed without corresponding alteration in pulse or temperature. There never was any cough. The tongue was dry, scaly or normal.

Food was taken freely throughout. There were frequent and heavy sweats, which were always followed by a fall in the temperature. No rose-rash was observed. The stools were always fetid; generally characteristic, occasionally bilious and loose or containing lumps. From time to time colic was severe. There was never any marked tympanites. The course of the temperature would suggest a relapsing form; but inasmuch as the general symptoms were not affected in their course by any fall of bodily heat, such an assumption would not be justified. The case must be regarded as one out of many illustrations of the doctrine that the essential character, whatever it may be, of enteric fever is not necessarily linked to the usually elevated temperature. Thus:—

From 3rd to 14th day .	Max., 104°.2 on 3rd day . . .	Min., 98°.4 on 14th day.
„ 15th „ 31st „ . . .	„ 101° „ 15th and 17th days „	98° „ forenoons of 22nd to 31st days.
„ 32nd „ 43rd „ . . .	„ 103°.6 „ 34th day . . . .	„ 98°.4 „ 32nd day.
„ 44th „ 56th „ . . .	„ 99°.8 „ 48th „ . . . .	„ 96° „ 49th and 52nd days.
„ 57th „ 71st „ . . .	„ 102°.8 „ 60th „ . . . .	„ 97°.5 „ 71st day.

There were no sequelæ beyond intense pain of cramping character in the calves and front of thighs, which persisted for about 10 days.

CASE XIV. 9th March 1889. Child of European resident, aged 10.—*Early Symptoms.*—Pungent skin; congestion of pharynx; cough; anorexia; white tongue; grinding of teeth. Worms had been suspected, but none were expelled after a couple of doses of santonine.

*Condition when first seen (4th day).*—As just described. There was no lachrymation, coryza or eruption; no headache or backache. Tongue dry and brown. Heart and lungs healthy. No splenic enlargement.

*Prominent Symptoms during course of Disease.*—Intense prostration and rapid wasting. Delirium occurred on the 11th day; it was generally quiet, sometimes muttering, once or twice violent. After the 10th day speech was very slow, and the child had evidently much difficulty in collecting and expressing his thoughts. There was a short fit of complete unconsciousness on the 16th day, and a violent rigor on the 20th day. Vertigo was complained of on the 10th day, and continued on and off until the 15th day, after which listlessness was so pronounced that no complaint was ever made of anything. Deafness came on on the 11th day, and rapidly became intense; it did not entirely disappear until many days after convalescence had been established. The pupils were dilated and insensitive on the 11th day, and so continued for some time after recovery. There did not appear to be any headache or backache, but there was marked intolerance of light, and as the fever disappeared there was severe cramping pain, in the calves chiefly, which lasted for several days. On the 7th and 8th days bitter complaint was made of midsternal pain and tenderness, for which no cause could be discovered. The supposition of a commencing periostitis had to be abandoned as the pain disappeared spontaneously after 48 hours. Sleep was usually good, with occasional prolonged fits of restless drowsiness; the child's eyes were generally closed during sleep. The pulse was never dicrotic, but was extremely weak and frequent; from the 8th to the 21st day it varied between 120 and 136. Respiration was rapid and shallow, ranging from 36 to 52 between the 11th and 19th days. When the fever was at its worst the character of the respiration was curious: there was a short shallow inspiration, instantly followed by a short superficial expiration, and then a long pause. Cough was not continuous, but was every now and then troublesome, sometimes hard, generally loose, and accompanied by large bronchial râles. The tongue was sometimes brown and dry, sometimes white and moist, never fissured. It became tremulous, and the child could not protrude it on the 12th and following days, and it was noticed on the 14th day to be flabby, yielding and falling back before the thermometer. The pharynx was congested for many days; so much congested on the 20th day as to cause a certain amount of dysphagia. The lips became covered with sordes on the 9th day, and speedily cracked. There was never any urgent thirst. Food was taken freely, except for a day or two when the condition of the throat was an obstacle. Profuse sweating was of frequent occurrence; on only one occasion (20th day) did it appear to influence the tem-

perature. Rose-rash appeared on the 11th day, and crops of sudamina succeeded one another after the 17th day. Severe vomiting occurred twice (18th and 20th days); on each occasion it was induced by a violent coughing fit and was accompanied by a copious evacuation of bronchial mucus. The stools were infrequent, never fetid; they were usually typical, with occasional hard lumps. For the first twelve days the urine was loaded with lithates; afterwards it was clear and copious. Tympanites was present after the 10th day, and was sometimes distressing; neither tenderness nor gurgling was at any time noted in the right iliac fossa. It was noticeable in this case that the general symptoms closely followed the course of the temperature.

4th to 9th day . . . . .	Max., 105°.4 on 6th day . . . . .	Min., 103°.5 on 9th day.
10th „ 14th „ . . . . .	„ 105°.2 „ 12th „ . . . . .	„ 101°.3 „ 13th „
15th „ 19th „ . . . . .	„ 103°.7 „ 19th „ . . . . .	„ 97°.5 „ 15th „
20th day . . . . .	„ 97°.7 at 3 P.M. . . . .	„ 95° at 1.30 A.M.
21st to 23rd day . . . . .	„ 102°.2 on 21st day . . . . .	„ 97° on 22nd day.
24th „ 31st „ . . . . .	„ 99° „ 30th „ . . . . .	„ 95° „ 25th „

CASE XV. 27th March 1889. Child of European resident, aged 15.—*Early Symptoms*.—Evening rigors, with severe headache, which has become continuous. Sleeplessness. Congestion of pharynx. Constipation.

*Condition when first seen (7th day)*.—Tongue dry; conjunctivæ injected; pungent skin; abdominal distension and tenderness; loaded urine. Stools, the effect of castor oil, yellow and extremely offensive.

*Prominent Symptoms during course of Disease*.—In this case there was a total absence of purely nervous symptoms. There was no increase in the area of hepatic or of splenic dulness. There was no eruption. On the other hand, tympanites became marked on the 8th day, and became excessive, being notably greater to the right of the middle line (a phenomenon unique in my experience). There was excessive iliac tenderness, and distinct gurgling independent of diarrhœa. The stools were variable in number and quality, sometimes infrequent, almost always characteristic, occasionally hard. The tongue too was variable, generally moist, once or twice brown and hard, frequently normal. The back of the pharynx and pillars were considerably congested. Sweating was profuse, and in the intervals there was a peculiar pungency of the skin altogether out of correspondence with the mouth temperature, which never rose above 102°.6 (8th day), continued over 100° to the 20th day, and then fell permanently to normal. The pulse was often found at 65, or thereabouts, of the lingering character previously described.

CASE XVI. 28th March 1889. Englishman, aged 28.—*Symptoms previous to admission*.—Intense malaise for six days; sleeplessness; nightly headache; abdominal pain; vomiting after food; stools infrequent, loose, dark-brown and white mixed. Urine porter-like. Patient is a total abstainer.

*Condition on admission (7th day)*.—Tongue moist, white; conjunctivæ yellow; skin yellow, puffy, not exactly œdematous; sweating heavily. Pulse 144, very soft. Temperature 103°.8. Urgent thirst. Slight downward enlargement of left lobe of liver, but no tenderness. No gurgling, but slight sensibility in right iliac fossa. No spots. Nothing to be discovered as regards heart, lungs or spleen. Urine loaded with lithates and with the colouring matter of the bile; no albumen. Patient extremely prostrate and irritable.

*Prominent Symptoms during course of Disease*.—There was no delirium at any time, but prostration was intense throughout. Towards the end of the second week there was much subsultus and large muscular trembling. The pupils were dilated and insensitive, and there was severe frontal headache until convalescence was fully established. A severe rigor occurred on the 12th day, after which the temperature fell to 95°, but rapidly rose to 103°. Deafness was observed from the 8th day. There was occasional sleeplessness, but as a rule a fair quantity of sleep was obtained, generally, however, much disturbed by terrifying dreams. The pulse after admission was never extremely rapid; it was always compressible, and fell to 60 for several hours on the 9th and 11th days. There was never any cough, but occasionally, without obvious cause, fugitive attacks of dyspnoea occurred. The tongue was variable, sometimes normal, sometimes white or

brown, once or twice dry. The back of the pharynx and pillars were congested, and once or twice there was some pain in swallowing. There was marked disgust for food, succeeded by voracity about the 28th day. There was constant and profuse sweating. The skin was canary yellow during most of the illness, clearing for a day or two at a time, but not losing its coloration finally until the 28th day. The urine was porter-like for a few days longer. There was no rose-rash; no gurgling; tympanites was slight and occasional. Up to the 34th day there was frequent bilious vomiting, with once or twice slight hæmatemesis, due apparently to straining. The stools were generally characteristic; now and then olive-green and oily; like washings of meat on the 38th day (after intestinal hæmorrhage). Dysuria occasioned much distress on the 8th and 9th days; its cause was obscure. Severe hæmorrhage occurred on the 38th day, after indulgence in dried fruit which had been surreptitiously brought to him. The bleeding recurred to a slight extent on the 39th day. How irregular the temperature curve was will be seen by the following table:—

7th day . . . . .	Max., 103°.8 at 9 P.M. . . . .	Min., 101°.7 at 8 A.M.
8th „ . . . . .	„ 99°.4 „ 8 A.M. . . . .	„ 96° „ 4 P.M.
9th to 20th day . . . . .	„ 104°.6 on 13th night . . . . .	„ 95° on 12th morning.
Temperatures normal or subnormal in early morning.		
21st to 30th day . . . . .	Max., 103° on 28th evening . . . . .	Min., 97°.8 on 21st morning.
31st „ 39th „ . . . . .	„ 104°.4 „ 37th „ . . . . .	„ 96°.6 „ 31st „
After the 39th day the temperatures were normal or subnormal.		

Although not belonging to the period under review, I will, in order to complete these illustrations of enteric fever as seen in Shanghai, refer to or report a few other cases which presented some peculiarities worthy of notice.

Enteric fever, though announcing itself in the most stormy manner, may run a benign and rapid course towards recovery.

CASE I.—An Englishman, aged 24, who had frequently suffered from malarious fever in different southern ports. Seen on the 4th day of an illness contracted up country, which had begun with violent headache, prostration, sleeplessness, loss of appetite, and dry loaded tongue. No rigor and no sweating. Had been largely dosed with quinine. Subdelirium on the 3rd night.

When seen, in early morning, the temperature was 103°.8; it rose to 104°.8 about 9 P.M. The abdomen was distended, very sensitive; no gurgling could be made out. The spleen could be distinctly felt, and palpation was painful. No ascertainable liver enlargement. Bowels constipated; relieved of extremely fetid stuff by enema. After this the stools were liquid, yellow with considerable deposit. Tongue very dry and hard in centre with thin brown fur; edges red. Skin yellow. Pulse 90, remarkably soft. Cardiac action extremely weak and occasionally intermittent. Next morning (5th day) the pharynx was deeply congested; there was slight dysphagia. Cough with mucilaginous frothy expectoration. Sleeplessness; delirium; increased tympanites and tenderness. Temperature in morning 103°, at night 104°. The symptoms then began to abate, and by the 8th day convalescence was established.

CASE II.—Dane, aged 35. Several attacks of malarious fever. Illness began with rigor, heat and sweating after a severe drenching. Dosed himself with antipyrine, quinine and purgatives. Had fever every day from beginning, and noticed little difference in its intensity at different hours. Sleepless, no delirium. Intense frontal headache on 5th day, which persisted without intermission through the following night. Urgent thirst. Drinking large quantities of milk.

When seen on the 6th morning, his skin was dry and a dirty yellow; there was much subsultus on attempting to grasp an object; the tongue was dry; there was no incoherence. The temperature was 104°.6; it rose to 105°.7 at noon, and to 106°.2 at night. Respiration 30 (48 at night), superficial; nothing discoverable in chest. On the 7th day the stools were frequent and characteristic. The temperature remained elevated, and the other symptoms but little changed until the 9th day, when convalescence suddenly set in. On the evening of the 8th day, after the temperature had been high for several days,

and had indicated on at least one day what might be called hyperpyrexia, there was a very marked accentuation of the second sound in the tricuspid area, the more remarkable as the other cardiac sounds were feeble and distant. This had disappeared when the heart was re-examined two days later. On the 8th and 9th days slight fugitive ecchymoses appeared on the arms. These vanished after a couple of hours, but only to appear again, hardly ever in the same place. The change of position was ascertained by surrounding each patch with ink. Iliac gurgling was distinct on the 7th day. On the afternoon of the 9th day there was a long and profuse sweat, after which every symptom, except intense weakness, at once disappeared.

In this case EHRlich's test gave no reaction. On adding the ammonia to the shaken-up liquid in the test tube an opalescent ring was formed. After 24 hours there was a slight violet or purple deposit.

CASE III.—Englishman, aged 25. Three days ill with prostration, headache, sleeplessness, foul tongue, loss of appetite. Thinks he is delirious at night. Temperature on 4th morning  $104^{\circ}$ ; in evening  $104^{\circ}.5$ . Abdomen tympanitic. Characteristic stools (four). No spots, tenderness or gurgling. Deafness and stupor on 6th day, temperature varying between  $102^{\circ}$  and  $104^{\circ}$ . Pulse 100 to 110, dicrotic; pupils dilated. Delirious; violent at night until the 8th day. Typhoid stools until the 11th day, when convalescence set in.

It is but seldom that we come across the "ambulatory typhoid" in which a patient goes through the entire, or nearly the entire, course of his fever without suspecting that there is anything wrong with him. The following histories describe conditions approaching this:—

CASE I.—Mercantile assistant, aged 29. Accidentally observed in his office, where he had been working in the usual way for the usual number of hours daily. He looked extremely ill, but said that beyond sleeplessness there was nothing the matter with him. Sent to bed. Temperature at noon  $104^{\circ}$ . Stools liquid, frequent, black from iron which he had been taking freely on his own account. Three rose-coloured spots on abdomen; much tenderness, distinct gurgling, tympanites. At night temperature  $102^{\circ}.4$ ; wandering. Tongue dry, yellow, red tip and edges. Spots continued to come out, and the fever followed the course usual in the third and fourth weeks. Convalescence was established on the 12th day after treatment began. When, after five days, the stools lost their black colouration they were seen to be typical.

In this case sudden death might have occurred. The circulation was feeble and intermittent when the patient was first seen, and on the following day he had a paroxysm of cardiac failure with dyspnoea, extremely rapid incomplete cardiac contraction, pallor and cold sweat, which would probably have terminated fatally had it come on while he was sitting at his desk.

CASE II.—A lady recently arrived in Shanghai; phthisical family history on both sides. Shortly after her arrival she went on a long sea trip, in the course of which she caught cold. This was speedily followed by "break-bone pains," occasional vomiting, yellow diarrhoea, sore throat, distension and tenderness of the abdomen. Her skin was always hot, often pungent; she slept badly, and talked in her sleep. Complete anorexia. After 10 or 12 days, frequent starting of the muscles of the limbs was observed. Meanwhile she went about at each port that she visited, inspected curio shops, and took much exercise. She swallowed a great deal of quinine.

On her return to Shanghai, probably about the 18th day of her illness, her tongue was dry and irritable, all the papillæ largely developed. Her gums were spongy. There were a number of minute herpetic ulcers on the mucous membrane of the lips. Her skin was dirty-yellow; lips pale. The abdomen was slightly distended, uniformly sensitive. Severe cough, with frothy tenacious expectoration. The temperature was  $101^{\circ}$  (7 A.M.), and rose to  $104^{\circ}.3$  at night. For 12 days a fever temperature was maintained, after which convalescence was established. The morning temperatures ranged between  $100^{\circ}$  and  $103^{\circ}.5$  for 11 days, and the night temperatures between  $101^{\circ}.4$  and  $105^{\circ}.2$ . The stools were characteristic, and all the symptoms indicative of the third and fourth weeks of ordinary enteric fever. It

may be noted that the catamenia appeared normally during the second week, and that they reappeared a fortnight after convalescence. A tendency to drag on with slightly elevated night temperature ( $100^{\circ}$ ) was speedily checked by the administration of quinine.

True relapse of enteric fever, by which I mean a fresh outburst some weeks after complete convalescence, is, so far as my experience goes, one of the rarest events here. The patient whose case has just been mentioned offered an instance of it.

*Enteric Fever. Relapse after six weeks. Recovery.*—Forty-two days after the last record of a fever temperature she began to experience loss of appetite, rapidly increasing weakness, sleeplessness and diarrhoea. This lasted for five days, and I saw her on the 6th day. Her morning temperature was  $102^{\circ}.5$ ; evening temperature  $104^{\circ}$ . Stools nearly watery; yellow, fetid. Tongue normal. Abdomen distended. Slight tenderness to percussion in hepatic region. Distinct gurgling. The temperature ran as follows (falling at night for three days):—

6th to 10th day . . .	Morning range .	$102^{\circ}.3$ to $103^{\circ}.7$	. . .	Evening range .	$103^{\circ}.4$ to $104^{\circ}.4$
11th „ 13th „ . . .	„ „	$100^{\circ}.8$ „ $102^{\circ}.8$	. . .	„ „	$103^{\circ}.8$ „ $104^{\circ}.1$
14th day . . . . .	Morning temperature .	$103^{\circ}.5$	. . .	Evening temperature .	$102^{\circ}.8$
15th „ . . . . .	„ „	$102^{\circ}.4$	. . .	„ „	$98^{\circ}.2$
16th „ . . . . .	„ „	$101^{\circ}.5$	. . .	„ „	$100^{\circ}.9$
17th to 22nd day . . .	Morning range .	$98^{\circ}.4$ to $99^{\circ}.8$	. . .	Evening range .	$98^{\circ}.4$ to $101^{\circ}.1$

The course of the relapse was thus exactly three weeks. The patient was deaf and occasionally delirious. Dilated pupils throughout. Two rose-spots were discovered on the 10th day. All through there was excessive perspiration. The tongue varied from normal to extreme dryness. The catamenia lasted from the 3rd day of the fever to the 13th. Diarrhoea was characteristic. There was intense prostration; congested pharynx; cough; headache; horrible visions. Convalescence was established at the end of the third week.

The chronic “seediness” which is occasionally the reward of habitual drinking may mark the onset of enteric fever; loss of appetite, sleeplessness, horrible visions, foul tongue, thirst and deranged bowels, with perhaps mucous or bilious vomiting, being regarded as natural incidents, and giving rise to no suspicion of their special significance.

CASE I.—Clerk, aged 22. Shivering and one distinct rigor, intense headache, sleeplessness, “dreamy states,” paroxysmal sweats, excessive bladder irritability, anorexia, urgent thirst. Bowels irregular for several days. Stools now liquid, yellow, fetid; frequent. Had been drinking and otherwise dissipating for a fortnight or three weeks, and had lost his employment in consequence. He attributed all his symptoms to his imprudences, and sought advice because he thought that he was about to have an attack of delirium tremens. On what I assumed to be the 8th day of his illness, I found the hepatic and splenic regions hypersensitive, the liver extending downwards for an inch below the costal arch, and the left lobe specially painful to percussion. The spleen could be distinctly felt, but the increase in its size was not great. Tongue white, dry, red tip and edges. Pulse, small and soft,  $104$ . Temperature at 2 P.M.  $103^{\circ}$ . Cough with mucilaginous expectoration; respirations 24. Distinct tenderness and gurgling in the caecal region. No spots. Sent to hospital.

