

## SOME OBSERVATIONS ON FEVER OF THE TYPHUS GROUP (VECTOR UNKNOWN).

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DURING the past year about ten cases of "Fever of the Typhus Group" occurred in Jubbulpore. The signs and symptoms manifested bore a marked resemblance to those recently described by Sachs, Blewitt, and others, but the constitutional disturbance in all cases was severe and in fact similar to that of ordinary typhus fever. I do not propose to give a detailed account of individual cases, but merely to give a concise résumé of the signs and symptoms more or less common to all.

There was usually a premonitory stage of one or two days, during which the patient complained of feeling below par, with frontal headache and general aches and pains all over the body, particularly in the joints of the wrists and ankles, and in the lumbar region. Patients generally sought treatment on the second or third day. Accession was marked by a brisk rise in temperature from 100° to 103° F. with severe frontal headache and profound prostration. The face was flushed, presenting a peculiar "bloated" appearance, which, coupled with extreme suffusion of the eyes, presented a spectacle suggestive of a child at the height of a severe attack of measles, and giving the patient a drunken expression. Insomnia was a marked symptom, with low muttering delirium at night. At the height of the fever the patient was dull and apathetic, taking little interest in his surroundings. He was non-communicative and reluctant to describe his condition, being merely content with replying to particular questions. In the more severe cases the speech was slurring, and there was a distinct delay in auditory perception, the patient frequently taking several seconds to reply to a question, and then only answering in monosyllables. On the fifth day the typical rash made its appearance. Generally it was first seen on the front of the shoulders, in the deltoid region, round Morenheims' fossa, on the front of the forearms, and on the shins. It then spread rapidly to the chest, arms, thighs, soles of feet, and palms of hands, with a few isolated spots on the abdomen and face. The eruption was never very marked on the back, except on the shoulders and buttocks. Frequently it was first seen on the soles and palms, and in one instance on the face. In all cases the spread was rapid, and involved the whole body (with the exception of the middle of the back) within three days of its onset. Simultaneously with the appearance of the rash on the trunk and limbs petechial spots made their appearance on the soft palate. These were present in all cases. About this time also a peculiar narrow band of injected blood-vessels appeared on the conjunctivæ running vertically from the periphery to the ciliary region over the centre of the eyeball. At the

outset the rash consisted of discrete macular, roseolar spots, which faded on pressure. The spots were subcuticular, and gave the skin a typical mottled appearance. They were best seen on the limbs when these were suspended, or when the circulation was retarded by pressure of a bandage or tourniquet. Later the spots became definitely petechial, no longer disappearing on pressure. In some parts, particularly on the forearms, there was a tendency to confluence, giving an appearance similar to that of "Erythema Igne." The colour of the eruption now turned to purple, or plum, and the spots were purpuric in nature. There was some pleomorphism, but on the forearms the purpuric character predominated. The rash faded in the reverse order to its appearance, persisting longest on the palms, forearms, soles and shins.

From observation it would appear that the severity of the disease bears an inverse relationship to the severity of the eruption. Cases with the mildest constitutional disturbance had the most marked eruption, and vice versa. Whether the distinctness of the rash is an indication of a sound cardiac mechanism or not, is a matter for conjecture. We are all familiar with the old adage, that the sudden disappearance of the rash in a severe case of measles or scarlet fever at the height of the disease is of grave prognosis, and heralds a failing heart.

Pyrexia in all cases lasted fifteen to sixteen days, dropping to normal by lysis. It was remittent in type, and in a couple of cases touched normal once during the twenty-four hours on about the seventh day. Usually it remained in the neighbourhood of  $102^{\circ}$  to  $104^{\circ}$  F. up to the eighth day,  $100^{\circ}$  to  $102^{\circ}$  F. from eighth to thirteenth day, and reverted to normal on fifteenth or sixteenth day.

At the height of the disease the condition of the patient was indicative of a profound toxæmia. The tongue was furred, with clean edges and tip, sordes appeared about the lips, and in one case small vesicles about the size of a split pea appeared on the face (sudaminal vesicles). In most cases the fauces were injected to some extent, but in no case was any glandular enlargement noticed. Bronchitis of the spasmodic type was a universal symptom in all cases, and usually made its appearance on the fifth day, its advent practically synchronizing with the appearance of the rash. Its severity varied in different cases, but, in all, slight cough with scanty expectoration was the rule. The tendency to congestion of the bases of the lungs was great, and some cases showed a distinct lack of aeration, without exhibiting any obvious serious lung or cardiac lesion. Neither the liver nor spleen showed signs of enlargement. There were few symptoms pointing to involvement of the alimentary tract. Constipation was the rule, with diarrhœa as a terminal event in fatal cases. There appeared to be very little involvement of the nervous system, apart from mental symptoms, only a dull stuporose, listless attitude, with low muttering delirium at night. Deep reflexes were usually preserved and at times brisk. In some cases there was hyperæsthesia of the skin of the abdomen and

chest. In one case, there was pronounced tremor of the hands and feet, with inco-ordination of movement and slurring of speech. The tremor was coarse and rhythmic, and aggravated on performing purposive movements. Strong efforts such as clenching the fists modified the tremor and practically abolished it for the time being, but it returned again when the patient relaxed. The patient's decubitus, with constant tremor, simulated encephalitis. This case died. A post-mortem examination revealed congestion of the brain and slight enlargement of the spleen with deposition of pigment in its interstices indicating blood destruction. The cord was not examined except high up in the region of the pons. It showed no pathological changes.