The disease proved severe. Spots appeared on the 11th day. The most distressing symptom was intense frontal headache with photophobia, which persisted until the middle of the third week. All through the disease the patient was very tremulous; after the 16th day he was stupid, and on the 40th day he became deaf. He did not become distinctly delirious until the 43rd day; he was muttering on the 44th day, with much subsultus; inclined to be violent on the 45th day. After this he did not wander. His pupils were dilated and insensitive from first to last. Sweating was profuse; there was one severe and prolonged rigor on the 11th day. The temperature was rarely under  $102^{\circ}$ , and often approached

105°, until the 36th evening, when it reached 105°.1; it then gradually fell, and first reached normal on the 48th day. There were occasional paroxysms of bladder irritability. Tympanites was never very marked. The stools were characteristic. Among many serious complications was ulceration of the pillars, soft palate and back of the pharynx, which made its appearance on the 10th day, and slowly spread over the hard palate, superficial sloughs being thrown off, and profound gangrene seeming imminent for several days. On the 22nd day an abscess was found in the scrotum at the root of the penis. This was incised and dressed antiseptically, but a deep slough formed, and the urethra was seriously threatened. Intestinal hæmorrhage occurred on the 22nd, 23rd and 24th days, about 60 ounces of blood, liquid and coagulated, being lost. Recovery however was complete, and there were no sequela.

CASE II.—Frenchman, aged 23; clerk. Similar history of constant debauchery. Sleeplessness, horrible dreams, anorexia, fetid diarrhoea, all attributed to natural disturbance of health in consequence of drinking. Seen about the 16th day. Intense prostration, rose spots, tympanites, deafness, stupidity, night delirium, typical diarrhoea. Dicrotic pulse. In this case the course was more benign. The temperature varied round 104° at night, and between 102° and 103° during the day until the 21st day. There was hardly any iliac tenderness, but pressure in the umbilical region was exquisitely painful. This tenderness lasted for a week and then disappeared spontaneously. The stools continued characteristic until the 31st day. There was a severe nasal epistaxis on the 23rd day. Apart from this, no complications. No sequela.

Sloughing of the scrotum has been observed in cases of profound malarial intoxication.\* Ulceration ("small, circular punched-out ulcers, healing rapidly") of the soft palate, rarely of the posterior wall of the pharynx, is given by CAHN of Strassburg (under KUSSMAUL'S guidance), as important for the diagnosis of typhoid.† It must very seldom be necessary to have recourse to this symptom for the purpose of strengthening a diagnosis. It is, however, important to note that ulceration of the upper end of the digestive tract may in typhoid prove in itself a source of danger.

In many of the cases detailed I have mentioned the occurrence of a soft systolic bruit, heard equally at the apex and base of the heart, appearing usually about the end of the second week and lasting until convalescence is fully established. I do not purpose here to consider the organic cardiac complications of enteric fever. This subject was exhaustively treated by HAYEM in 1875.‡ The bruit to which I refer indicates no valvular mischief, and is doubtless due to toxic interference with the innervation of the heart and degenerative changes in the cardiac muscle, manifesting themselves by irregular contraction. It has, however, given occasion to an erroneous diagnosis.

CASE.—*Enteric Fever. Muscular Bruit mistaken for an indication of Pericarditis.*—In October 1875 I was in attendance on a Japanese, aged 24, who was passing through an attack of typhoid fever of average severity. The bruit to which I refer, and for which I had been searching, became audible on the 14th day. The patient's friends, probably impressed and made apprehensive by the frequent examination of the heart region, surreptitiously consulted an eccentric practitioner whose career in Shanghai was neither brilliant nor prolonged, but who had I understand passed through the usual training of a large London hospital. He denounced the diagnosis of typhoid fever, pronounced the disease to be pericarditis, and gave a fatal prognosis unless the patient was "at once put on mercury pushed to salivation and a large blister" was applied to the præcordia."

Presumptuous ignorance pushed to this extent is fortunately rare. But the story shows that mistake is possible, especially should no sufficient attention be paid to the history of each

\* References in *London Medical Record*, 1886, p. 151.

† *Berliner klinische Wochenschrift*, 1886, p. 217.

‡ *Leçons cliniques sur les manifestations cardiaques de la fièvre typhoïde.*

case. Nor is the accurate diagnosis of typhoid fever merely a matter of scientific nicety. In the case just related the heroic treatment recommended would in all probability have proved speedily fatal, just as many typhoid cases have undoubtedly died poisoned by quinine, and in later days by antifebrin.

Parotid bubo presenting itself as a complication is usually of fatal significance. Subcutaneous abscesses in various parts of the body are not infrequent, as is well known, and however long and tiresome the series of such collections may prove they are hardly ever of grave import. Even in the rare instances when abscesses, due to the degeneration of ZENKER, form in the substance of muscles, recovery has been the rule.\* But MURCHISON † reports losing five cases out of six in which parotid bubo appeared, and quotes TROUSSEAU to the effect that a case scarcely ever recovers when pus forms in the depths of the parotid gland. Recovery is certainly very uncommon. In recent literature I find but one case so terminating recorded. ‡

The patient was a boy of 7 years. About the 16th day inflammation of the left parotid region declared itself, with gangrene of the skin below the right angle of the mouth. Sanious pus evacuated by deep incision six days later. Submaxillary bubo of right side terminating in resolution.

A case of recovery from sequential "cellulitis of the neck" is reported in the same journal.§ From the anatomical description given this would appear to have been a parotid bubo which ended in resolution after division of the fascia over the gland.

CASE.—*Enteric Fever. Bubo in each Parotid. Recovery.*—A lady, aged 23, recently married. Usual series of symptoms. Sleeplessness, headache, articular pains, prostration; hurried respiration, slight cough with expectoration of bronchial mucus; pulse soft, rapid, dicrotic; dry loaded tongue, nausea, anorexia, thirst, diarrhoea, abdominal distension, hypersensibility in caecal region; temperature varying between 102° in the morning and 104°.6 at night. There was an initial rigor, and paroxysms of sweating were frequent subsequently. Deafness was an early symptom (5th day). There was much drowsiness, the patient dozing for hours at a time with her eyes half open. Delirium and subsultus on the 6th day. When fully awake she complained bitterly of paroxysms of intense pain starting from the shoulders and radiating to her finger-tips, being particularly severe in the elbows. The elbows were red, very sensitive to pressure, but there was no effusion into them and motion was free. Constant purging of characteristic fluid. Occasional epistaxis. At the end of the first week the lips were cracked, teeth covered with sordes; face flushed purple; very stupid; breathing superficial and laboured with much expansion of the *alæ nasi*, profuse secretion in the tubes, hardly any cough; right heart overfilled.

At this stage, as suffocation appeared imminent, I administered a sulphate of zinc emetic, which brought up an incredible quantity of mucus, and, followed by a large draught of champagne, changed the immediate aspect of affairs. In such urgent cases the risk of collapse after the vomiting must be anticipated and faced.

After the 10th day the temperature fell, but the nervous symptoms were unabated. She was always restless, and the delirium was occasionally wild. Her sense of smell became extraordinarily acute. Severe occipital pain. Great abdominal distension, but very free escape of flatus. On the 14th day she was vermin-hunting, and a crop of purpuric spots came out on the buttocks. Her pulse was now running. Cramps of leg muscles. Constant shouting; all sorts of fancies as to where she was. On the 15th day she complained of severe pain behind the jaw on the left side, and a deep-seated hard swelling, very sensitive to pressure, was detected there. Her temperature rose next morning to 103°.5. Left side of neck now brawny. A similar swelling forming on the right side.

\* For references, see *Progrès Médical*, 1886, p. 1067.

‡ *Lancet*, 1879, ii, 909.

† *The Continued Fevers of Great Britain*, 2nd ed., p. 583.

§ *Lancet*, 1889, ii, 998.

All this time the stools were frequent and typical. There was no cardiac bruit.

On the 18th day the stools were frequent, fetid and passed unconsciously. On the 19th there was a severe rigor followed by sweating. An exploratory incision under local anaesthesia gave exit, at what appeared to be a considerable depth (the tissues overlying the gland being however much thickened by oedematous infiltration), to about 6 drachms of bloody and curdy pus, with one or two minute sloughs. During the following days, under frequently renewed poultices of very fine oakum freshly carded from new Europe rope and wrung out of boiling water, the skin being protected by a thick layer of boracic ointment, there was a profuse discharge of pus, which speedily assumed a healthy character. Three days after the evacuation of the abscess on the left side deep fluctuation was detected in the right parotid swelling. This was incised and similarly treated, the pus from this second abscess being creamy. By the 38th day the incisions had closed, and convalescence was established.

In a long experience of enteric fever the case just summarised was the most menacing that I have ever known to terminate in recovery.

Among the rarer sequelæ of enteric fever are affections of the eye. MURCHISON casually mentions sloughing of the cornea, attributing it to arterial thrombosis. In the following case ulceration was probably merely a local sign of general malnutrition.

*Enteric Fever. Marginal Corneal Ulcers. Recovery.*—A Chinese dyer, aged 39. For a fortnight had had frequent, liquid, yellow, generally fetid stools; red, baked tongue; pungent heat of skin; wasting, muscular weakness; sleeplessness, stupor and night delirium. There had been no rigor or sweating.

On admission the tongue was raw, furred, dry. Intense headache, photophobia, insensitive and slightly dilated pupils. Two rose spots on abdomen. Stools frequent, typical. Abdomen swollen, marked tenderness in caecal region. Pulse rapid, feeble, dicrotic with occasional intermittences. Suitable nourishment rapidly improved the condition. On the 26th day a small ulcer was observed at the outer edge of the left cornea, followed by three more a few days later. All four healed slowly, and the eye had not completely recovered until three weeks after the appearance of the first ulcer.

That enteric fever may run its course, and even a severe course, with very slight elevation of temperature or with none at all is well known. Cases of this kind are, however, rare. A more important observation is that in the course of an attack the temperature curve may vary between very wide limits while the general symptoms show no improvement in correspondence with the lower readings of the thermometer.

*Enteric Fever. Moderate or normal Temperatures. Severe Symptoms. Recovery.*—A Japanese, aged 24. Ill five days when first seen. The usual group of symptoms was present. Up to the 14th day the temperature never reached 104°, and was rarely over 102°. The highest reading for the 24 hours was in this case, as in most others, always registered about 6 P.M., the descent for the night beginning between 6 P.M. and 9 P.M. After the 14th day the temperature was normal or subnormal. But the patient was for nearly three weeks perfectly deaf and either stupid and indifferent or wildly delirious; he hardly ever slept; his stools were indescribably fetid, and his abdomen enormously distended. The bases of both lungs were solid for 10 days. He refused wine and was fed only with the utmost difficulty. On the 28th day, when the temperature had already been normal or slightly below normal for a fortnight, convalescence suddenly set in, without however any critical phenomenon, and recovery was speedy.

In several cases of enteric fever occurring among females, detailed in this and previous Reports, it has been incidentally noted that the catamenia are not arrested or materially affected by even the severest forms of the disease. In one case where the attack came on during the period of lactation and nursing was continued (against advice), the child appeared sufficiently

nourished and certainly received no injury. The following case shows that pregnancy at an early stage is not necessarily disturbed by enteric fever :—

*Enteric Fever. End of second month of Pregnancy. Pregnancy undisturbed.*—Patient had suffered severely from Tamsui fever. When seen her temperature for several days had not been below 101°. Vomiting, anorexia, foul tongue; dry pungent skin; headache, lumbar and joint pain, sleeplessness. Temperature (afternoon) 103°.5. This was supposed to be the 5th day. Diarrhœa, yellow and flocculent, occurred on the 7th day, and persisted. Muscular pains of extraordinary severity formed the most distressing symptom. There was but slight tympanites; no spots; but there were distinct tenderness and gurgling in the cœcal region. The highest morning temperature recorded was 102°.4 on the 8th day, and the highest evening temperature was 103° on the 7th day. The temperature did not fall to normal until the 27th day. At this time pregnancy was not suspected. The catamenia had been absent for two months, but as they had frequently been irregular on previous occasions no particular attention was paid and the fact was not mentioned. However, 230 days from the beginning of the fever a mature child was born. Pregnancy therefore dated from 50 days before the patient fell ill.

It would naturally be supposed that enteric fever attacking a person already advanced in phthisis would run a severe and probably fatal course. This, however, has not been my experience. In fact all the cases which have come under my care with this combination have by a singular chance terminated favourably.

CASE I.—*Enteric Fever, occurring during the third stage of Phthisis. Intestinal Hæmorrhage. Recovery.*—Patient (female, English, aged 28) seen 20th October 1875, on what was supposed to be the 8th day of her illness. She is a fragile woman, with salient cheek bones, flushed cheeks, fair hair and complexion, ill-formed teeth, sunken chest, atrophied mammæ, clubbed finger-tips. Has had two children, both alive but delicate; one four years old, the other two years. She nursed each for only a few weeks, when her milk failed without any breast trouble. Five years ago she had severe hæmoptysis, which lasted for a month, and was followed by a long period of purulent expectoration. She recalls rather indistinctly a similar sequence of events several years before, when she was a child. Ever since the last attack of hæmoptysis she has coughed, expectorated purulent lumps, and sweated at night. She has very slowly wasted, losing a few pounds every year. The catamenia since the birth of her last child have been irregular as to quantity, regular as to recurrence. Anorexia. Constipation.

Her father and one sister died of phthisis at an early age.

Her present illness began about a week ago with constant high fever, quiet night delirium, and almost absolute sleeplessness. She speedily became extremely prostrate. Excruciating frontal headache; photophobia. Lightly tapping the head anywhere exasperates the headache. Pupils dilated, sensibility to light apparently diminished (only a very dim light could be used). She has a short hacking cough, and profuse yellow, frothy, fetid diarrhœa, which came on after a seidlitz powder taken two days ago. This afternoon (8th day) there was a profuse discharge of bloody fluid from the bowel. She is constantly retching.

There is no uterine trouble. The heart is apparently healthy as regards the valves, but there is a faint muscular bruit at the apex and base. The pulse is distinctly dicrotic. The liver and spleen are of normal size, and neither is tender on palpation. Marked tenderness and gurgling in the right iliac fossa, and the supra-pubic region is also very sensitive.

The lungs are uniformly dull in front. There is a deep depression under the left clavicle. The chest hardly expands in the least on the deepest inspiration. Respiration being almost exclusively abdominal causes so much distress that it is voluntarily slowed. Percussion is clear behind on the right side, between the scapula and the spine. Respiration is puerile over the upper part of the right back,

tubular elsewhere. Posteriorly the whole left chest is wooden, except over a small area corresponding to the spine of the scapula; here there is gurgling.

The heart sounds are not audible in the right back, but are intensified in the left axilla. True vesicular murmur is not to be found anywhere. Respiration is tubular over the greater part of both fronts, with small scattered areas of absolute silence.

In spite of this unfavourable condition the fever ran an average course. Prostration was extreme. The temperature rose to  $105^{\circ}.8$  on the 10th night, and was  $104^{\circ}$  on several mornings; but there was generally a daily interval between 10 A.M. and 2 P.M., when it fell to about  $100^{\circ}$ . Delirium was occasionally violent, with very severe headache. Dysuria was distressing from the 11th to the 13th day. On the 10th day continual twitching of the lower facial muscles on both sides was observed. This ceased on the 12th day. Rose spots appeared in successive crops after the 12th day. On this day also the catamenia appeared (due date), and lasted until the 15th day, the discharge containing several black clots. The temperature fell to normal on the 26th day, and did not again rise. A fortnight later it is noted that the myocardial bruit had almost disappeared. The condition of the chest was unaltered. Patient was eating and sleeping well.

CASE II.—*Enteric Fever in course of Phthisis. Syphilis. Intestinal Hæmorrhage. Pneumonia. Recovery.*—Marine engineer, aged 28. Patient comes of a phthisical family. In June 1884 for the first time spat blood, and ever since has been much troubled by cough with muco-purulent expectoration. He sweats much in the early morning. He is gradually but very slowly losing weight. There is consolidation at both apices. In August 1884 he contracted syphilis, followed in November by a roseolar eruption, which was accompanied (at another port) by an attack of "typho-malarial fever" which laid him up for two weeks. Apart from the eruption just mentioned, he has had no constitutional symptoms of syphilis.

Seen 19th March 1885, supposed to be the 6th day of an illness characterised by sleeplessness, severe headache, pungent skin, intense prostration, white tongue with red dry tip and edges, meteorism, abdominal sensitiveness, not localised; and yellow, slimy, fetid diarrhœa. The temperature ran high— $103^{\circ}.4$  on the 12th morning,  $105^{\circ}$  on the 11th evening. It averaged  $102^{\circ}$  in the morning and  $104^{\circ}$  at night for the first 17 days, when there was a sudden fall to normal, which persisted until the 21st day, accompanied by remission of all the symptoms. Severe intestinal hæmorrhage on the 8th day, controlled by sulphuric lemonade. Bleeding did not recur. The pulse and temperature were alike unaffected by the hæmorrhage, the pulse being throughout full, soft and under 100 in frequency. The stools were characteristic; there was much quiet delirium; spots appeared on the 12th day. On this day also there was a slight discharge of pus from the umbilicus, the source of which was obscure. Tympanites was distressing, but abdominal tenderness disappeared early. On the 11th day the tongue and muscles of the limbs became tremulous. On the 10th day the patient was troubled with cough, and expectorated some frothy mucus streaked with blood. Previous to this day and after it until the 21st the lung symptoms appeared to be in abeyance.

On the 21st day, when everything promised speedy convalescence, dyspnœa came on suddenly, with livid lips, scanty, blood-stained expectoration, and dry tongue. The base of the right lung up to the angle of the scapula was absolutely dull. Breathing tubular; no respiratory murmur. Respiration 36; pulse 120; temperature  $104^{\circ}$ , about which it remained for seven days, rising to  $105^{\circ}.2$  on the 3rd night. On the 2nd day of the pneumonia a very large quantity of bile was vomited, with notable relief to the breathing. There was now slight splenic enlargement and tenderness, but no notable enlargement of the liver. The expectoration was characteristic. On the 8th day the lung had cleared, and from this out (28th day of the illness) convalescence was uninterrupted except by violent cramps in the left calf muscles, which persisted from the 37th to the 39th day.

The complication with pneumonia is tolerably frequent, but not specially fatal. It was menacing in the case just detailed, but rather on account of the phthisical and syphilitic history of the patient.

*Enteric Fever. Pneumonia. Severe nervous symptoms. Recovery.*—Englishman, clerk, aged 32. Ailing for about 10 days. Sleepless, severe vertical headache, muscular pains, prostration; anorexia, brown baked tongue with red tip and edges, frequent bilious vomiting, yellow diarrhœa. For the last four days the stools have contained blood. Coughing.

Seen 2nd January 1876, assumed to be the 10th day of the illness. At the base of the right lung is an area about the size of the palm of the hand absolutely dull. It is with difficulty that the patient can be got to draw a long breath; when he does crepitation is audible. In the centre of the patch crepitation is coarse, finer towards the margins. At the edge of the dull area respiration is tubular. Marked immobility of right side. Patient cannot lie on the left. Sputa rusty.

Half a dozen rose spots round umbilicus. Gurgling and tenderness in right iliac fossa. Tongue as above described. Pupils medium, sluggish. Much muscular tremor. Respirations 40; pulse 100; temperature (4 P.M.) 103°.

The pneumonia was severe. Respiration varied between 40 and 50; pulse between 100 and 130 (on the 16th, 17th and 19th mornings falling to 84, 96 and 96 respectively, the corresponding breathing rates being 46, 40 and 48); temperature between 100° and 103°.8 in the morning, and between 101° and 105° at night. On the 16th and 22nd mornings the temperature fell for a couple of hours to normal, without any corresponding general improvement. Paroxysms of sweating were severe and frequent. On the 12th day about 2 ounces of pure blood was expectorated, and it is noted on the same day that the stools were like "meat-washings." Delirium, muttering, subsultus and indifference from the 13th day; fly-catching on the 21st day, when also he had a prolonged rigor. Pulse hyperdicrotic. On the 15th day it is noted: "Base of right lung completely solid; unconscious of dyspnœa; pupils widely dilated and "insensitive; muttering delirium during semi-sleep; very distinct myocardial bruit."

Meanwhile the enteric fever pursued its course. The stools were frequent and characteristic; there was distinct gurgling on palpation in the cœcal region; whether there was tenderness or not could not be ascertained. On the 17th day the following note was taken: "Is constantly drowsy, but can hardly "be said to sleep. Constant starting of legs. A touch on either sole causes a jump as though a shock "from a battery had been given." A fresh crop of rose spots came out on the 18th day, the former having faded. There was great abdominal distension. The heart's action became extremely feeble towards the end of the third week. On the 23rd day crepitation was again audible, and on this day there was a considerable loss of blood from the nose. After this all the symptoms abated. Delirium persisted to the 30th day, but by the 32nd day convalescence was established.

The following case is a purely typical one, occurring in a young subject recently arrived, advancing without complication, but with almost every ordinary symptom, to a favourable issue at the end of the third week. It represents the natural course of the disease when the patient is placed amid favourable surroundings, for, after stopping quinine, treatment was limited to a carefully regulated diet, sponging with tepid water and vinegar, the administration of a few chlorate of potassium lozenges, and an occasional enema.

*Enteric Fever. Natural course. Recovery.*—A young English girl, aged 15½; recently arrived in Shanghai. Ailing for a week with sleeplessness, articular and muscular pain, "stitch" in left side of chest, frontal headache, intolerance of light; anorexia, foul tongue, yellow diarrhœa, sore throat; pungent skin. She had been delirious during the night previous to summoning advice. Had had 10 grains of quinine every day, administered in amateur fashion.

Seen 8th May 1885, supposed to be the 8th day of the disease. The morning temperature was  $102^{\circ}$ ; afternoon,  $104^{\circ}.5$ ; evening,  $105^{\circ}$ . Face flushed. Spleen tender; could just be felt on deep palpation. No hepatic enlargement or tenderness. Heart healthy. A few disseminated moist râles over posterior surface of both lungs. Tongue brown, moist. No spots. Slight gurgling in cæcal region; no marked tenderness. Pillars and back of pharynx much congested; on each side behind the posterior pillar there is a raised congested patch, only a part of which is visible, which appears to be the main cause of the throat trouble. Stools characteristic.

There was great prostration throughout. A very faint myocardial bruit was audible from the 10th day to the establishment of convalescence. The pulse was soft and lingering, varying in frequency from 78 to 100; dicrotic after the 12th day. Patient was delirious from the 10th to the 20th day; very deaf and stupid from the 10th day onward. The pupils were dilated but sensitive after the 12th day. From the 16th to the 19th day there was general muscular tremor, with subsultus from the 18th to the 21st day. There was no rigor. Sleep was variable, but a fair amount was obtained, mostly disturbed by visions. Cough was troublesome for a few days; on the 10th she expectorated some blood-stained mucus with marked relief, and on the 12th day she had a paroxysm of hurried breathing without dyspnoea, lasting for a couple of hours, during which the respiration rose to 40. There was nothing discoverable in the lungs beyond slight bronchial catarrh to account for these symptoms. The condition of the tongue varied; it was sometimes brown and dry, occasionally normal. The lips were cracked, and sordes collected on the teeth on the 11th day. On the 10th day an ulcer appeared on the congested patch on the left side of the pharynx and spread for two days, causing some dysphagia. It had healed by the 17th day, and the patches disappeared shortly afterwards. Thirst was urgent. There was complete anorexia until the 15th day, when appetite began to return. Paroxysms of sweating were frequent. The eruption appeared in two crops, on the 10th and 13th days respectively. From the 11th day out the skin was covered with sudamina. The stools were characteristic up to the 17th day; horribly fetid, but occasionally solid between the 11th and 18th days. No intestinal hæmorrhage. There was slight tympanites, which first declared itself on the 10th day. On the 14th day the abdomen was rather excavated. There was no vomiting; splenic tenderness persisted to the end of the illness, and once or twice slight hepatic sensitiveness was complained of under percussion. There was no ascertainable enlargement of the liver. Gurgling was present from the first in the cæcal region, and from the 10th day onward there was some sensitiveness. Her hair began to fall out on the 11th day, and had become very thin before the illness terminated; six months later it had grown luxuriantly. For a week after convalescence was established she suffered severely from aching in the soles of her feet and cramping pains in the joints of her fingers and toes. After her recovery her memory was a complete blank with regard to the earlier and middle periods of her illness. The following abstract indicates the range and course of the temperature:—

8th to 15th day.—Max.,  $105^{\circ}$  on 8th morning and 11th forenoon; min.,  $100^{\circ}.2$  on 15th morning. The temperature was generally close to  $104^{\circ}$  between 11 A.M. and 3 P.M.

16th to 19th day.—Max.,  $103^{\circ}$  on 18th afternoon; min.,  $98^{\circ}.4$  at 11 A.M. on 16th day. During this period there was a fall of one or two degrees at night.

20th day.—Max.,  $103^{\circ}.4$  in the afternoon, after a saline laxative, which stirred up and brought away a quantity of putrid fæces. Temperature normal all through forenoon and at night.

After the 22nd day the temperature remained permanently normal.

So far as my experience goes, enteric fever is rare in young children. I hear of many cases, just as I hear of many cases of diphtheria and of sprue, terminating of course in recovery, but I see hardly any. Malarious fevers, fever from indigestion, from worms, from exposure to heat, occasionally fever of purely nervous character, are all common enough among children, and no doubt explain many marvellous recoveries from typhoid within a week or 10 days. But when genuine typhoid does attack a young child and runs its normal course of three or four

weeks, it often leaves after it a condition of deep anæmia with dyspepsia, bowel irregularity, fetid stools, and a tendency to moderately high temperature towards evening, which last almost indefinitely. Here quinine, or quinine with arsenic, alcohol and gentle saline purgatives, with frequent sponging with hot diluted vinegar, are more effectual than even change of air, which often completely fails to restore health. Iron is, I think, seldom of any use and is often injurious.

CASE.—A girl, aged 7; recently arrived from England. Had had a three weeks' illness at another port, diagnosed as "typho-malarial fever." The symptoms described clearly indicated typhoid. She had lost 8 lbs. during her illness. After a fortnight's change to Chefoo she was brought to Shanghai. Her lips and gums were pale, conjunctivæ pearly, finger nails dark; she was made breathless by slight exertion, and complained of much cardiac distress. Her pulse was 132. She slept badly. Her stools were frequent; sometimes small, always fetid, generally pulpy, but occasionally watery. They were yellow or light brown, and often contained bits of undigested food. Her tongue was moist, but brown and loaded. She had a short dry cough. The child complained chiefly of occasional vertigo, of constant aching in all her muscles, and of absolute disgust for food. There was nothing to be detected in the lungs; there was a faint systolic cardiac bruit heard equally well at base and apex, not propagated into the axilla. There was no hepatic enlargement, but the spleen was easily to be felt and was distinctly tender. During the first three days her temperature varied in the morning between  $97^{\circ}.8$  and  $99^{\circ}.3$ ; at noon between  $99^{\circ}$  and  $100^{\circ}.5$ ; and at night between  $101^{\circ}.9$  and  $103^{\circ}.5$ .

Under the treatment above indicated she had begun to sleep perfectly well by the 4th night, and on the 5th day appetite is noted as voracious. On the 10th day colour had returned and the child seemed well, the night temperature however still reaching  $100^{\circ}$ . On the 12th day treatment was discontinued. The temperature did not rise above normal after the 10th day, and a week later the patient returned home in perfect health.

Systematically arranged in this Report and in that which immediately preceded it, as well as scattered through previous issues, there are now in print descriptions fully illustrative of, I believe, every form of enteric fever encountered in China. These records are the *pièces justificatives* upon which is based the clinical study of enteric fever which closes this volume.

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## CLINICAL STUDIES OF DISEASE AS OBSERVED IN CHINA.

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### CHAPTER IV.

#### ENTERIC FEVER.

##### DEFINITION AND HISTORY.

I WOULD define Enteric Fever as an acute disease of the entire economy; infectious but not contagious; presenting all degrees of severity; of uncertain duration; characterised by fever of remittent character, early and remarkable depression, nervous disturbance, rapid wasting and muscular degeneration, and by an infiltration of glandular tissue throughout the body with multinucleated cells, which speedily advances to complete granular or fatty disintegration in a larger or smaller number of the agminated and solitary glands of the intestine and of the glands of the mesentery.\*

It is in the fact that enteric fever is a disease of the whole body—that is, that all the systems of organs corresponding respectively to the various functions of life are obnoxious to the influence of its cause, whatever that may be—that we find an explanation of the variability in its symptoms which is so great as to suggest the existence of several distinct forms of disease agglomerated under the single name of enteric fever. For reasons altogether unassignable, but such as we see illustrated every day in other sequences of events, the stress of the poison falls in different cases upon different sets of organs and with different degrees of intensity.

Twenty-five years ago the majority of the older practitioners at the open ports in China threw doubt on the existence of enteric fever among foreigners. They rarely if ever made a postmortem examination, and experience had so deeply impressed them with the multiformity of malarial manifestations, that no phenomenon of disease, however curious and unexpected, seemed incapable of being reasonably referred to malaria as its cause. Hence the wide and constant prevalence and the heavy mortality of what was called remittent fever; for faulty diagnosis led to faulty treatment, and quinine was lavished on cases where its action must have been distinctly hurtful. Nor unfortunately have mistaken views regarding this important matter altogether died out. A very few years ago a Shanghai resident contracted at another port what was diagnosed as “typho-malarial fever,” but which from the description given was certainly enteric, during which there were intense prostration, delirium, and subsultus; tympanites, gurgling, and iliac tenderness; and which proved fatal. The diagnosis, when

\* The description of enteric fever which follows may possibly be in many respects defective, for it is neither more nor less than an abstract from a multitude of case sheets and postmortem reports which have accumulated under my hands during close on a quarter of a century. Whatever I have not seen myself finds no place in it. But lacuna which would be inexcusable in a didactic treatise are almost inevitable in pages whereof the sole object is not to teach but to contribute to the raw material of teaching.

challenged after the event, was reaffirmed on the ground that "as there were no spots and as the stools were sometimes brown the disease could not have been typhoid." The patient swallowed between 60 and 70 grains of quinine daily for more than a fortnight, a treatment certainly in nowise calculated to further recovery.

There has been a similar history in India, where enteric fever first appeared in the statistical returns of the diseases of British troops in 1870.

Yet the disease was recognised and its origin discussed by the medical officers serving with the British troops in China in 1859. During the years from 1861 onward scattered cases of enteric, some of which, it must be confessed, were diagnosed as "typho-malarial" or "mixed" fevers, but in any case not as remittent, were observed in Newchwang, Tientsin, Peking, Chefoo, Chinkiang, Kiukiang, Ichang, Shanghai, Ningpo, Foochow, Amoy, Swatow, Canton and Hoihow;\* that is to say, everywhere from end to end of the coast of China; but at least up to 1875 they were regarded as rarities, and to none of the fatal cases was any report of postmortem examination appended until September 1884, when Dr. RENNIE, of Foochow, published† a brief account of characteristic lesions found by him. Since then the morbid appearances have been frequently described. In the earlier days the remarks on fevers inserted in the reports of missionary hospitals for natives were meagre in the extreme, and betray an absolute confusion between enteric, severe remittent, and the form of typhus described in the last chapter. Notwithstanding this, in the lists of diseases treated appended to these reports "typhoid fever" frequently appears, as though the form were perfectly defined in the minds of the reporters. Thus, 75 cases of typhoid fever are entered without any remark in the list given for 1861 by the medical officer of the London Missionary Society's Hospital at Shanghai. Alternate over-hesitation and over-confidence in the matter of diagnosis were, however, natural and excusable at a time when nothing had as yet been done to clear up the morbid anatomy of a disease of so fluctuating a type.

In some cases no doubt it was a mere question of language. The late Dr. REID, of Hankow, than whom there have been few more competent or patient observers, while admitting the frequency among his foreign patients of "malarious fever with enteric symptoms," against which quinine was perfectly inoperative, was in the habit of asserting positively that in a practice of 15 or 20 years in Hankow he had never seen a case of enteric fever. Dr. BEGG, though he recognises its presence at that port, believes that it differs from the disease as encountered in Europe, inasmuch as constipation usually replaces diarrhoea, and the eruption is seldom or never seen. These differences, however, as will be shown farther on, are not sufficient to constitute a distinct form of the affection.

However it may be among the natives, about whose diseases and their prevalence and propagation we know hardly anything, enteric fever has not at any time or anywhere in China shown itself in an epidemic form among foreigners. On the other hand, it may be said to be endemic at all the ports open to trade. How or why each individual case arises usually remains a mystery, however diligently we may attempt to construct a history of something swallowed or of something inhaled. It is reasonable to suppose that there is much specific faecal contami-

\* See Customs *Medical Reports*, *passim*.

† *Ibid*, xxviii, 13; xxx, 3.

nation of air blown from fields which are manured exclusively with night-soil, of milk through the medium of adulteration with creek water, and of the aerated beverages manufactured by natives, and sold in large quantities at very cheap rates, chiefly to sailors, in low-class taverns. To refer the cause of the disease to atmospheric or telluric influences independent of a contagium of some kind, is merely to darken counsel by words without knowledge. So long as we are surrounded by natives we are certain to be able to look in the right direction for the cause, whether we succeed or fail in isolating it from its manifold accompanying conditions. Our position is almost identically that of European residents in Indian cities where the close proximity of crowded native quarters is a constant source of danger. Brigade-Surgeon HAMILTON graphically describes\* the filthy habits of even the highest caste Hindoos, and the conditions as to milk supply and as to the manufacture of aerated waters, which in India go to account for the spread of enteric fever among the natives, among foreign families, and among the British soldiery.

The native of India is an extraordinary anomaly; he is so bound down by caste prejudices that he will throw his food away if only the shadow of a stranger, or lower caste native, falls on his cooking place, and a Brahmin would die of thirst sooner than drink out of the vessel of a man inferior to him: yet this severe Brahmin may be seen washing and drinking in a tank, the banks of which are covered with human excrement, washed by every shower into the water he does not hesitate to use for all domestic purposes. . . . The young soldier drinks foul water or dirtily made drinks such as ginger-beer, lemonade, etc. . . . The milk supply in India is a well known and most fertile cause of disease. . . . It is almost incredible the filthy conditions under which we obtain our milk supply in India. Cows fed on litter and garbage of every description—cow-sheds filthy to a degree—milk vessels washed in liquid sewage—milk diluted with water from the filthiest sources,—these are every day facts.

Making the necessary allowance for different local circumstances, this description might with hardly any exaggeration be applied to the foreign ports in China. I have myself stood by during the washing of a night-bucket and the cleaning of rice under the same tap at the same time, and I saw the spatters from the bucket falling into the rice basket. The rice was of course still uncooked, so probably in this particular instance no harm could be done. But the illustration is sufficient. The danger that must lurk in aerated waters manufactured by persons whose ideas of cleanliness and propriety may be estimated from the example just given is obvious. As regards milk supply, we are, at certain ports where dairies have been established under foreign supervision, better off than British residents are in India. But even under foreign management a great deal of work must be left to Chinese, who will not fail to use dirty water in preference to clean for washing vessels, who will neglect to drain and dry the vessels so washed, and who, when an opportunity offers of stealing milk, will supply the deficiency with water drawn from the nearest source—generally a creek which is no better than an open sewer.

Looking back for a quarter of a century on the medical history of the foreign settlements in China, nothing comes out more clearly than the fact that while at each place a certain show of sanitary improvement has been made, enteric fever has steadily grown in importance as a factor in the sickness and death rates. I give full weight to the fact that in China,

\* *British Medical Journal*, 1890, ii, 788.

as in India, greater care and accuracy in diagnosis explain a certain portion, perhaps a large portion, of the increase. But any practitioner who for many past years has kept careful notes of all his fever cases, and now peruses them uninfluenced by the diagnosis recorded at the time, will admit that while some which he once placed under the rubric of remittent fever were in reality enteric, there is a real, notable and progressive increase in the ratio of enteric cases to all fever cases which come under his care. Malarial fevers have correspondingly diminished in frequency and importance, and the question may fairly be asked, though perhaps not yet answered, whether the causes, such as improved subsoil drainage, which are operating towards the extinction of the class of malarial affections, may not be contributing to the increase of enteric disorders.

#### ETIOLOGY.

As regards individual predisposition, not very much can be said. Youth is no doubt a predisposing cause; and it would appear that the number of males attacked is far larger than that of females. Thus, out of a group of 100 successive cases taken at random, 76 were males and 24 were females. But this really gives no information, for a considerable number of the enteric cases treated here come from the shipping in harbour, and these cases are of course all males and mostly young men. Of the same 100 cases the ages were—

Between 0 and 10 years, in 3 cases.					
„	11	„	20	„	19
„	21	„	30	„	57
„	31	„	40	„	16
„	41	„	50	„	5

The great preponderance of cases in the third decade of life is no doubt exaggerated by the peculiar local circumstances; still the excess is so notable that it cannot be altogether explained away. It may, therefore, be safely asserted that an individual is here more obnoxious to enteric fever between the ages of 20 and 30 than at any other period. Recent arrival in China does not predispose an individual so powerfully as we should expect, judging by the recorded experience of India. Thus there were—

39	cases in which the patient had been less than 6 months resident,
9	„ „ „ „ between 6 months and 1 year,
13	„ „ „ „ „ 1 year and 2 years,
39	„ „ „ „ more than 2 years;

but the value of the first line of this table has to be seriously discounted for the reason above assigned.

The series of 100 cases upon which I have based these tables was thus distributed through the quarters of the year:—

From January to March . . . . .	25 cases.
„ April to June . . . . .	16 „
„ July to September . . . . .	32 „
„ October to December . . . . .	27 „

It would thus appear that as regards season enteric fever is most prevalent in summer.

## SYMPTOMS.

Before analysing the symptoms which present themselves in well marked cases of various degrees of severity, it will not be inopportune to cite the history of a purely typical case, occurring in a young subject recently arrived, advancing without complication, but with almost every ordinary symptom, to a favourable issue at the end of the third week. It represents the natural course of the disease when the patient is placed amid favourable surroundings, for, after stopping quinine, treatment was limited to a carefully regulated diet, sponging with tepid water and vinegar, the administration of a few chlorate of potassium lozenges, and an occasional enema.

*Enteric Fever. Natural course. Recovery.*—A young English girl, aged 15½; recently arrived in Shanghai. Ailing for a week with sleeplessness, articular and muscular pain, "stitch" in left side of chest, frontal headache, intolerance of light; anorexia, foul tongue, yellow diarrhoea, sore throat; pungent skin. She had been delirious during the night previous to summoning advice. Had had 10 grains of quinine every day, administered in amateur fashion.

Seen 8th May 1885, supposed to be the 8th day of the disease. The morning temperature was 102°; afternoon, 104.5; evening, 105°. Face flushed. Spleen tender; could just be felt on deep palpation. No hepatic enlargement or tenderness. Heart healthy. A few disseminated moist râles over posterior surface of both lungs. Tongue brown, moist. No spots. Slight gurgling in caecal region; no marked tenderness. Pillars and back of pharynx much congested; on each side behind the posterior pillar there is a raised congested patch, only a part of which is visible, which appears to be the main cause of the throat trouble. Stools characteristic.