All cases showed a slight leucocytosis on or about the fifth day, with a general increase in all the formed elements.

Urine was generally high coloured and scanty, and in a few cases contained albumin. In no case were pathogenic organisms isolated from the urine or fæces.

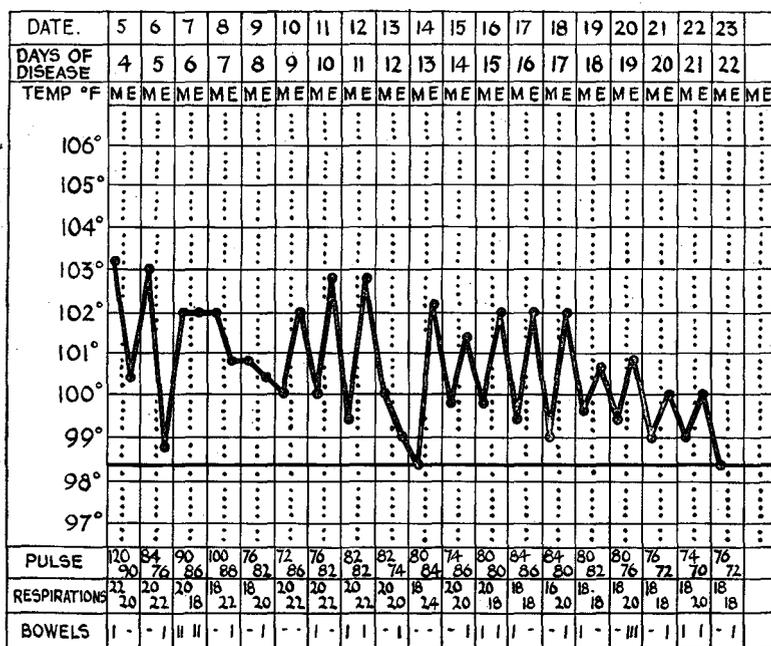
Pulse and respirations varied with the temperature and the extent of the bronchial involvement. The appetite and gastric tolerance requires special mention. I quite endorse Colonel Boyd's remarks on this subject. There is not so much a marked anorexia as a definite reluctance on the part of the patient to subject himself even to the slight exertion associated with helping himself to some food. He prefers to lie motionless in bed in a state of complete disinterestedness. Food must be frequently offered and fed to him; under this régime food is taken, retained, and apparently assimilated quite well.

Photophobia was not a marked symptom, and in the few cases in which it occurred it was of a particularly mild type. Examination of the fundus oculi showed nothing of note. The discs were normal in appearance, there were no retinal hæmorrhages, but there was evidence of slight injection of the retinal vessels.

In all cases the Weil-Felix reaction was positive. The highest agglutination being usually of the OXK or OX19 type. Two cases, however, showed the highest agglutination with OX2. Such cases have not previously been encountered and are therefore of special interest, and deserve recording.

*Case 1.*—Sjt. —. 1st King's Regiment. Aged 30. Total service twelve years. Service in India, three years. On February 2, 1935, the patient felt unwell and experienced "rheumatically pains" all over his body. On February 3 he was worse, had a rigor and some fever. He then reported sick. He was detained in hospital on February 4 with a temperature of 103° F. He had a severe headache and slight cough. A blood-smear was examined and malignant tertian rings were seen in the film. The spleen was not palpable and there were no physical signs of note. Fever persisted on February 5, and headache in the frontal region was particularly distressing. The tongue was coated in the middle, the tips and edges were

clean. Heart and lungs were normal. Spleen was not palpable. Urine was normal and sterile. On February 6 the condition was much the same, but the eyes were injected and face "bloated." On February 8 a generalized macular, roseolar, symmetrical, non-irritating rash made its appearance on the palms of the hands, soles of feet, chest and on the thighs. The spots gave the appearance of "subcuticular mottling," were pleomorphic, and disappeared on pressure. They were most pronounced on the palms and soles. On February 9 the rash was more marked and petechial spots appeared on the palate. Condition was worse on February 10. The patient was dull mentally and very listless, uninterested in his surroundings, and reluctant to talk. A few spots appeared on the back and abdomen. On



February 11 the rash was generalized and more marked. On February 12 the condition was much improved. The temperature fell in the morning, but rose again in the evening. Heart, lungs, and abdomen were normal. From 12th to 18th his condition remained stationary. On the 18th the eruption became petechial, and gave a dusky mottled appearance to the skin. On the 25th the temperature had fallen to normal, but the rash still persisted. By this time the patient was definitely on the mend, and from now on improved rapidly, being allowed up on March 10. He was discharged and excused duty for fourteen days on March 15. The rash was still evident on discharge, but had faded to a slight extent. At this stage I lost touch with the patient as I left the station.