There was great prostration throughout. A very faint myocardial bruit was audible from the 10th day to the establishment of convalescence. The pulse was soft and lingering, varying in frequency from 78 to 100; dicrotic after the 12th day. Patient was delirious from the 10th to the 20th day; very deaf and stupid from the 10th day onward. The pupils were dilated but sensitive after the 12th day. From the 16th to the 19th day there was general muscular tremor, with subsultus from the 18th to the 21st day. There was no rigor. Sleep was variable, but a fair amount was obtained, mostly disturbed by visions. Cough was troublesome for a few days; on the 10th she expectorated some blood-stained mucus with marked relief, and on the 12th day she had a paroxysm of hurried breathing without dyspnoea, lasting for a couple of hours, during which the respiration rate rose to 40. There was nothing discoverable in the lungs beyond slight bronchial catarrh to account for these symptoms. The condition of the tongue varied; it was sometimes brown and dry, occasionally normal. The lips were cracked, and sordes collected on the teeth on the 11th day. On the 10th day an ulcer appeared on the congested patch on the left side of the pharynx and spread for two days, causing some dysphagia. It had healed by the 17th day, and the patches disappeared shortly afterwards. Thirst was urgent. There was complete anorexia until the 15th day, when appetite began to return. Paroxysms of sweating were frequent. The eruption appeared in two crops, on the 10th and 13th days respectively. From the 11th day out the skin was covered with sudamina. The stools were characteristic up to the 17th day; horribly fetid, but occasionally solid between the 11th and 18th days. No intestinal hæmorrhage. There was slight tympanites, which first declared itself on the 10th day. On the 14th day the abdomen was rather excavated. There was no vomiting; splenic tenderness persisted to the end of the illness, and once or twice slight hepatic sensitiveness was complained of under percussion. There was no ascertainable enlargement of the liver. Gurgling was present from the first in the caecal region, and from the 10th day onward there was some sensitiveness. Her hair began to fall out on the 11th day, and had become very thin before the illness terminated; six months later it had grown luxuriantly. For a week after convalescence was established

she suffered severely from aching in the soles of her feet and cramping pains in the joints of her fingers and toes. After her recovery her memory was a complete blank with regard to the earlier and middle periods of her illness. The following abstract indicates the range and course of the temperature:—

8th to 15th day.—Max.,  $105^{\circ}$  on 8th morning and 11th forenoon; min.,  $100^{\circ}.2$  on 15th morning. The temperature was generally close to  $104^{\circ}$  between 11 A.M. and 3 P.M.

16th to 19th day.—Max.,  $103^{\circ}$  on 18th afternoon; min.,  $98^{\circ}.4$  at 11 A.M. on 16th day. During this period there was a fall of one or two degrees at night.

20th day.—Max.,  $103^{\circ}.4$  in the afternoon, after a saline laxative, which stirred up and brought away a quantity of putrid fæces. Temperature normal all through forenoon and at night.

After the 22nd day the temperature remained permanently normal.

But it is seldom that a case follows the classical outline of the text-books. A stormy onset may prelude a benign and rapid course to recovery.

Thus, in a case first seen on the 6th morning the patient's skin was dry and a dirty yellow; there was much subsultus on attempting to grasp an object; the tongue was dry; there was no incoherence. The temperature was  $104^{\circ}.6$ ; it rose to  $105^{\circ}.7$  at noon, and to  $106^{\circ}.2$  at night. Respiration 30 (48 at night), superficial; nothing discoverable in chest. On the 7th day the stools were frequent and characteristic. The temperature remained elevated, and the other symptoms but little changed until the 9th day, when convalescence suddenly set in. On the evening of the 8th day, after the temperature had been high for several days, and had indicated on at least one day what might be called hyperpyrexia, there was very marked accentuation of the second sound in the tricuspid area, the more remarkable as the other cardiac sounds were feeble and distant. This had disappeared when the heart was re-examined two days later. On the 8th and 9th days slight fugitive ecchymoses appeared on the arms. These vanished after a couple of hours, but only to appear again, hardly ever in the same place. The change of position was ascertained by surrounding each patch with ink. Iliac gurgling was distinct on the 7th day. On the afternoon of the 9th day there was a long and profuse sweat, after which every symptom, except intense weakness, at once disappeared.

On the other hand, a condition that hardly passes beyond mere malaise during the whole course of the attack may be accompanied by a lesion destined to prove suddenly fatal within a few hours.

Death occurred suddenly in the case of a young Englishman a couple of hours after I had left him reading a newspaper on the 20th day of what was to all appearance an extremely mild attack of enteric fever. His temperature had always been normal or subnormal in the early morning, rising to  $102^{\circ}.5$  or  $103^{\circ}$  at night. Diarrhoea was never urgent, but the stools were characteristic, and there were rose spots. It was with difficulty that he had been kept in bed, and his life in hospital was a continual protest against the restriction of his diet. At the autopsy a single PEYER'S patch, 3 inches from the valve, was found deeply ulcerated, slight congestion being all that could be discovered elsewhere. Death was due to the rapid formation of a clot in the pulmonary artery.

When considering the phenomena presented by a given case it should be borne in mind that no single symptom can be assigned as pathognomonic. No symptom out of all those presently to be enumerated may not be absent. We must be content to judge by the grouping of such as are present in each instance, taking account of their individual unreliability. Thus, for example, the degree of heart weakness manifested need not be proportional to the severity of the disease, nor, as has just been shown, can the benignity of the general symptoms be trusted as an indication of the nature or extent of the existing lesions. It may, therefore, be

stated that in any case taken at random disproportion possibly exists between the lesions and the symptoms. While, therefore, we must, at least for the present, admit that the characteristic grouping of a larger or smaller number of well defined symptoms imparts pathological unity to enteric fever, it is perhaps more true of it than of any other disease that each case has a special natural history, the symptoms often differing widely as between one case and another, and often varying from day to day in seeming arbitrary fashion in each individual case.

There is no means of accurately determining the period of incubation, for the simple reason that it hardly ever occurs that the source of infection can be clearly made out. LIEBERMEISTER, from some extremely vague observations, guesses the average incubation period at three weeks. For us it is only safe to say that we know nothing about it.

It is not necessary to repeat here in narrative form the history of the earliest symptoms which lead a patient to seek advice, and of those observed at the moment when he comes under treatment. So far there is a certain general similarity between all cases, and the history given on page 53 suffices to indicate what these common symptoms are. It will be more profitable to classify the phenomena observed, analysing each group and describing the more important members of it as necessity arises.

*Temperature.*—It is seldom that a case of enteric fever is seen during the first three or four days. When it is seen at this early period the temperature alone may appear to indicate an ordinary simple fever, or an intermittent of quotidian or tertian form. It may, however, be laid down as a rule that in enteric fever  $104^{\circ}$  is not reached before the 3rd day. After that day the rise may be very rapid. I have just recorded an instance in which, at 9 P.M. on the 6th day, the mercury reached  $106^{\circ}.2$ . Such cases are not necessarily the most menacing. However indispensable a careful watching of the temperature is, it cannot be too carefully borne in mind that the bodily heat is only one symptom out of many, and important only in consequence of its effect—whether sudden, as in hyperpyrexia, or prolonged, as in the ordinary course of a continued fever—upon the nervous centres, upon the cardiac muscle, and upon the great glandular organs. That enteric fever may run its course, and even a severe course, with very slight elevation of temperature or with none at all should never be forgotten. Cases of this kind are, however, rare. A more important observation is that in the course of an attack the temperature curve may vary between very wide limits while the general symptoms show no improvement in correspondence with the lower readings of the thermometer. A detailed discussion of modern opinions as to the significance of fever considered in itself would be altogether out of place here. It is sufficient to say that (except in urgent and very rare cases of hyperpyrexia, when the heat alone is sufficient to kill within a short time) the exclusive direction of therapeutical measures to the lowering of the temperature in enteric fever is not reasonable, is, so far as my experience goes, seldom more than momentarily successful, and is often distinctly hurtful.

The general law that enteric fever is of remittent form, the temperature being higher at night than in the morning, is the first outcome of the study of charts constructed from cases

in which antipyretics have not been administered, and wherein the normal curve is not distorted. Exceptionally the form is inverted, the morning reading of the thermometer being higher than that of the night. Neglecting such cases, and supposing that the temperature is taken sufficiently often, it will be observed that—

1°. As a rule, in uncomplicated cases of average severity the daily minimum during the first three weeks varies between  $97^{\circ}$  and  $102^{\circ}.5$ , and the daily maximum between  $103^{\circ}$  and  $105^{\circ}.5$ .

2°. In exceptional cases there may be no rise of temperature whatsoever, or an altogether insignificant rise, while dirotism of the pulse and probably the characteristic grouping of many other symptoms indicate the nature of the disease. I have recorded a lingering case with unmistakable symptoms, including eruption, in which the maximum reached was  $99^{\circ}.8$ , and two others in which there was no rise whatsoever.

3°. When the morning temperature is moderate (*e.g.*,  $102^{\circ}$  or  $103^{\circ}$ ) there is a steady rise until about noon (occasionally a slight fall), a further rise from about 2 P.M. to 6 or 7 P.M., and a gradual fall of a degree or so up to midnight, the temperature continuing to fall up to 6 A.M.

4°. When the morning temperature is very high (*e.g.*,  $105^{\circ}$ ) there is a fall of one degree or a little more towards noon, a rise through the afternoon up to 6 or 7 P.M. until the morning temperature is reached or slightly exceeded, and then a fall until about midnight, when the temperature is nearly the same as it was at noon.

5°. The morning temperature may be in turn subnormal, normal, or not more than  $1^{\circ}$  above normal all through the course of a severe case in which temperatures of  $104^{\circ}$  or  $105^{\circ}$  are registered at other periods of the day.

6°. Occasionally in the course of the disease a sudden fall from  $104^{\circ}$  or more to normal or less (in one case, fatal four days later, to  $96^{\circ}$ ), the depression lasting for an hour or more, may occur without anything being found to account for it, and without any effect upon the other symptoms.

7°. When convalescence is commencing the temperature is often very unsteady; subnormal, normal, or slightly over normal in the early morning, slightly rising or falling towards noon, and falling or rising towards evening.

8°. Occasionally, but rarely, a permanent fall from a high daily average temperature to normal occurs suddenly, and marks the final departure of the fever. This is generally accompanied by a profuse sweat or a rush of diarrhoea, and may be regarded as termination by crisis.

9°. When a spurious relapse occurs in the course of convalescence, or when a true relapse occurs after several weeks, the temperature follows the same rules as it observes in ordinary cases.

10°. The internal temperature is generally, but not always continuously, high for several hours before death. A high internal temperature with cold extremities is of extremely bad augury, but the prognosis is not necessarily fatal.

11°. Death may occur in cases where the temperature has been moderate throughout. (*See* PROGNOSIS.)

The weekly averages of temperature, taken every three hours day and night, in a series of 62 cases terminating in recovery, in which no antipyretics were administered, are exhibited in the subjoined table. The observation has a certain interest, and is not without value inasmuch as it indicates that longer intervals of comparatively low temperature occur during the second and third weeks than would be inferred from the two or three observations which commonly are all that are daily taken. It has to be remarked that the averages given for the

sixth week are derived from 15 cases only, as out of the 62 these (24.19 per cent.) were all in which the fever lasted beyond the 35th day.

Day.	Average Maximum.	Average Minimum.
1st to 7th . . . . .	104°.13 . . . . .	101°.21
8th „ 14th . . . . .	103°.65 . . . . .	98°.47
15th „ 21st . . . . .	103°.12 . . . . .	98°.51
22nd „ 28th . . . . .	102°.44 . . . . .	97°.62
29th „ 35th . . . . .	101°.92 . . . . .	97°.95
36th „ 42nd . . . . .	103°.70 . . . . .	98°.84

In order to enumerate all the peculiarities of the temperature curve it would be necessary to detail a multitude of isolated cases. Thus, I have notes of several lingering cases in which the temperature after hardly exceeding 100° for several days at a time, swung between 102° and 105° for a week or more, and then fell to normal without any general improvement. Or I might cite at length the report of a case fatal on the 23rd day, in which up to the 17th day the highest temperature was 101°.2. On the 17th evening it suddenly ran up to 103°, but fell immediately to about 100°, at which it remained until a few hours before death. Any set of rules contained within a moderate compass must therefore be imperfect. Those just given do not profess to do more than cover the majority of cases.

*The Nervous and Muscular Systems.*—The symptoms referrible to these systems I have grouped into series without attempting to indicate the exact periods at which the different groups make their appearance. The order corresponds in a general way to the progress of the disease, but in some cases the groups overlap one another.

Rigor; prostration; general malaise; marked languor; irritability of temper; muscular weakness with exaggerated sense of fatigue on the slightest exertion; restlessness; sleeplessness, or disturbance of sleep by visions; vertigo; tinnitus; subjective sensation of flashes of light before the eyes; headache—frontal, temporal or occipital; backache; pains in muscles and joints; subjective feelings of chills and heat; slight incoherence.

Apathy; stupidity; loss or disturbance of memory; delirium; deafness; muscular tremors, subsultus, rigors; dilated and insensitive pupils.

Exaggeration (occasionally) of senses of hearing and smell; stupor; violent or muttering delirium; moaning, sighing; fly-catching and vermin-hunting; hallucinations of sight and hearing; increased cutaneous and muscular reflex irritability; convulsions, tetanic contractions; hiccough; stupor, insensibility; involuntary evacuations; coma-vigil. Suicidal attempts may be made, but not with suicidal intent. The patient lies with eyes half open and lower jaw fallen.

Rigor may be an initial symptom, or may present itself first after several days, or even in the third or fourth week. In the latter case it is probably due either to an intercurrent malarial attack or to septic absorption. It may occur frequently, or not at all. It may be of excessive violence, and it may be accompanied or not by a fugitive fall of temperature. Sleeplessness is very frequently distressing, and sometimes proves almost invincible. Spontaneous pain in the muscles and joints is often accompanied by localised areas of exquisite tenderness—on the scalp, on one or the other side of the abdomen, most frequently in the epigastric region. Or spontaneous pain may take the form of sciatica or pleurodynia, or of

flying internal pains of neuralgic character or following the course of the spine. Or it may be sternal, and give rise to the suspicion of periostitis. Finally, such pain may persist all through the disease, or be altogether absent. Vertigo is often a very early symptom. Delirium is nearly but not always present. In one case (fatal) it was extremely violent on the 5th day, and was accompanied by vermin-hunting. It is seldom present before the 7th day, but then may take any imaginable form. It may be present only at night, or it may never pass beyond a condition of dreaminess and slight incoherence. When delirium is violent there are generally terrific illusions. Early muttering is of worse augury than early violence. It is usually, and I imagine correctly, thought that assurances on the part of the patient that he is perfectly well are of ominous significance, but I have found this apparent buoyancy in many severe cases which however terminated favourably. Depression is the rule, and is certainly more favourable than exaggerated cheerfulness in bad cases. Delirium may persist to the seventh week, and I have notes of one curious instance where it was first observed on the 43rd day. Muscular weakness shows itself in obvious ways from the first. Later, it is manifested by dorsal decubitus and a tendency to sink to the foot of the bed. A case proved fatal in which this tendency was observed as early as the 4th day. The tongue becomes flabby and tremulous, and falls back under accidental pressure with the thermometer; the patient has difficulty in protruding it, and when protruded he does not think of drawing it back. These are late and ominous symptoms. The mouth hangs open. There may be paralysis of the soft palate, with consequent inability to swallow, and snoring. The tremor, which is generally marked at an advanced period, is usually due to mere weakness, but is occasionally of a convulsive character. I have seen it disappear temporarily after a severe hæmorrhage. I have also seen it extremely severe as early as the 4th day in a case which recovered. It may be paroxysmal, almost of the character of rigor. Subsultus is almost invariable when a case is grave or prolonged. Floccitatio and carphology are evidences of profound poisoning, and are seldom if ever absent in fatal cases. Large disorderly jerking about of the hands is of like or of still worse import. Of two cases of general convulsions (not epileptic), one recovered and one died. Tetanic contractions of the neck, back and limbs, or of the forearms alone, or of the neck muscles only, are fortunately rare. In cases where they occurred I never saw recovery. They are evidence of exaggeration of the reflex activity of the cord excited by toxic or hyperthermic disturbance of the spinal centres.

I observed one curious case in which, while the forearms were so firmly flexed on the arms that no justifiable amount of force could extend them, the patient now and then extended them voluntarily.

To the same class of phenomena belong the instances in which the slightest touch on the cutaneous surface makes the patient jump as if an electric shock had been administered, and those wherein light percussion of the pectorals induces strong contraction and causes localised lumps to form. The fugitive retraction of the abdominal wall which is sometimes observable should probably be placed under this category. In five out of eight cases in which during the second and third weeks I have had an opportunity of testing the patellar tendon reflex, I believed that it was slightly exaggerated on both sides. It must, however, be acknowledged that "knee-jerk" activity differs so much in perfectly healthy individuals, that no great value attaches to this observation.

Deafness is sometimes of gradual onset and sometimes sudden. There is always intolerance of light, and the pupils are almost invariably contracted and usually insensitive. In one case I observed an interval (22nd to 26th day) during which they became sensitive. Smell and hearing sometimes become abnormally acute. I have notes of three such cases, two of which (where hearing was exaggerated) proved fatal, while the third, in which the sense of smell became extraordinarily developed, recovered. In none of these cases was there any illusion of the senses involved.

In the two fatal cases the patients, for several hours on the day preceding death, instead of answering questions put to them, repeated the questions with absolute accuracy.\*

Paroxysmal dyspnoea and fits of sighing or irregular respiration, for which no adequate explanation can be found in the lungs, are purely nervous phenomena. As mere curiosities:—in one case the attack was ushered in by a series of fainting fits, and in another a fit of unconsciousness occurred on the 16th day, lasting for about half an hour. Both terminated favourably.

Loss of weight is always marked. The daily average for 10 cases was 1.49 lb. It begins early, and is due as well to wasting of the muscles as to absorption of fat.

During convalescence paræsthesiæ of various kinds are common.

Excluding one case of aphasia, which was probably bulbar, I have not seen the true paralyse (spinal, cerebral or peripheral) described by TROUSSEAU, LANDOUZY, NOTHNAGEL, EISENLOHR, MURCHISON, CORMACK and many others. It seems probable that exceptional violence of the initial lumbar and articular pain, the hebetude of the period of illness, and the profound weakness of early convalescence, may in some instances assume the guise of paralysis.

*Symptoms exhibited by the Digestive System.*—Here also I have grouped the symptoms of typical cases in progressive order. It is not to be supposed that all are present in any individual case.

Anorexia; thirst; nausea; bilious vomiting; white or brown loaded tongue with red prominent fungiform papillæ at the tip and along the margins; diarrhœa or constipation; fœtor of breath; fœtor of stools.

Colicky pain; gurgling in the cœcal region with hypersensitiveness on palpation; tympanites from relaxation of the muscular layers of the intestine; enlargement and tenderness of the spleen, which reach their maximum before the 10th day; slight enlargement and tenderness of the liver.

The tongue is dry, brown, sometimes black, fissured longitudinally or transversely, or may be perfectly normal, or it may change rapidly from the former to the latter condition, while the other symptoms remain unaltered. The lips are dry and blood-stained from picking; the gums and teeth covered with sordes. Diarrhœa may be frequent and profuse, 10 or 15 stools in the 24 hours; as a rule, the number of stools is from four to six. The stools are generally liquid, flocculent, depositing on standing a sediment of epithelial débris and undigested food, speckled with minute black dots, alkaline (rarely acid or neutral), ochre-coloured or brown, perhaps blood stained, always horribly fetid. They are sometimes viscid, and often like gruel. Constipation frequently replaces diarrhœa, and at a late period may indicate the existence of deep ulcers paralysing the intestinal walls, and may precede profuse hæmorrhage.

Exaggerated tenderness instead of being limited to the cœcal region may be referred to the whole abdomen, or may exist only in the left iliac region, or over a small area in the middle

\* Écholalie of French authors.

of the hepatic region, or close to the umbilicus, or in the epigastrium. It is often absent. Gurgling usually but not always accompanies tenderness. It may appear for the first time late in the third week. Colic may be severe. In one case it was so violent as to induce a condition of collapse, and to suggest the existence of strangulation of the intestine. Vomiting may be a source of serious distress. When it occurs early it is always bilious; when urgent at a late period it usually takes the form of hæmatemesis, the vomit containing nearly pure blood or "coffee-grounds," or late vomiting may be due to sudden and excessive secretion of bile. In no case have I found very notable enlargement of either liver or spleen. The lower edge of either seldom reaches to more than 1 inch or  $1\frac{1}{2}$  inch below the corresponding costal border, and tenderness on palpation is by no means invariable. Tympanites is generally present; it may be limited to one side of the abdomen; it may suddenly disappear and then recur; it may be absent throughout; or it may be so excessive as to cause great distress, and, later, to prove an independent source of danger by pressure on the diaphragm.

The diarrhœa may at the beginning be of dysenteric form. It may be speedily arrested, giving place to constipation, or it may persist and become colliquative. The stools are sometimes olive-black and oily or dark brown, from excess of bile; or they may consist of bloody serum ("meat-washings") with slight fawn-coloured sediment; or at the last they may contain portions of slough and have a gangrenous odour. Occasionally the stools are almost normal throughout. As a rule, the appetite fails early, but it may be normal, or (rarely) voracious. Thirst is often urgent; in graver cases it is altogether absent.

Slight and temporary intestinal bleeding at an early period need give rise to no anxiety. The case is, however, far different when at a late stage with profoundly altered blood, and probably degenerated vessels, a severe hæmorrhage occurs. It is not easy to say which is of worse omen—a discharge of arterial blood which has been rapidly expelled after escape from an eroded mesenteric vessel, or a copious oozing of tarry blood from the edges of extensive areas of ulceration. Hæmorrhage may appear early and persist, or it may be intermittent. I have seen it profuse on the 5th and 6th days, on the 6th day, on the 9th and 10th days, and on the 13th day, all four cases terminating favourably.

In one case, which terminated in recovery, hæmorrhage was constant from the 8th to the 14th day. It was then absent for a week, appeared slightly on the 21st day, and was profuse on the 25th, 27th, 28th, 30th, 32nd, 37th, 55th and 56th days, the temperature during this long period being generally normal, occasionally subnormal, and only on one occasion (34th day) reaching  $101^{\circ}.4$ .

It may first appear in the sixth week (fatal case). At whatever period it occurs, provided it be not of great violence, it may or may not influence the temperature.

Thus, in a case which was throughout characterised by hæmorrhages of all degrees of severity, small quantities of blood were seen in the stools on the 12th, 17th, 18th, 19th and 20th days. On the 21st day three hæmorrhages occurred, amounting to 80 ounces of scarlet blood, which speedily coagulated. The patient was blanched by the bleeding, but showed no signs of collapse. The temperature, which had been  $104^{\circ}$  on the night of the 20th day, was on the 21st,  $99^{\circ}.5$  (7 A.M., four hours after the first hæmorrhage),  $99^{\circ}.6$  (noon),  $99^{\circ}.8$  (5 P.M.),  $100^{\circ}.2$  (10 P.M.). It rose again on the 22nd day. Three hæmorrhages, amounting to 17 ounces, occurred on this day, mostly black clots, but had no effect on the temperature. Again, on the 24th and 37th days there were small bleedings. Recovery.

*Urine.*—The urine is at first “febrile”—dark, scanty, muddy, of high specific gravity, and containing a large excess of urea and uric acid, while the chlorides are notably diminished. By the end of the second week it is generally pale and copious, and later on often contains a small quantity of albumen, or, more frequently, of peptones. In very severe cases with prolonged high temperature hæmaturia may occur, and along with early deep jaundice the urine (I think invariably) contains the colouring matter of the blood. I have notes of one case of severe hæmaturia beginning on the 10th day which ended in recovery.

Retention is rare, but I have once or twice observed it at the end of the third week, while the rectum was evacuated unconsciously. Incontinence of urine, as well as of fæces, is common enough, and may occur early. In four cases, all females, “incontinence,” “stammering bladder,” “intense bladder irritability,” “distressing dysuria,” were, respectively, noted from the first. Irritability of the bladder is sometimes paroxysmal, disappearing for days at a time. As a rule, involuntary escape of both urine and fæces does not occur until between the 11th and 20th days. In one case (female) it was observed on the 6th day.

*The Circulatory System.*—The heart speedily shows signs of weakness and irritability, its muscular structure being no doubt affected by the high bodily temperature, while it is being directly poisoned by the chemical products fabricated by the disease germs. Syncope may readily be induced by allowing the patient to sit up. Sooner or later, in the great majority of cases, but generally towards the close of the second week, a soft bruit is audible with the systole at both apex and base, but most distinctly at the apex. It indicates no valvular mischief, and is doubtless due to toxic interference with the innervation of the heart and degenerative changes in the cardiac muscle, manifesting themselves by irregular contraction. It has, however, given occasion to an erroneous diagnosis of pericarditis. It generally persists until convalescence is established. A mitral regurgitant murmur may declare itself at an advanced period; but this too may safely be attributed to changes in the muscular wall of the heart, and will disappear with the advance of convalescence. (See also CONVALESCENCE.)

To weakness of the heart's action is to be attributed the cold extremities and the paroxysmal cooling of the surface observed in grave cases at an advanced period. The patient while his internal temperature is 104° or more may complain bitterly of cold. The same mechanism explains the dyspnœa, sometimes amounting to orthopnœa, and accompanied by lividity of the features and imminently threatening collapse, which, without any sufficient explanation furnished by the condition of the lungs, and in the absence of any cardiac valvular lesion, occasionally occurs paroxysmally in the third or fourth week. I noted it once on the 8th day.

Epistaxis, which almost invariably occurs, and at any period, is an indication of weakened (degenerated?) vascular walls. It may by its violence prove menacing even in the first week.

The pulse is usually frequent from a very early period, but in any case soon becomes small, soft and lingering. Its frequency is subject to wide variations without any modification of other symptoms. I have noted a rate of 40 to 46 between the 8th and 21st days, 48 to 60 between the 13th and 18th days, and 65 to 72 between the 10th and 14th days. It seldom fails to reach 110 or 120 at some period of even the most favourable cases. It is, I think, always dicrotic

after the beginning of the second week, and when this cannot be at once recognised raising the arm will often make it perceptible. Dicrotism will sometimes be detected by the sphygmograph before the finger can make it out.\* When very distinctly pronounced the heart sounds at the same time assume a foetal character. Allied to the dicrotic condition is that in which there is a back stroke after each beat, like the *pulsus bisferiens* of aortic stenosis. The pulse may be irregular and intermittent. In estimating the importance of this symptom we should not forget that the patient may be in the habit of smoking to excess. Apart from this, when the general symptoms are not disquieting intermittence is not necessarily of bad augury. It may be due to some reflex inhibitory action starting from the intestine. Instability of the pulse, depending on relaxation of the arterial walls as well as on the enfeebled cardiac action before referred to, is manifested by the quickening effect of a change of position and by the condition approaching collapse often induced in the later stages of the disease if the patient should suddenly sit up in bed. So likewise is to be explained the tendency to local congestions, superficial and visceral, in which doubtless the altered character of the blood plays a part. Hence the hæmorrhages not dependent on ulcerative erosion of vessels, the hypostatic pulmonary congestion, lividity of the features, and the occurrence of small cutaneous ecchymoses.

The pulse may be at the same time both quick and lingering, the expansion of the vessel being slow even when the complete cycle is a short one. In rare cases it may be full and vibrating, or large, soft and regular; and this even at an advanced period. But as the end of the third week is reached it is, in grave cases, miserable, and for hours or days before death may be reduced to a mere ripple.

*The Respiratory System.*—The nervous symptoms which declare themselves through the lungs have already been mentioned. Bronchitis with dry, hacking cough and scanty, frothy or muco-purulent expectoration is of almost invariable occurrence. The sputa are often blood-stained, the blood being derived either from the inflamed bronchial mucous membrane or from the pharynx. Breathing is accelerated almost from the first, and I have seen the respiration rate reach 42 in a minute on the 7th day, without any trace of pneumonia to account for it.

Pneumonia is considered under COMPLICATIONS.

*Phenomena exhibited by the Skin.*—The skin may be dry and pungent from the first, or parchment-like, or bathed in sweat. Towards the end of the second week paroxysmal drenching sweating fits are often observed. They are frequently absent. When they occur the secretion has usually a nauseous odour, sometimes very marked. They may have no influence on the bodily temperature; they are sometimes immediately preceded by a rigor, and as they are as common in winter as in summer they cannot here be attributed, as they sometimes have been in India, to excessive atmospheric heat over-stimulating the sweat glands. They are probably of septic origin. Rarely a profuse critical sweat, somewhere about the 20th day, marks the disappearance of the fever. A fugitive pink or livid flush will early be noticed on either cheek or on both, independent of the occurrence of pneumonia.

\* I have many sphygmograms taken from enteric fever cases, but I do not reproduce them as they are almost identical with those figured by MAREY: *Physiologie médicale de la Circulation du Sang*, pp. 389, 391.

In two cases where there was no pneumonia I observed herpes at the corners of the mouth. In another, complicated with severe pneumonia and pleurodynia, I found an eruption of herpes zoster. Once also (on the 42nd day) a herpetic eruption appeared on the prepuce. This may have been independent of the fever, but the patient assured me that he had never before suffered from this affection.

The entire surface of the body may be dusky. About the 10th day the typical eruption should be looked for. It is frequently absent in cases where all other specific symptoms are perfectly well marked, and its appearance may be delayed at least as far as the 15th day. When present it appears at intervals of four or five days, in successive crops of minute lenticular, slightly elevated, moderately hard papules, of rosy colour (occasionally livid) which disappears under strong pressure; or an additional spot or two may be found every day for a week or 10 days. I have never seen it elsewhere than on the abdomen and on the thorax as high as the level of the nipples. There is no noticeable increase of fever corresponding to the appearance of each crop. The eruption invariably vanishes very shortly after death. Sudamina are generally abundant.

Dr. BEGG has rarely, if ever, observed the specific eruption in enteric cases at Hankow, and Dr. WALES has never seen it at Canton.

In rare instances I have observed minute ecchymosis-like spots grouped into small patches on the arms or the chin. They are fugitive, disappearing after a couple of hours without leaving a trace, but reappearing after a longer or shorter interval, hardly ever in the same place. In one instance the successive appearances of these spots on the face were attended by marked symptoms of collapse.

Jaundice, which, according to Sir WILLIAM JENNER and Sir THOMAS WATSON, never accompanies either typhus or typhoid fever in England, is here generally (perhaps always) present to a greater or less extent in prolonged cases. A faint yellow tinge of the skin is a common early symptom, and even in the lightest cases, when accompanied by deepening of the colour of the urine, is doubtless evidence of pyrexial exaggeration of the normal blood-corpuscular disintegration. In proportion to its depth it indicates more or less profound alteration of the blood and more or less serious interference with the action of the liver. When severe jaundice occurs early (before the 11th day) it becomes a most formidable complication; it is generally associated with hæmoglobinuria, intestinal hæmorrhage and hæmatemesis—indications of blood dissolution. Such cases are for the most part fatal (*see* PROGNOSIS). When it appears late it is no longer of such grave import, and its indications are sufficiently supplied by other symptoms. I have published many cases in which it was extremely well marked in or about the third week, but which ended in recovery.

Bed-sores, more or less extensive gangrene from pressure, rarely occur before the middle of the third week. (*See* COMPLICATIONS.)

Prickly heat, in all the cases where, under my observation, it had been present at the onset of enteric fever, rapidly disappeared; and mosquitoes avoid an enteric fever patient.

There is generally considerable, but temporary, loss of hair during the fever or during convalescence.

## LATENT ENTERIC FEVER.

It is but seldom that we come across the "ambulatory typhoid" in which a patient goes through the entire, or nearly the entire, course of his fever without suspecting that there is anything wrong with him. The following histories describe conditions approaching this:—

Mercantile assistant, aged 29. Accidentally observed in his office, where he had been working in the usual way for the usual number of hours daily. He looked extremely ill, but said that beyond sleeplessness there was nothing the matter with him. Sent to bed. Temperature at noon  $104^{\circ}$ . Stools liquid, frequent, black from iron which he had been taking freely on his own account. Three rose-coloured spots on abdomen; much tenderness, distinct gurgling, tympanites. At night, temperature  $102^{\circ}.4$ ; wandering. Tongue dry, yellow, red tip and edges. Spots continued to come out, and the fever followed the course usual in the third and fourth weeks. Convalescence was established on the 12th day after treatment began. When, after five days, the stools lost their black colouration they were seen to be typical.

In this case sudden death might have occurred. The circulation was feeble and intermittent when the patient was first seen, and on the following day he had a paroxysm of cardiac failure with dyspnoea, extremely rapid incomplete cardiac contraction, pallor and cold sweat, which would probably have terminated fatally had it come on while he was sitting at his desk.

In the case just related the syncope was probably due either to some inhibitory action reflected to the heart from an ulcerated intestine, or simply to muscular failure of the heart itself, the degenerated fibres being greatly overstrained by the patient's daily work, which had not been in any way diminished.

In the following case it would not have been surprising if sudden death had occurred by perforation. The intestinal lesions were certainly extensive and probably deep.

A lady recently arrived in Shanghai; phthisical family history on both sides. Shortly after her arrival she went on a long sea trip, in the course of which she caught cold. This was speedily followed by "break-bone pains," occasional vomiting, yellow diarrhoea, sore throat, distension and tenderness of the abdomen. Her skin was always hot, often pungent; she slept badly, and talked in her sleep. Complete anorexia. After 10 or 12 days frequent starting of the muscles of the limbs was observed. Meanwhile she went about at each port that she visited, inspected curio shops, and took much exercise. She swallowed a great deal of quinine.

On her return to Shanghai, probably about the 18th day of her illness, her tongue was dry and irritable, all the papillæ largely developed. Her gums were spongy. There were a number of minute herpetic ulcers on the mucous membrane of the lips. Her skin was dirty-yellow; lips pale. The abdomen was slightly distended, uniformly sensitive. Severe cough, with frothy tenacious expectoration. The temperature was  $101^{\circ}$  (7 A.M.), and rose to  $104^{\circ}.3$  at night. For 12 days a fever temperature was maintained, after which convalescence was established. The morning temperatures ranged between  $100^{\circ}$  and  $103^{\circ}.5$  for 11 days, and the night temperatures between  $101^{\circ}.4$  and  $105^{\circ}.2$ . The stools were characteristic, and all the symptoms indicative of the third and fourth weeks of ordinary enteric fever.

It is noteworthy that in this case relapse occurred six weeks after full convalescence.

## ENTERIC FEVER IN INFANCY.

I have but rarely encountered enteric fever in young children; I hear of many cases, but I see hardly any. Malarious fevers, fever from indigestion, from worms, from exposure to heat, occasionally fever of purely nervous character, are all common enough among children, and no

doubt explain many marvellous recoveries from typhoid within a week or 10 days. When it does occur in children under 10 or 12 years old the fever runs higher during the first week than it ordinarily does in adults, and there is little or no tendency to intestinal hæmorrhage. Apart from this, the symptoms are essentially the same as those which present themselves later in life. After running its normal course of three or four weeks genuine typhoid in the child often leaves after it a condition of deep anæmia with dyspepsia, bowel irregularity, fetid stools, and a tendency to moderately high temperature towards evening, which last almost indefinitely. Here quinine, or quinine with arsenic, alcohol and gentle saline purgatives, with frequent sponging with hot diluted vinegar, are more effectual than even change of air, which often completely fails to restore health. Iron is, I think, seldom of any use and is often injurious.

I have had no fatal case among children; which may perhaps be explained by the small experience of the disease in infancy to which I have confessed.

#### COMPLICATIONS.

The complications of enteric fever are without number. Any disease may be accidentally associated with it, and no constitutional condition affords protection against it. Certain authorities assert that there is a close relation between *Scarlatina* and enteric fever. I can cite but one case in which the one disease ran into the other:—

An Englishman, aged 22, passed through an attack of scarlatina of moderate severity in January 1888, and was still in hospital completely isolated and his skin still desquamating when, on the 3rd February, enteric fever set in with very severe initial symptoms. It ran a rapid and tempestuous course, wild delirium alternating with stupor between the 8th and 10th days. Characteristic diarrhœa was present, with rose spots, and gurgling and sensitiveness in the cæcal region. The temperature fell to normal on the 18th day, and did not again rise.

The complication with *Pneumonia* is so frequent that a definite relation between the two morbid conditions can hardly be doubted. Whether in a given case it forms a part of the morbid condition to which the name enteric fever is given, or appears as something superadded, it is occasionally the direct cause of death. But however severe both diseases may be, if they occur in a healthy subject, and both run a typical course, the prognosis is by no means bad.

*Enteric Fever. Pneumonia. Severe nervous symptoms. Recovery.*—Englishman, clerk, aged 32. Ailing for about 10 days. Sleepless, severe vertical headache, muscular pains, prostration; anorexia, brown baked tongue with red tip and edges, frequent bilious vomiting, yellow diarrhœa. For the last four days the stools have contained blood. Coughing.

Seen 2nd January 1876, assumed to be the 10th day of the illness. At the base of the right lung is an area about the size of the palm of the hand absolutely dull. It is with difficulty that the patient can be got to draw a long breath; when he does crepitation is audible. In the centre of the patch crepitation is coarse, finer towards the margins. At the edge of the dull area respiration is tubular. Marked immobility of right side. Patient cannot lie on the left. Sputa rusty.

Half a dozen rose spots round umbilicus. Gurgling and tenderness in right iliac fossa. Tongue as above described. Pupils medium, sluggish. Much muscular tremor. Respirations 40; pulse 100; temperature (4 P.M.) 103°.

The pneumonia was severe. Respiration varied between 40 and 50; pulse between 100 and 130 (on the 16th, 17th and 19th mornings falling to 84, 96 and 96 respectively, the corresponding breathing rates being 46, 40 and 48); temperature between 100° and 103°.8 in the morning, and between

101° and 105° at night. On the 16th and 22nd mornings the temperature fell for a couple of hours to normal, without any corresponding general improvement. Paroxysms of sweating were severe and frequent. On the 12th day about 2 ounces of pure blood was expectorated, and it is noted on the same day that the stools were like "meat-washings." Delirium, muttering, subsultus and indifference from the 13th day; fly-catching on the 21st day, when also he had a prolonged rigor. Pulse hyperdicrotic. On the 15th day it is noted: "Base of right lung completely solid; unconscious of dyspnoea; pupils widely dilated and insensitive; muttering delirium during semi-sleep; very distinct myocardial bruit."

Meanwhile the enteric fever pursued its course. The stools were frequent and characteristic; there was distinct gurgling on palpation in the cæcal region; whether there was tenderness could not be ascertained. On the 17th day the following note was taken: "Is constantly drowsy, but can hardly be said to sleep. Constant starting of legs. A touch on either sole causes a jump as though a shock from a battery had been given." A fresh crop of rose spots came out on the 18th day, the former having faded. There was great abdominal distension. The heart's action became extremely feeble towards the end of the third week. On the 23rd day crepitation was again audible, and on this day there was a considerable loss of blood from the nose. After this all the symptoms abated. Delirium persisted to the 30th day, but by the 32nd day convalescence was established.

The right lung is that most commonly and most severely affected; but inflammation may start in both at once, or in the second as the first is clearing. It may be accompanied or preceded by severe *Pleurodynia*, or *Intercostal Neuralgia* with an eruption of *Herpes Zoster* over the corresponding nerve area. It may arise late. In one case I noted its commencement on the 21st day.

*Bronchitis* can hardly be considered a complication as its occurrence is almost invariable. I find but one case in which its complete absence is noted. It is generally present from the first, or declares itself after a few days. The characteristic expectoration is often tinged with blood.

*Pleurisy* is rare in cases which recover. In cases fatal by pneumonia the pleural cavities usually contain much blood-stained serum.

*Pharyngitis* is a very common complication; indeed, I think always present to a greater or less degree, and therefore presumably to be ranged among the essential symptoms. LUSCHKA'S gland in the pharynx, though rudimentary under ordinary circumstances, appears to assume a temporary developmental action during the course of enteric fever. In the earlier stage the mucous membrane covering it, and especially that covering its lateral portions, becomes congested, just as the mucous membrane overlying PEYER'S patches does. Later on, when the glands in the intestine are ulcerating, LUSCHKA'S gland frequently ulcerates likewise, causing severe spontaneous pain, dysphagia, cough and blood-stained expectoration, partially occluding the posterior nares, whereby the mouth, always open for respiration, is kept dry, and perhaps contributing to the bronchitis and lung congestion common at this stage. The nauseous smell often observed on a patient's breath is largely due to the condition of the throat.

The pharyngeal condition sometimes involves great danger, and indicates profound poisoning.

In one case, which terminated in recovery, ulceration of the back of the pharynx made its appearance on the 10th day, and slowly spread to the pillars, soft palate, and mucous membrane covering the hard palate, sloughs being thrown off, and deep gangrene seeming imminent for several days. On

the 22nd day an abscess was found in the scrotum at the root of the penis. This was incised and dressed antiseptically, but a deep slough formed, and the urethra was seriously threatened.

*Laryngeal ulceration* is, I think, rare. The voice is weak but seldom hoarse, and in my postmortem records I find lesions of the larynx noted only twice. I must confess, however, that they were not always looked for.

It would naturally be supposed that enteric fever attacking a person already advanced in *Phthisis* would run a severe and probably fatal course. This, however, has not been my experience. In fact, all the cases which have come under my care with this combination have by a singular chance terminated favourably.

*Intestinal Hæmorrhage* is considered in the section devoted to symptoms.

Even in cases where the most sedulous care is taken with regard to cleanliness and the avoidance of pressure, *Bed-sores* will occasionally occur some time about the end of the third week. As a rule they do not greatly add to the patient's distress, as the same altered condition of the blood, which is an important factor in their production, has by this time induced indifference by its intoxicating effect on the brain. But they add considerably to his danger. They appear as livid patches on the parts most exposed to pressure—elbows, upper fold of the nates, and sometimes on the heels. Unless they yield to treatment sloughs quickly form, and when detached lay bare the fascia or muscles, sometimes over a surface of 2 or 3 inches in diameter.

*Parotid Bubo* is usually of fatal significance. MURCHISON reports losing five cases out of six in which parotid bubo appeared, and quotes TROUSSEAU to the effect that a case scarcely ever recovers when pus forms in the depths of the parotid gland. Recovery is certainly very uncommon. I can cite but one case, and in this both glands suppurated. The symptoms were throughout of extreme severity.

Deafness was an early symptom (5th day). There was much drowsiness, the patient dozing for hours at a time with her eyes half open. Delirium and subsultus on the 6th day. When fully awake she complained bitterly of paroxysms of intense pain starting from the shoulders and radiating to the finger-tips, being particularly severe in the elbows. The elbows were red, very sensitive to pressure, but there was no effusion into them and motion was free. . . . . At the end of the first week the lips were cracked, teeth covered with sordes; face flushed purple; very stupid. . . . . After the 10th day the temperature fell, but the nervous symptoms were unabated. She was always restless, and the delirium was occasionally wild. Her sense of smell became extraordinarily acute. . . . . On the 14th day she was vermin-hunting, and a crop of purpuric spots came out on the buttocks. Her pulse was now running. Cramps of leg muscles. Constant shouting; all sorts of fancies as to where she was. On the 15th day she complained of severe pain behind the jaw on the left side, and a deep-seated hard swelling, very sensitive to pressure, was detected there. Her temperature rose next morning to 103°.5. Left side of neck now brawny. A similar swelling forming on the right side.

Both glands were incised, each incision giving exit to a large quantity of pus, that from the right side "laudable," but that from the left, broken down and mingled with blood clots and small sloughs. Convalescence set in shortly after the collections were evacuated.

*Jaundice* (see section on SYMPTOMS) is probably present to a greater or less extent in all cases of average severity. Occasionally, however, it is so marked as to assume independent importance. I note only those instances in which it could be qualified as "deep," where the

skin assumed an olive tint and the conjunctivæ were intensely yellow; where also the onset of the symptom was not gradual. Of these I can cite nine, occurring respectively on the 5th, 8th, 10th (three cases), 11th, 14th, 17th and 44th day. Of these, those in which the jaundice declared itself on the 5th and 8th days, and two of those in which it was first observed on the 10th day, proved fatal, severe intestinal hæmorrhage occurring in three of the fatal cases.

Thus, out of nine cases in which "deep" jaundice occurred as a complication, four died, a mortality of 44.44 per cent.

It would also appear, though the cases are too few to support a categorical statement, that the earlier this complication arises the more fatal is its import,—

For out of five cases in which it occurred before the 11th day four died, a mortality of 80 per cent.

A case of *Acute Mania* occurring on the 10th day proved rapidly fatal.

A case of *Pyæmia*, in which on the 15th day the left shoulder and left knee were found red, hot, swollen, fluctuating, spontaneously painful and extremely sensitive to palpation, proved fatal on the 20th day.

The same patient suddenly became *Aphasic*, without paralysis of the limbs or face, on the 16th day, and continued in this condition for an hour. He recovered speech, but remained stupid up to his death.

I have seen two cases of *Ulceration of the Cornea*, one of which proved fatal.

In the case which recovered a small ulcer was observed on the 26th day at the outer edge of the left cornea, followed by three more a few days later. All four healed slowly, but the eye had not completely recovered until three weeks after the appearance of the first ulcer.

In several cases of enteric fever occurring among females, which I have elsewhere published, it was incidentally noted that the *Catamenia* were not arrested or materially affected by even the severest forms of the disease. In one case where the attack came on during the period of *Lactation*, and nursing was continued (against advice) through the entire course of the disease, the child appeared sufficiently nourished, and certainly received no injury. The milk supply was diminished but not arrested, and on the cessation of fever it again became normal in amount. In this case convalescence was established on the 18th day, and the highest temperature registered was 104° on the 5th, 7th, 12th and 14th days.

I have also published a case of early *Pregnancy* in which the temperature did not fall to normal until the 27th day, the highest temperature registered having, however, been only 103°.5. Pregnancy proceeded uninterrupted; indeed was not suspected until after the attack had passed by.

*Diarrhœa*, yellow and flocculent, occurred on the 7th day, and persisted. Muscular pains of extraordinary severity formed the most distressing symptom in this patient's case. There was but slight tympanites; no spots; but there were distinct tenderness and gurgling in the cæcal region. The *catamenia* had been absent for two months, but as they had frequently been irregular on previous occasions no particular attention was paid and the fact was not mentioned. However, 230 days from the beginning of the fever a mature child was born. Pregnancy therefore dated from 50 days before the patient fell ill.

It so happens that this is the only instance in which I have met enteric fever in a pregnant woman, and I therefore draw no conclusion as to the general probability of pregnancy being undisturbed by the fever.

In persons who before contracting enteric fever have been impregnated with *Malaria* we are extremely likely to find the latent condition roused into activity by the newly imported disturbance. Thus, no doubt, are to be explained the symptoms of intermittent fever which often usher in enteric, but which are soon masked by those of the acute disease, and many of the intercurrent attacks of fever of intermittent or remittent form which frequently delay convalescence. If this hypothesis be correct, it must be admitted that the two forms of disease may strike at the same time, for the complication described not uncommonly presents itself in individuals who have but recently arrived in China, who have never lived in a malarious district, and have never suffered from any malarial affection.

Latent *Syphilis* is occasionally brought to light. Thus, I have published a case in which the patient having no motive whatsoever for deception assured me that for more than 15 years he had been completely free from any manifestations of a syphilis contracted 19 years before, and which had run through an ordinary course with marked secondary symptoms. He had been vigorously treated during three or four years with mercury and iodide of potassium, and had presented no tertiary symptoms.

On the 44th day of enteric fever of rather more than average severity an unmistakeable coppery eruption appeared on the chest and forearms. Next day there was œdema and lividity of the soft palate, swiftly followed by specific ulceration of the left anterior pillar. Within three weeks, during which the patient was treated with mercurial inunction, and iodide of sodium internally (iodide of potassium inducing diarrhœa), the eruption disappeared and the throat recovered.

The combination of *Dysentery* with enteric fever is particularly fatal, not only on account of the double strain brought to bear on the victim's vital powers, but on account also of the grave hepatic complications which (I think) always present themselves when the two diseases occur simultaneously or run into one another. I do not, of course, here refer to the slight dysenteric symptoms which occasionally accompany the initial diarrhœa of enteric fever. It is not uncommon to discover ulceration of the colon in cases of apparently frank enteric fever, and ulceration of the lower end of the ileum in cases of seemingly uncomplicated dysentery. But there are groups not yet sufficiently studied in which enteric fever is grafted on to dysentery, and conversely. Either may precede the other. In two fatal cases in which enteric fever preceded I was unable to obtain a postmortem, but the symptoms pointed clearly to the presence of pyæmic abscesses, probably in large number, in the liver. In a third case, in which enteric fever followed immediately on dysentery,—

The autopsy revealed innumerable small abscesses in the liver, varying from the size of a pea to that of a Brazil-nut, so that any piece of the gland when thoroughly washed presented the appearance of a coarse-meshed sponge. The colon was ulcerated throughout its entire extent, and contained a considerable quantity of altered blood. An ulcer in the cœcum had perforated. The lower end of the ileum was sown with circular ulcers in the midst of infiltrated areas, some of which had not broken down, corresponding to Peyer's patches.

In such cases hæmatemesis is very liable to occur, and I am disposed to attribute it to rupture of varices of the lower œsophageal venous plexuses, which offer a ready receptacle for the blood of the portal system hindered in its passage through an encumbered liver. During inspiration there is a derivation of venous blood to the thorax, but under normal conditions this is relieved by the bronchial, azygos and phrenic veins, which are in communication with

the coronary vein of the stomach. When, however, the strain on the œsophageal veins is, as in cirrhosis of the liver and presumably in widespread suppuration, vastly increased, this relief may easily prove insufficient, the œsophageal varices may give way, and hæmorrhage into the stomach be produced.

#### CONVALESCENCE AND SEQUELÆ.

Convalescence is always gradual. The patient begins to sleep better and to feel refreshed by sleep; mental depression and indifference disappear. After an attack of ordinary severity weakness is profound and the body is left wasted to an extreme degree. Muscular strength, appetite and the power of digesting return slowly, while the process of recovery is apt to be interrupted by fugitive bursts of fever, the temperature sometimes suddenly rising to 103° or 104° for a few hours. These paroxysms are often coincident with the action of a laxative, which stirs up before expelling fæcal accumulations containing undigested food which has fermented or putrefied. Many weeks elapse before recovery can be said to be complete; but after enteric fever, as after many other acute diseases, health appears to be established on a higher level than it had reached for months or years before the attack.

The course of convalescence is, however, often interrupted and lengthened. Crops of boils are a source of annoyance, but are not of serious import. Inter- and intra-muscular abscesses are not uncommon, forming rapidly and silently in the majority of cases, and reaching an enormous size before the skin betrays any sign of their presence. When within the substance of muscles they contain broken-down blood clot and fragments of tissue as well as pus, and are no doubt due to the degeneration of ZENKER. The affected muscles remain weak for a considerable time after the healing of such abscesses; but in all the cases which have fallen under my observation there has been complete recovery of function. Occasionally severe intra-muscular inflammation occurs, but does not proceed to suppuration. The deep inguinal glands sometimes enlarge enormously, and by pressure cause œdema of the lower extremity. Independently of this cause, œdema of the hands, feet and ankles usually supervenes as soon as the patient begins to move about and use his hands. This symptom finds a ready explanation in the persisting cardiac weakness and the relaxed (degenerated?) vascular walls, as well as in the anæmic condition, which otherwise betrays itself by pale lips and gums, breathlessness, and a soft or musical murmur at the base of the heart, obviously of hæmic origin. The myocardial systolic bruit usually present after the first week of fever, and which, although audible at base and apex, is more distinct at the apex, passes as convalescence advances into the musical systolic bruit just mentioned, which is most audible at the base. Both disappear as strength returns.

Periostitis of the long bones, of the ribs and sternum has been noted in several of the cases upon which this study of enteric fever is founded. The nodes may often be dissipated by treatment, but when they suppurate there is generally superficial exfoliation of the underlying bone and tediously protracted ulceration of the skin.

The following case was not under my care during the original illness.

8th November 1888. Clerk, aged 36.—Patient was in hospital from the 25th March to the 28th April 1888 with severe enteric fever. Before leaving he had pain in the lower left chest wall

anteriorly, followed by a swelling which burst about the beginning of June, and has ever since gone on draining two or three fluidrachms of serous and flaky pus daily. He has frequent attacks of fever of short duration, and the discharge increases before these attacks come on. His complexion is waxy and features puffy. Neither liver nor spleen is sensibly enlarged. Appetite good, bowels regular. Has not suffered seriously from his lesion until a few weeks ago, since which time it appears to him to cause slight attacks of spasmodic dyspnoea. Tongue brown, loaded. Temperature normal. Urine neutral; S.G. 1,015; straw coloured, with slight mucous cloud. Filtered, it gave no deposit on boiling or when treated with nitric acid in the cold. Boiled with nitric acid it turned a delicate and permanent pink.

Half an inch to the left of the middle line of the sternum and  $3\frac{1}{4}$  inches above the tip of the ensiform cartilage there is a fungating ulcer. The probe entering by the side of the excrescence passes backwards and outwards at an angle of  $30^\circ$  with the surface for  $2\frac{1}{4}$  inches, when it enters a smooth cavity. No dead bone felt. The exploration was very painful.

There was no sign of deposit in the lungs, and this, along with the history and the patient's general appearance, negatived the suggestion of a tubercular abscess.

A semi-circular flap, 3 inches in radius, with its convexity downwards and its base extending horizontally from the inner edge of the left mammary gland to the middle of the sternum, was with the areolar tissue and muscle raised from the thoracic wall. The internal intercostals between the fifth and sixth costal cartilages were divided, when an abscess cavity was opened, of which the posterior wall was formed by new tissue matted over the pleura and pericardium. The fifth rib was carious for about an inch from its articulation; it was resected. The upper half of the anterior inch of the sixth rib was also carious, and was chipped and scraped away. The sixth cartilage was found to be calcified, and was excised. An abscess cavity was now found in the lower third of the gladiolus, containing much debris and pus. This was cleared out with a sharp spoon, and a counter-opening made into it from the front of the bone. The cavities were thoroughly rubbed with iodoform, drained, and the flap replaced. Recovery was uneventful, but healing was not complete before the expiration of 10 weeks.

Among sequelæ referrible to the nervous system, I noted in one case, unique in my experience, the supervention of myopia (= 4 D), the refraction having previously been normal. Cutaneous anæsthesia and paræsthesiæ of various kinds, affecting limited areas, such as the inner surface of one thigh, the soles of the feet, etc., frequently occur and persist for weeks. On the other hand, there may be sciatic pain of various degrees, sometimes sufficiently severe to cause lameness; muscular cramps, referred chiefly to the calves; or neuralgia, generally of the limbs.

Often after a severe and protracted illness a fatuous condition persists for several weeks, the patient remaining excitable, and incoherent when excited, emotional, easily moved to laughter and tears. Or he may become melancholic. Memory is weakened or almost abolished. There may be actual imbecility. Hallucinations, seldom I think of a terrifying kind, maintain restlessness. They present themselves either by day and night or only at night, and are sometimes recognised by the patient himself as illusions.

I once saw in consultation at another port a case of *Hepatic Abscess* which had declared itself during convalescence from a severe attack of enteric fever. The opinion was expressed that it was sequential to the intestinal lesions of the immediately precedent illness. But inasmuch as, so far as could be judged, it was a single abscess, and as the patient had for many years been deeply impregnated with malaria, it appeared more probable that its origin had been

malarial. Diagnosis of its cause was further obscured by a history of prolonged dysentery 18 months before.

Operation was recommended, but for some reason was not performed. A month later I was informed that the abscess had burst into the bowel, and the patient shortly succumbed to septic absorption and purulent diarrhoea.

This is the only case within my experience in which hepatic abscess could with any show of reason be attributed to enteric fever as its cause.

#### RELAPSE AND RECRUDESCENCE.

The term relapse is commonly used to designate not only true recurrence with reproduction of all the characteristic symptoms of the disease, after a more or less prolonged period of convalescence from an attack which has run the usual course to fall of temperature and cessation of the primary symptoms, but also, in a loose sense, any reappearance, which is more than merely fugitive, of fever. Clearly the former is the correct acceptation of the term, but the time which has elapsed between the close of the first period of high temperatures and the opening of the second, is an element the importance of which is differently estimated by different observers. Thus, supposing a full fortnight of apparently final convalescence had passed, many would consider a fresh lighting up of fever accompanied by most or all of the symptoms observed in the initial attack as a relapse, whereas it might, and probably would, in fact, be due to the regular but slow development of lingering and unsuspected lesions in the intestinal canal. Such a case would more properly be described as a "recrudescence," though it should answer to the ordinary test of a "relapse," namely, the recurrence of typical stools and perhaps of a typical eruption.

Accepting this latter test, with its acknowledged imperfections, it may, I think, be said that true relapse of enteric fever is rare in China. Convalescence, however prolonged, is usually definitive. The following case appears to be a genuine instance:—

*Enteric Fever. Relapse after six weeks. Recovery.*—Forty-two days after the last record of a fever temperature in a case which had lasted four weeks, the patient began to experience loss of appetite, rapidly increasing weakness, sleeplessness and diarrhoea. I saw her on the 6th day. Her morning temperature was  $102^{\circ}.5$ ; evening temperature  $104^{\circ}$ . Stools nearly watery; yellow, fetid. Tongue normal. Abdomen distended. Slight tenderness to percussion in hepatic region. Distinct gurgling. The temperature ran as follows (falling at night for three days):—

6th to 10th day . . .	Morning range .	$102^{\circ}.3$ to $103^{\circ}.7$	. . .	Evening range .	$103^{\circ}.4$ to $104^{\circ}.4$
11th ,, 13th ,, . . .	" "	$100^{\circ}.8$ ,, $102^{\circ}.8$	. . .	" "	$103^{\circ}.8$ ,, $104^{\circ}.1$
14th day . . . . .	Morning temperature .	$103^{\circ}.5$	. . .	Evening temperature .	$102^{\circ}.8$
15th ,, . . . . .	" "	$102^{\circ}.4$	. . .	" "	$98^{\circ}.2$
16th ,, . . . . .	" "	$101^{\circ}.5$	. . .	" "	$100^{\circ}.9$
17th to 22nd day . . .	Morning range .	$98^{\circ}.4$ to $99^{\circ}.8$	. . .	Evening range .	$98^{\circ}.4$ to $101^{\circ}.1$

The patient was deaf and occasionally delirious. Dilated pupils throughout. Two rose spots were discovered on the 10th day. All through there was excessive perspiration. The tongue varied from normal to extreme dryness. The catamenia lasted from the 3rd day of the fever to the 13th. Diarrhoea was characteristic. There was intense prostration; congested pharynx; cough; headache; horrible visions. Convalescence was established at the end of the third week.

On the other hand, the following case presents merely the characters of repeated recrudescence:—

Patient admitted on what was supposed to be the 10th day of an illness characterised by general malaise, severe spontaneous epigastric pain, sleeplessness, persistent fever, constipation alternating with yellow diarrhoea, loss of appetite, wasting.

He was brought to hospital in collapse, referred by him, after reaction, to the violence of an attack of abdominal pain. There was no hernia; abdomen tympanitic, extremely sensitive all over.

Characteristic diarrhoea speedily set in, alternating with stools perfectly black, often solid, but generally liquid; dicrotic pulse; sleeplessness; temperature rising during the day from about  $100^{\circ}$  in the early morning to close on  $104^{\circ}$  at night. Spots were observed on the 12th day. (*Primary period of fever.*)

From the 25th to the 33rd day the morning and evening temperatures were below  $100^{\circ}$ , all the symptoms abated, and convalescence appeared to have set in. On the 32nd day a slice of chicken was allowed. (*First interval.*)

On the 34th day the afternoon temperature rose to  $102^{\circ}$ , and the entire train of symptoms speedily reappeared. Spots were observed on the 40th day. The temperature was frequently over  $104^{\circ}$ , but fell gradually from the 43rd day, reaching normal on the 55th day. Abatement of the other symptoms was not, however, so complete as before. (*First recrudescence.*)

From the 56th day to the 60th there was gradual improvement, with normal temperatures. The patient was kept on restricted diet. (*Second interval.*)

On the 60th day the afternoon temperature rose to  $102^{\circ}.5$ , and the characteristic symptoms, with the exception of the eruption, which was not observed, reappeared. This condition lasted to the 84th day, when a normal temperature, morning and evening, was again registered. The highest temperature reached during this period was  $103^{\circ}$ . (*Second recrudescence.*)

From this out there was no rise of temperature. But convalescence could not be said to have been established before the 93rd day. From the 80th day to about the 130th there was marked imbecility. For three weeks after convalescence began severe sciatic pain on both sides caused lameness, and a periosteal node formed on the chondral extremity of the fourth rib on the left side.

I have never met with a fatal case of relapse. That a second attack may however be attended by reproduction of all the original lesions, is attested by the following postmortem record,\* which I reproduce in default of similar material of my own:—

Female, aged 21. Relapse two months after convalescence. Severe acute general peritonitis most marked about the viscera occupying the right iliac fossa. Both large and small intestines contained pale yellow, pea-soupy liquid, but no solid faeces. Evidences of the original attack consisted of ragged ulcers with slaty base and undermined edges, partially cicatrised, situated in the caecum and adjacent 2 inches of ileum, and of an isolated typical "typhoid" ulcer 2 feet above the ileo-caecal valve. The changes indicative of the recent attack consisted of vivid congestion surrounding for a variable distance the Peyerian patches here and there for a distance of  $4\frac{1}{2}$  feet up the ileum. The surface of the patches was greyish, on the same level as the surrounding mucous membrane, and covered by yellow adherent pseudo-membranous film transgressed the limits of the patch and overlay the surrounding halo of congestion, notably so in the neighbourhood of the ileo-caecal valve. The solitary follicles of the large intestine down to within an inch of the anus were prominent and surrounded by congestion, but nowhere ulcerated. The mucous membrane of both small and large intestines intervening between these lesions was softened and acutely inflamed. There was marked fibroid thickening of the wall of the caecum—at first sight

\* Transactions of the Pathological Society of London, xxxvi [1885], p. 196.

suggestive of "growth,"—with matting together of the surrounding tissues. The mesenteric and retroperitoneal glands presented the same morbid condition. They were greatly enlarged; most of them hard and caseous, but some softened and acutely inflamed. The condition was confined to the abdominal lymphatic glands.

It may be questioned whether this was not a case of recrudescence rather than of true relapse.

Recurrence of enteric fever is certainly rare, so rare that it is currently believed that one attack protects the individual for many years, if not for his whole life. Two cases have, however, been recently recorded by practitioners in China, in one of which the disease recurred after 10 years, and in the other after four years.\*

#### MODE OF DEATH.

Death may occur at almost any period. Early, from the initial impact of the disease, the vital functions being overpowered by the poison before there has been time for the development of the ordinary symptoms. Late, from exhaustion, through continued molecular degeneration of vital organs. The earliest date at which I have seen death occur was the 8th day, and in that case I was unfortunately unable to obtain a postmortem.

In the majority of fatal cases one or other of the following conditions is the immediate cause of death. The patient may die in the collapse of sudden general peritonitis, preceded or not by perforation of the bowel or by the bursting of a suppurating mesenteric gland; or in the collapse of hæmorrhage; or from heart failure; or from the cumulative poisonous and hyperthermic action exerted on all the tissues, and notably on the blood, on the brain, and on the nervous centres regulating the circulation, respiration and temperature as well as secretion and excretion; or from pulmonary congestion and œdema; or from pneumonia, whether specific or merely intercurrent, and whether accompanied or not by pleurisy with serous (generally hæmorrhagic) effusion; or exhausted by colliquative diarrhoea, with or without repeated moderate hæmorrhages; or from septicæmia due to products of bowel destruction finding their way into the veins.

It is not uncommon to find a patient momentarily displaying an extraordinary amount of muscular strength a very short time before death.

#### DIAGNOSIS.

The solution of the problem of diagnosis must depend on a careful study of the symptoms in each individual case. In no instance will all the usual symptoms be found congregated. The early supervention of nervous exhaustion is a valuable indication; so also are dilatation and immobility of the pupils, with pearly sclerotics. Dicrotism of the pulse is exceedingly important, but doubt has generally disappeared before this is observed. The course of the temperature is an indispensable guide, but more information cannot, I think, be expected from it than I have indicated on page 56. Certain cases of acute miliary tuberculosis and of tubercular meningitis will occasionally deceive the very elect, but luckily these are of such

\* *Customs Medical Reports*, xxxiii, 19; xxxvii, 22.

infrequent occurrence here that they need hardly enter into consideration. The distinction between enteric fever and severe remittent is of all the most obscure. Neither the history; nor the range of the temperature; nor the condition of the tongue; nor the nervous symptoms, including sleeplessness, delirium and stupor, if the case has been neglected; nor the frequent constipation; nor the splenic enlargement, will serve as a guide. Yet here accurate diagnosis is by no means merely a matter of scientific nicety. The heroic treatment for which remittent fever frequently calls is likely enough to be fatally mischievous in enteric. For my own part, I have seen at least one case of the latter disease in regard to which no doubt remains in my mind that the patient was poisoned with quinine. Thus, the compound term "typho-malarial fever" which has arisen out of the mysterious connexion between remittent and typhoid has done incalculable mischief. Not only does it crystallize a pathological doctrine which is no better than a surmise, and which in all probability is utterly wrong, but it suggests a line of treatment which is generally distinctly hurtful. At the commencement of a fever, intense depression out of proportion to the period of the illness, pale and puffy features, pearly sclerotics, sleeplessness, headache and vertigo, which very frequently usher in the more characteristic symptoms of enteric, should rouse strong suspicion when the indications of the thermometer are doubtful. At a slightly more advanced stage the maximum temperatures will be found higher in malarial than in enteric cases, and the daily temperature curve composed of long waves instead of short ripples; the liver is more frequently enlarged and painful; bilious vomiting is more frequent; the stools frequently contain an excess of bile, and tympanites is uncommon. Doubt is not long justifiable; the uselessness of quinine is manifest within two or three days, and if by chance the patient should be constipated, his extraordinary susceptibility to the action of a laxative is at once suggestive of commencing enteric fever. Indeed, the diagnosis is commonly fixed before the temperature curve has run long enough to exhibit the difference between the frequent short rises and falls which occur each day in enteric fever and the regular daily ascent and descent in remittent.

It is essential to note that the symptoms marking the onset of enteric fever may be subjectively indistinguishable from those that make up the chronic "seediness" which is occasionally the reward of habitual drinking. Loss of appetite, sleeplessness, horrible visions, foul tongue, thirst and deranged bowels, with perhaps mucous or bilious vomiting, are regarded as natural incidents of periodical recurrence; they give rise to no suspicion of any special significance, and often the second week of enteric fever is reached before advice is sought.

#### PROGNOSIS.

There is probably no disease in which recovery so frequently takes place from a condition so desperate as is often encountered in enteric fever. On the other hand, there is no disease in which the mildness of symptoms may prove more deceptive. Prognosis is therefore always doubtful. This much is certain, that it can never be based on excessively exaggerated temperature in the early period of the disease, nor upon moderate temperature in the later periods. I have the histories of three fatal cases in which the temperature, taken every three hours, never exceeded  $102^{\circ}.5$ . There is hardly a symptom at any stage, not even excessive

hæmorrhage, that is by itself of absolutely fatal import. Deep jaundice occurring in the first 10 days is of exceedingly bad augury. Out of five such cases, four died, a mortality of 80 per cent. A high internal temperature with cold surface is usually, but not always, of fatal significance. Of four cases in which large disorderly movements of the hands were observed, three died, or 75 per cent. Finally, four cases of tetanic contraction of the neck, back and extremities (one case), or of the arms alone (three cases), all died. Apart from these symptoms, which are fortunately of infrequent occurrence, it is only after considering the daily range of the temperature and the number of hours during which it remains at a high level, carefully reviewing the condition of all the organs, estimating the power of resistance remaining to the nervous system, the integrity of the muscular structure of the heart, the functional activity of the liver, spleen and kidneys, and the extent and depth of the destructive process in the bowel, that a probable opinion as to the future can be expressed. And even when this is altogether favourable, it must not be forgotten that a pin-hole ulcer may be on the point of perforating the intestine and changing the entire aspect of affairs within an hour. It is evident that pre-existent disease of the heart, or of any viscus, is of evil omen for the prognosis. There are certain indications of imminent death, such as expressionless features, eyes widely open gazing into vacancy, lower jaw fallen, complete wakefulness with absolute indifference or insensibility to every impulse that may possibly arise from within or from without, body cold and bathed in sweat, hardly perceptible pulse and respiration. But these are obvious signs of the final agony, and need no skilled interpretation.

#### PATHOLOGY.

In dealing with enteric fever we are no doubt brought face to face with fermentative and putrefactive processes, but whether these are of one kind only, or are set going in many and various directions at once, and whether differences of type in the enteric affections which we have hitherto classed together under "enteric fever" correspond to differences in the fermentative germs, or merely to differences in the environment into which such germs are introduced, are questions which for the moment are insoluble. It is now widely believed that enteric fever is caused by a specific micro-organism. But EBERTH'S bacillus has never been identified in India, and never, so far as I know, in China. I myself have diligently searched for it, but without result. In India, again, there is a growing belief that one of the fevers prevalent in that country, though symptomatically indistinguishable from enteric fever, is characterised by intestinal lesions differing from those of that disease, and, therefore, presumably due to a different agency. Wide experience in China leads to a like conclusion (*see MORBID ANATOMY*). But even further, certain Indian observers hold that cases of fever may show bowel lesions identical in general aspect with those of true enteric fever and yet not be due to the specific cause which produces the latter.\* It seems, however, in the present state of knowledge, to be a wanton introduction of confusion to promulgate the doctrine that, although among the forms of continued fever occurring in Europe and America specific enteric fever is the only one characterised by the presence of intestinal lesions of a peculiar type, it is an open question whether this should hold good for cases occurring elsewhere. However

\* *Twenty-fifth Annual Report of the Sanitary Commissioner with the Government of India*, p. 27.

this may be, those who are familiar with the clinical and anatomical features of genuine enteric fever in European countries will not fail to recognise that disease in the account here given of the symptoms and morbid anatomy of the affection which passes as enteric fever in China.

If non-specific irritation be invoked as the cause of certain cases of fever indistinguishable from enteric, then it must be confessed that in a considerable number of instances enteric fever as verified by autopsy does seem to take its rise from a chill or from the eating of subsequently suspected meat. I have published such cases in the Chinese Customs *Medical Reports*. Here we must first make allowance for mere coincidence. But as a far larger number of cases appear to be related to such accidents than the doctrine of chances will explain, and as we cannot admit that different causes can give rise to specifically identical effects, we are forced to assume that at least in some instances incriminated meat has come from animals infected with enteric fever,\* or that, under some elementary influence common to all the apparent causes, pre-existent indifferent micro-organisms are transformed into the organism which causes enteric fever. This latter explanation is purely hypothetical, and so far altogether unsatisfactory.

The "typhoid state" is occasionally developed so early that there must be another cause for it besides prolonged high temperature, or absorption of transformed products of increased bodily waste, or septic invasion of the blood by fluids furnished by the intestinal ulcers, or a combination of all these factors. Intercurrent falls of temperature, even when prolonged, are often without any effect on the general condition; and the other causes assigned demand a longer time for the manifestation of their action than the histories of such cases as I now refer to permit us to assume. This residual cause can be no other than a chemical poison or more than one, secreted or elaborated by the germ or germs. What, therefore, appears really essential is the recognition of the intoxicating product, whatever it may be, before it has induced destructive organic lesions. This recognition must necessarily precede any but empirical attempts to arrest the destructive action before it has advanced beyond the stage of irritation or congestion; for it is certain that in any given case the germs must be in full activity before their presence is manifested. The mere identification, no matter how certain, of a specific germ would, therefore, not advance matters much on the side of profitable treatment, however interesting it would be from a scientific standpoint, and however important from the point of view of preventive medicine.

#### MORBID ANATOMY.

I have no intention of describing the morbid anatomy of enteric fever as though I were writing a text-book. What follows is designed mainly to show that the lesions discovered postmortem are essentially the same as those encountered in cases of enteric fever examined in Europe and America. The importance of this lies in the fact, already often mentioned, that in China many cases of what is certainly enteric fever are diagnosed as "remittent" or "typho-malarial," and are consequently treated in a manner which does not conduce to recovery.

\* On the occurrence of enteric fever among animals, see GRIESINGER, *Traité des Maladies infectieuses*, p. 238 (French translation, 1877). Also *Transactions of the Pathological Society of London*, xxxvi [1885], p. 527.

The first striking general notion obtained from studying the morbid anatomy of enteric fever is, that there is no assignable ratio between the severity of the symptoms observed during life and the extent or depth of the lesions to be expected after death.

Reference has been made to the extraordinary and puzzling variety in the grouping of symptoms encountered in enteric fever, a variety so great as to suggest that more than one disease may be included under the term. Yet when the postmortem records of fatal cases are confronted with the clinical reports we find as an almost invariable rule that to the multiplicity in symptoms there corresponds an essential unity in the organic lesions. On the other hand, it occasionally happens that a case proceeds in close conformity with the acknowledged type, but the lesions discovered after death, though sufficient to explain the symptoms, are not those which we associate with enteric fever. This is illustrated by the following extracts from the postmortem records of two cases recently observed, in which the course of symptoms was strictly in accordance with the average course of "enteric fever." The fever no doubt was enteric, but not in the special sense which we attach to that qualification.

CASE I.—Death occurred on the 24th day. \* \* \* On opening the abdomen the transverse colon was enormously distended with gas, its inferior border reaching to within 4 inches of the pubes. There was no general peritonitis. The liver was slightly enlarged and dripped with blood on section; it weighed 65 ounces. The gall bladder was tightly distended with olive-green fluid. The spleen was enlarged and very friable, presenting two large yellow, broken-down pulpy infarcts at the upper end of its posterior border. Kidneys overfilled with blood; otherwise normal. The bladder contained a few ounces of very slightly albuminous urine.

The ileum was injected on its peritoneal surface. The last 6 inches of its mucous membrane was soft and œdematous, ecchymosed in large patches. There was no ulceration or infiltration of PEYER'S groups, but the upper surface of the ileo-cæcal valve and the mucous membrane adjoining it were gangrenous and black. There was no perforation. There were no adhesions round the cæcum. The mucous membrane of the cæcum was deeply injected, and the cæcal surface of the valve was, like the ileac surface, gangrenous. The serous surface of the ascending colon was injected. The bowel contained a considerable quantity of apparently normal fæces. The mucous membrane as far as 2 or 3 inches beyond the hepatic flexure showed extensive patches of ecchymosis.

CASE II.—Death occurred on the 22nd day. \* \* \* The peritoneal cavity was distended with gas free from fæcal odour. On incision there was a profuse escape of turbid, yellow fluid. The diaphragm was arched into the chest; its peritoneal surface deeply injected, and patches of lymph here and there over it. Surface of stomach, of small intestines and of colon injected,—purple. The stomach was enormously distended with gas and fluid. The colon was also much distended. The great omentum was rolled up and tucked under the lower border of the transverse colon. The small intestines were distended, and glued together by flakes of recent and bands of organised lymph. Flakes of thick pus were scattered widely over their surface. The parietal peritoneum was injected, but there was no lymph deposit on its surface. The liver extended from the fourth interspace to the costal border in the nipple line. Its tissue was soft, but not abnormal to the naked eye. It weighed 74 ounces without having been drained but after the escape of a considerable amount of blood during its removal. The gall bladder was empty. The spleen was swollen and soft, covered with lymph in flakes, bathed in pus derived from a partially localised collection behind and internal to it. It weighed 12 ounces. The posterior peritoneal surface of the stomach was deeply injected, covered with flakes of lymph. It aided in enclosing a magma of broken down pus and lymph, serum and effused blood, which was retained by rather loose adhesions between the stomach, spleen and pancreas. The left extremity of the greater curvature was fringed with organised lymph in pieces from  $\frac{2}{3}$  inch to 1 inch long. There were large

ecchymoses on both mucous surfaces. The stomach contained a blood-stained turbid fluid. There was no perforation and no ulcer. There was no noteworthy enlargement or hardening of the mesenteric glands. The lower 18 inches of the ileum presented a vast number of solitary ulcers with central slough not yet separated. These were strictly limited by the ileo-cæcal valve, in the neighbourhood of which they were most thickly set. There was no perforation (water test under high pressure). There was no ulceration or even infiltration of PEYER'S patches. The small intestine contained, besides an enormous quantity of gas, a little bloody tenacious fluid. The serous surface of the cæcum was much injected. The appendix vermiformis was normal. There was no evidence of any localised inflammation in the peri-cæcal region. The posterior cæcal glands were not in any way enlarged or distended. The large intestine was injected on its serous surface. Its mucous membrane was smeared with blood-stained fluid, here having a green tinge; when washed it appeared normal. The kidneys were very slightly congested.

I have detailed the preceding exceptional cases for the sake of completeness, and more especially with the view of contributing to the body of facts destined eventually to justify or upset whatever theories may from time to time be put forward with regard to the nature of enteric fever in the East.

Turning now to ordinary cases, I have no records of postmortems made during the first week of the disease. The skin is usually parchment-like, showing ecchymoses in the supra-clavicular regions, on the abdominal wall, thighs and ankles as well as on the dependent parts of the body. For about 24 hours after death the surface retains a certain amount of heat.

For instance, 21 hours after death, the average temperature of the air having been 40° F., the temperature of the skin of the abdomen (surface thermometer 10 minutes in position) was 50°.

The duration of rigor mortis is variable.

I have noted it "strong" 7½ hours after death; "very strong" 17½ and 21 hours after death; and "passing off" after 9 hours.

There is often a discharge of bloody and frothy fluid from the nose and mouth. The muscles are usually dry on section. The blood is fluid throughout the body, with little or no tendency to coagulate. The diaphragm is generally strongly arched into the chest, and in cases of general peritonitis the pleural surface of the diaphragm is commonly inflamed in patches corresponding in position with the inflamed areas on the peritoneal surface. The pleuræ usually contain bloody or citrine-coloured serum in small (sometimes in very large) quantity. In such cases there are always patches of pleuritic inflammation, with or without lymph deposit. The lungs may be perfectly healthy, or in any stage of pneumonia, or passively congested and œdematous. Septic infarcts are sometimes found in one or other of the (lower) lobes. The bronchial mucous membrane is injected and often smeared with muco-purulent secretion. The bronchial glands are almost invariably enlarged and hard. The pericardium is generally normal as to its surfaces. In cases fatal by pneumonia it contains straw-coloured or pink serum (4 fluidounces in one case).

The heart may be to all appearance perfectly normal even as late as the middle of the third week. But generally its muscular tissue is soft, dead-leaf colour, and often dotted with minute yellow spots. The cavities may contain no blood, or either side may be full or distended. Coagula are often found, postmortem or of older date; if formed during life they are (I think) most likely to be found in the right ventricle and left auricle.

In certain of the muscular fibres fatty or vitreous granular bodies replace the striations, producing what has been described as segmentary dissociation. There is a great increase in the number of the muscular nuclei, and pigment granules are distributed among the fibres. The interstitial tissue contains multitudes of small round cells and free leucocytes as well as much granular exudation. Fibres in a perfectly normal condition are found side by side with others in which degeneration is far advanced.

The endothelial surface of the great vessels is often stained with the colouring matter of the blood.

On opening the peritoneal cavity there will generally be found more or less peritonitis, and often general inflammation. The cavity is sometimes distended with gas, even when there is no perforation. There may be no effusion, or much, sometimes blood-stained, or yellow and turbid. If there has been perforation or an approach to perforation the intestines will be found matted together by lymph and false membranes round the seat of the accident. The serous surface of the bowel may be inflamed universally or in patches. The intestines are usually distended with gas and bulge into the incision. On filling them with water under pressure a minute perforation is sometimes brought to light which would otherwise escape notice.

I was once present at the autopsy of a case of enteric fever where the peritoneal cavity was distended with gas and contained much faecal liquid as well as pus and lymph. Water pressure detected a pin-hole aperture, which under mere inspection would probably not have been seen. It was in the middle of an inflamed PEYER'S patch, 12 inches from the valve, and, with the exception of one other patch which was merely congested, the rest of the intestine was apparently healthy.\*

But in almost every case, at whatever period after the first week it may have proved fatal, all the stages of morbid alteration in the intestine are present. On opening the digestive tract from the termination of the œsophagus to the anus, thickening and injection in small circular patches of the mucous membrane of the stomach will probably be noticed. These patches are mostly found on the posterior surface, and they may be the seat of very acute inflammation or of ecchymosis. The stomach is often largely inflated, and its serous surface injected, even when there is no general peritonitis. The small intestine will be found to contain yellow fluid fæces, or perhaps blood and putrid liquid. The mucous membrane of the duodenum may be intact or irritated, and it is not uncommon to find one dead lumbricoid worm or more in this section of the bowel. A few solitary glands in the jejunum may be inflamed. But the characteristic lesions are to be found in the ileum, nearly the whole surface of which may (rarely) be studded with solitary ulcers. As we ascend the bowel from the ileo-cæcal valve, where the lesions are usually the most advanced, following the surface opposite the mesenteric attachment, we come upon elliptical areas of infiltration of PEYER'S patches, and anywhere on the bowel surface infiltrated solitary follicles, both manifest to sight and touch as elevations more or less hard, but covered with mucous membrane little if at all altered. For the most part below these, or sometimes

\* Long ago RILLIET and BARTHEZ, and HENOCH, when treating of typhoid fever in young children, described cases wherein, although all the most characteristic symptoms of enteric fever were present, the postmortem signs were limited, so far as the abdominal viscera were concerned, to enlargement, softening or disintegration of one single PEYER'S patch, or to a superficial and apparently trivial inflammation of the mucous membrane of the large and small intestines (*entérite typhoïde*; R. and B.). "We must, therefore, conclude that pathological alterations may be very slightly developed, or even altogether absent, without this fact authorising us to deny that a given case was one of typhoid" (HENOCH).

surrounding them, are patches in various stages of inflammation, hæmorrhagic infiltration, sloughing and ulceration; the sloughs bile-stained, small or extensive, superficial or extending deeply into the muscular coats, or to or through the serous coat. The ulcers are ragged-edged or sharp-cut with undermined borders and worm-eaten, pulpy, grey or blood-stained surfaces. The patches not yet ulcerated, or only superficially ulcerated, are pale or injected. A section made through such a patch at right angles to its surface reveals an underlying firm yellowish-white layer, of variable depth. The ulceration becomes more and more general as we approach the valve. It may be strictly limited by the valve, which may be almost eaten through, although the cæcal surface and the mucous membrane of the entire colon may be intact. Occasionally PEYER'S patches to a great extent escape, and the surface of the bowel is thickly set with sloughing solitary glands. Here and there we may find ulcers in which a process of repair had begun by the downward inflexion of the edges and the formation of granulation tissue, the first steps towards cicatrization. We may also find, chiefly at the highest limit of the lesions, small patches still infiltrated, but which are undergoing a process of retrogression. Thus almost every autopsy presents a more or less complete history of the nature and course of the morbid process in the intestine.

The infiltration of PEYER'S patches and of the solitary glands consists, when slightly advanced, in a rich cellular proliferation and development, wherein the adjacent mucous membrane usually shares, so that the elements of the mucous membrane are fused with those of the glands. A vertical section through a patch brings to light a somewhat dense layer of variable thickness, made up of masses of embryonic cells embedded in an amorphous substance. Of these cell masses some will be found undergoing fatty or granular, not caseous, degeneration, and here and there minute sloughs will be seen where the infiltration has obliterated the capillaries.

Commencing at a distance of about 5 mm. from the edge of an ulcer the peritoneal coat is thickened and cloudy. The longitudinal muscular fibres are dissociated, and infiltrated with round cells, which are also thickly scattered between the transversely cut fibres of the circular coat. Minute hæmorrhages are here and there visible among the bundles; the capillaries are greatly enlarged, and the vascular walls are abnormally friable, as shown by torn (or spontaneously ruptured) vessels in otherwise perfectly successful sections. Occasionally, however, an area of normal muscle is to be found. The areolar coat is the seat of innumerable small hæmorrhages, and its meshes are thickly strewn with round cells, which lie among the lymph corpuscles, many of which appear to be proliferating, and the majority of which are deformed. Even where the muscular and areolar coats are already deeply infiltrated with round cells perfectly normal villi may be seen projecting into the lumen of the bowel. As the ulcer is approached the bases of the villi are thinned and invaded by round cells; several villi are fused together, exhibiting irregular masses of deformed cells, amorphous particles and minute blood extravasations on the free surface of the membrane. The crypts of LIEBERKUHN are swollen and filled with round cells, then gradually disappear along with the villi. They and the swollen solitary and agminate glands become crammed with nuclei, and are fused with the interstitial tissue, a free space usually occupying the centre of each follicle, the vestige, no doubt, of a minute abscess.

Coming to the ulcer itself, one first notices complete disorganisation of the structures of the bowel at its edge. The normal elements have almost totally disappeared, their remnants being mingled together, while multitudes of deeply stained nuclei (logwood) seem to form the wall of the ulcer. The muscular coat is represented by a few muscle cells. Scattered festoons of curled up fibres, along with short segments derived from the remains of the circular coat, are the traces of the areolar layer. At the point of perforation, when perforation has occurred, sprays of elastic fibres entangling large, flat, granular, nucleated

cells, the endothelial cells of the lymph sinuses, protrude on the peritoneal surface. In each field all these elements are present in inextricable confusion. An empty vessel is here and there visible; here and there also hæmorrhagic clots and groups of fat cells. On the peritoneal surface at the edge of the perforation minute nucleated cells are heaped up. On the mucous surface the border of the ulcer is undermined, agglomerations of round cells projecting so as to overhang the cavity beneath from which the slough has been cast out.

The colon is generally distended with gas, and may contain vast quantities of undigested curd. It may be perfectly normal, deeply congested or strewn with ulcers.

The solitary glands undergo a process identical with that which attacks the glands of the small intestine. When they ulcerate several may coalesce into a single patch, and series of these patches are often found extending as far as the splenic flexure or down as far as the rectum. The cæcal surface of the valve and some of the patches in the colon are occasionally gangrenous. The retro-cæcal glands are generally indurated and enlarged, and sometimes suppurating.

The mesenteric glands are swollen and hard, or soft from breaking down of their contents. On section they exude a pinkish-brown purulent fluid, and contain sloughs which readily shell out of the capsule. They vary in size; the largest I have seen were somewhat bigger than a Brazil-nut. Although they are most affected in those portions of the mesentery which correspond to the profoundest intestinal lesions, they have undergone change also in regions where the adjacent bowel shows no sign of morbid alteration. It may, therefore, be inferred that their implication is mainly primary, and only in part due to infection from the intestinal surface. This conclusion is supported by the frequent occurrence of an identical process in the bronchial glands, pharyngeal tonsil, etc.

Selecting a gland in an early stage of induration, it will be found that the swelling is due to cellular infiltration and overgrowth of connective tissue.

The liver is generally but slightly enlarged, its weight varying between 60 and 75 ounces. I have seen its surface coal-black. It is often hyperæmic, dripping with blood on section. To the naked eye the surface of a section appears singularly uniform and greasy, usually of yellowish-brown colour.

On minute examination the vast majority of the hepatic cells are, in advanced cases, found swollen, and in a condition of granular or fatty degeneration, the nuclei having disappeared, or at all events become invisible amid the oily contents of the cells.

The gall bladder is frequently tightly distended with bile, but is occasionally quite empty. In one case I found a minute ulcer on its mucous surface. The spleen is enlarged, its weight varying between 11 and 16 ounces. I have never found it increased as NIEMEYER describes it to "from twice to six times its natural size," nor is the degree of its increase any measure of the severity of the disease. It is always friable, often reduced to mere putrilage, containing yellow broken-down pulpy infarcts, chiefly towards its posterior border.

In the spleen the positive morbid appearances are chiefly enlargement of the Malpighian bodies and crowding of the softened pulp with small round cells and yellowish pigment granules.

The kidneys are commonly enlarged, often dripping on section. By squeezing the papillæ one can obtain a considerable discharge of greyish catarrhal liquid.

The renal epithelium, in limited areas of the cortical and pyramidal portions, is granular, the nuclei invisible, and in certain portions the outline of the cells themselves indistinct or altogether undeterminable. Degeneration is always, or at least generally, more advanced in the cortical portion than in the pyramidal.

The voluntary muscles I have not examined microscopically. But from the occasional occurrence of intra-muscular hæmorrhage and suppuration, as well as from the intensity of muscular weakness during the early stages of convalescence, it is probable that their fibres undergo granular or waxy degeneration identical with or similar to the forms described by ZENKER. Their degeneration may indeed be assumed *à priori* whenever the bodily temperature remains for a prolonged period at a high level.

I have examined the brain in only four cases of enteric fever, and in none of them with much result. In the first case, fatal on the 22nd day by pneumonia, there was no noticeable alteration. In the second, fatal by heart failure on the 30th day, the convolutions were œdematous, and there was about a fluidrachm of serous fluid in each lateral ventricle. In the third and fourth, death occurred on the 29th and 32nd day respectively, from septic absorption and exhaustion. In the first of these the convolutions were abnormally dry and shrunken; in the second the brain was œdematous.

Sections from the cortex were carefully examined in all. In the first and third, where the brain appeared unaltered or shrunken, I made nothing out. In the two cases where the tissue was distinctly œdematous the perivascular lymph spaces were seen to be crowded with small corpuscular bodies; several nerve cells were masked or distorted by aggregations of the same bodies, while others appeared to contain two or more nuclei.

The condition of the spinal cord I have never investigated.

#### TREATMENT.

The indications for treatment are generally simple.

Whoever sees in the *Temperature* the chief or only enemy to be combated will use cold baths, large doses of quinine, and the modern antipyretics. For my own part, whenever the temperature has been high enough to suggest the cold bath, I have found in the condition of the heart a sufficient contraindication. Here alcohol by stimulating the flagging cardiac muscle, and thus driving the blood through the pulmonary and surface capillaries, does a double service. It has for this reason always appeared to me to be the safest and most reliable antipyretic. Quinine has singularly little effect in lowering the temperature, and it has the disadvantages of aggravating headache, promoting delirium, diminishing any slight desire for food that may exist, and increasing diarrhœa. But when the coincidence of malarial and enteric fever is suspected a test dose of quinine (15 grains) may safely be administered. If this reduces an anomalous temperature curve to enteric form, then, and in that case only, quinine should be persisted with (unless it proves hurtful) until the curve becomes normally enteric. When this result is attained quinine is no longer of use. Such cases demand specially careful supervision of the temperature chart. Antipyrin I have found mainly useful in controlling the often agonising headache. Antifebrin I have never administered, but I have seen sufficient of its effects in producing cyanosis and cardiac distress, while its antipyretic

virtues are only temporary, to satisfy me of its uselessness and to make me suspect its safety. The officinal solution of acetate of ammonia is often of use when the skin is dry and pungent and the tongue baked. Given with lemon juice and a little syrup it is sufficiently agreeable, and it seldom fails to soften the tongue and induce gentle perspiration. It also tends to strengthen and steady the heart's action.

The amount of *Sleep* obtained must be carefully investigated at every visit. A patient is not asleep because he lies in a somnolent and indifferent state; and unless the nervous system is periodically rested by natural or provoked sleep, a condition resembling delirium tremens is induced, sufficient of itself to cause death. A gentle stimulant at night is usually effective. When this fails, chloral, with which it is wise to combine digitalis, should be given in divided doses. Tepid sponging of the whole body has a distinctly sedative effect, and where the cause of sleeplessness lies in intense headache which antipyrin has failed to relieve, a douche of cold water over the head will generally afford sufficient relief to admit of sleep with or without chloral. If everything else fails, recourse must be had to subcutaneous injections of morphia.

I have very rarely found it necessary to treat the *Diarrhœa* by astringents. In fact, when this symptom is urgent the administration of a simple enema by causing the expulsion of masses of putrid stuff with fecal lumps or undigested food, removes what is in great measure the cause of the flux. Should it, however, continue urgent a starch and laudanum enema or a subcutaneous injection of morphia will rarely fail to reduce it within reasonable bounds.

The *Constipation* which frequently replaces or alternates with diarrhœa is best met by enemata of warm water, to which castor oil may if necessary be added. One or two evacuations of the bowels should be secured daily. During convalescence, when there is almost always constipation or ineffectual emptying of the bowel, it is from time to time necessary to administer gentle saline laxatives in order to clear away the fermenting debris of imperfect digestion.

To control *Intestinal Hæmorrhage* nothing has in my hands equalled the watery extract of *Hamamelis virginica* sold under the name of "Hazeline." I have published several cases of enteric fever and of dysentery in which the effect of this drug in arresting violent bleeding from the bowel could not reasonably be doubted. The doses should be large—at least 4 fluidrachms every two hours.

When the patient has become too weak to change his position without assistance and too indifferent to notice the increasing inefficiency of his respiratory movements, special attention should be paid to rolling him gently over for half an hour at a time, alternately on one side and the other, supporting his back with pillows packed behind it. So far as lung congestion depends on mechanical causes, the chance of its occurrence is materially lessened by this simple precaution.

In one case, in a fragile lady, as early as the beginning of the second week, when moderate pulmonary congestion had existed for a couple of days, the smaller tubes and air-cells throughout a large portion of both lungs suddenly filled with fluid. Suffocation was imminent, and although prostration was extreme the administration of an emetic appeared to be the only way out of the difficulty. Accordingly I gave a sulphate of zinc emetic, the effect of which was the evacuation of an incredible quantity of mucous fluid from the tubes, and immediate relief to the breathing, with disappearance of cyanosis. Collapse,

however, swiftly followed. Ether hypodermically, brandy by the bowel, and a large draught of champagne as soon as the patient could swallow, dispelled this danger; and the case terminated in recovery.

The occurrence of *Bed-sores* should always be anticipated and guarded against. When they threaten, frequent sponging of the reddened skin with camphorated spirit, while a water-cushion is placed under the suspicious spots, will often serve to avert them. If in spite of these precautions they do occur, they should be sponged two or three times a day with a dossil of cotton soaked in red wine, and then covered with zinc ointment spread on lint, a water-cushion being now indispensable.

As prostration and indifference deepen attention must at every visit be paid to the condition of the bladder. Here I have but seldom noted retention of urine, but it has occurred. I assume that there is no danger of mistaking overflow for involuntary evacuation.

In the later stages of the fever abdominal distension is sometimes very distressing, and may reach such an extent as to exert menacing pressure on the diaphragm. But even under these conditions, the use of the long tube which is strongly recommended by many authors should be adopted with extreme caution. Deep lesions of the large intestine often extend so far down that should one unluckily fall on such a case perforation of the wall of the bowel with the tube would in all probability occur. Hot-water enemata, turpentine fomentations, and the administration of minute doses of turpentine by the mouth, generally give relief, and can do no mischief.

The administration of dilute hydrochloric acid (to the extent of a fluidounce in 24 hours) has been extolled by several writers. I have never seen the least effect on the fever or other symptoms that could reasonably be attributed to its use. But largely diluted and judiciously flavoured it forms an agreeable beverage, of which, however, most patients soon tire.

The time for quinine comes late. During convalescence, when the morning temperatures are normal or subnormal, there may be a rise to 100° or 101° between 6 P.M. and midnight. One large daily dose of quinine is at this stage invaluable.

It has never seemed to me advisable to administer alcohol in the enormous quantities recommended by some authorities. A flagging heart may often be stimulated by a moderate dose of wine or brandy, and a rising temperature controlled by the same means. A baked tongue will frequently become moist under its influence. But the occasions must be rare in which more than 4 or 5 ounces of brandy or an equivalent quantity of wine is necessary. Weak claret and water is almost always agreeable, and is certainly never hurtful; it stimulates appetite and digestion. A draught of wine-whey or a couple of ounces of milk-punch given at night will often induce sleep, and when not specially contraindicated is certainly preferable to chloral or morphia.

Much comfort is derived from sponging the entire body two or three times daily with tepid water to which a little aromatic vinegar has been added. I have often noted a fall of from half a degree to 1° in the mouth shortly after this partial bath.

The periostitis and glandular enlargements of the convalescent period are best combated by inunctions of mercurial ointment morning and evening. The gums are of course inspected every day, but I have frequently been struck by the tolerance of mercury in such cases when

administered in this way. Opium in large doses and saline laxatives have given speedy and excellent results in cases of melancholia and of hallucinations.

The *Diet* is all important, both as regards its nature and its total daily quantity. Enteric fever patients should from the first be fed every three or four hours day and night in small quantities at a time. Milk can generally be borne, and when it can it must form the chief part of the nourishment given. But it should be remembered that the dense curd of undiluted milk often proves extremely difficult of digestion,\* that the patient is generally losing by perspiration large quantities of blood salts, and that the vegetables and fruit which form part of the diet of health are omitted from the ordinary diet of enteric fever. Hence it is advisable to add a little gelatine to the milk, or to dilute it with one or other of the mineral waters, lime water, rice water or barley water, or with a strong broth (strained and skimmed) in which bread and vegetables have been boiled. A mixture of equal parts of milk and of the broth just mentioned, suitably seasoned, is generally readily taken, and represents an almost perfect food. If the mixture is refused the broth should be given alternately with milk. Peptonised milk is sometimes absorbed when milk in its natural state obstinately resists digestion. Lemon juice or orange juice diluted with sweetened water is always liked, and helps to replace the vegetable element missing from the diet.

It is very important to secure the maximum of variety in the necessarily limited scale of diet. Café-au-lait; tea made with milk instead of water; eggs lightly boiled, or in the form of egg-nogg, or as batter pudding; beef juice (which when not digested turns the stools a reddish brown); ice cream in small quantities, are generally liked and are well borne. Jellies though of no nutritive value are useful as analeptics, and are grateful to the palate. Farinaceous jellies and puddings may vary the dietary, but it is doubtful whether they are readily digested.

I have almost invariably observed the rule to give no solid food until the temperature has been normal for a week. In the rare cases when I have abandoned it, it has been because, every other symptom having disappeared, and the stools having for several days completely regained the natural faecal odour to the exclusion of all foetor, the persistence of a fever temperature has seemed possibly due to want of a more generous diet. And, in fact, the addition of fish or of a little scraped meat has in such cases been followed by a fall of temperature.

When the patient is thirsty there is no difficulty about getting him to drink large quantities of plain cold water, or eau rouge, or fresh lemonade, or mineral water from which the gas has been allowed to escape. But when thirst is not urgent he should be encouraged to drink such diluent beverages freely.

It is hardly necessary to explain how indispensable a moderately warm and well-ventilated room is, free from currents of air that can fall on the bed; or to dwell on the need for sedulous cleanliness, changing body and bed linen daily, or whenever it has become wet

\* I once examined the body of an enteric fever patient to whom from five to seven "quart" bottles of milk had been administered daily. The colon and the last 4 feet of the ileum were tightly crammed with curd. Death had been due to general peritonitis without perforation, the bowel a couple of inches above the valve having been reduced for nearly its entire circumference to its serous coat.

with perspiration or otherwise soiled; frequently washing the patient with soap and tepid water (napkins being used, and never sponges), paying special attention to all regions where folds of skin are found; or to insist on the importance of physical and mental rest in its widest sense. Thus, all large or sudden movements should be discouraged; the use of the bed-pan should be recommended from an early period; the light in the room should be carefully regulated, and never suddenly turned on at night; external noise should be as far as possible excluded, and the sound of footsteps on the floor should be deadened by loose pieces of carpet, removed and beaten every day; rustling skirts and creaking boots should be prohibited; the patient should never be suddenly roused if drowsy or sleeping; visitors should be excluded, and a judicious censorship exercised over letters and newspapers. Talking in the room should never be conducted in whispers, but should be distinct though in a low tone. The attendants should be warned not to lean upon or shake the bed while speaking to the patient; and, finally, in winter the fire should be coaled either with large lumps put on with the fingers, or, if with small lumps, then these should be brought to the room in paper bags, each containing a convenient quantity.

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