## LABORATORY FINDINGS.

February 8, 1935 : seventh day of disease.

Total white cells 8,300 ; polymorphs 69 per cent ; lymphocytes 27 per cent ; eosinophils 1 per cent ; mononuclears 3 per cent.

Blood-culture, sterile.

Widal		Weil-Felix
<i>B. typhosus</i>	.. 350	OX2—25
<i>B. paratyphosus</i> A	.. 135	OX19—Nil
<i>B. paratyphosus</i> B	.. 135	OXK—25
<i>B. paratyphosus</i> O	.. Nil	

February 11 : Stools normal macroscopically. No pathogenic organisms were cultivated.

February 12 : Eleventh day of disease :—

Widal		Weil-Felix
<i>B. typhosus</i>	.. 125	OX2—500
<i>B. paratyphosus</i> A	.. 70	OX19—350
<i>B. paratyphosus</i> B	.. 50	OXK—50
<i>B. paratyphosus</i> O	.. Nil	

Blood-count : Total white cells 8,000 ; polymorphs 69 per cent ; lymphocytes 25 per cent ; mononuclears 2 per cent ; eosinophils 1 per cent.

February 13 : Urine, no albumin or sugar. Culture sterile.

February 15 : Stools negative for amœbæ or cysts and enteric and dysentery groups.

February 18 : Seventeenth day of disease :—

Widal		Weil-Felix
<i>B. typhosus</i>	.. 200	OX2—350
<i>B. paratyphosus</i> A	.. 175	OX19—300
<i>B. paratyphosus</i> B	.. 200	OXK—50
<i>B. paratyphosus</i> O	.. Nil	

Blood-count : Total white cells 7,500 ; polymorphs 73 per cent ; lymphocytes 25 per cent ; mononuclears 1 per cent ; eosinophils 1 per cent.

February 24 : Twenty-third day of disease :—

Widal		Weil-Felix
<i>B. typhosus</i>	.. 200	OX2—300
<i>B. paratyphosus</i> A	.. 75	OX19—300
<i>B. paratyphosus</i> B	.. 200	OXK—85
<i>B. paratyphosus</i> O	.. Nil	

March 2 :—

Widal		Weil-Felix
<i>B. typhosus</i>	.. 300	OX2—300
<i>B. paratyphosus</i> A	.. 175	OX19—175
<i>B. paratyphosus</i> B	.. 200	OXK—85
<i>B. paratyphosus</i> O	.. Nil	

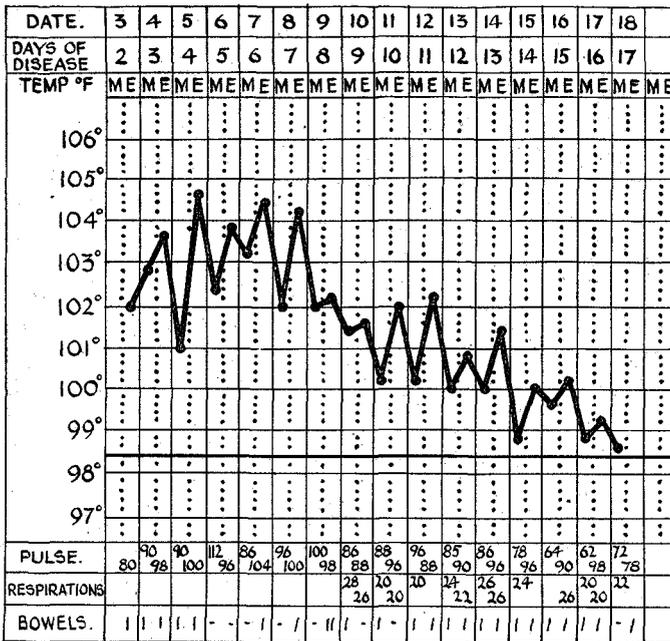
March 10 :—

Widal		Weil-Felix
<i>B. typhosus</i>	.. 175	OX2—175
<i>B. paratyphosus</i> A	.. 125	OX19—85
<i>B. paratyphosus</i> B	.. 125	OXK—50

Case 2.—Pte. ——. 1st King's Regiment. Aged 27. Service seven years. In India two years.

Admitted to hospital on July 3, 1934, complaining of chilliness, headache and general malaise. On July 1 he had played rugger, and had had

a shower bath after the match, which brought on a "shivering fit." He felt quite well next morning, and remained well until the night of July 2, when the "shivering" recurred. This time the attack was more severe, and accompanied by dull frontal headache, pains at the back of the eyes, with twinges of pain in the phalanges, wrist, and ankles. The face was peculiarly "bloated," the eyes dull and injected, giving an appearance of bluish-red blotchiness. Closer investigation of the face revealed a macular, subcuticular rash, consisting of discrete spots which disappeared on pressure. The spots were particularly marked on the forehead and cheeks. At the bend of the elbows, and on the chest, there was a slight papular rash suggestive of "prickly heat." The tongue was furred,



breath foetid, but fauces and tonsils were normal. There was marked bronchitis of a spasmodic type, with scanty expectoration and slight cough. The cyanosis of the face was probably due to this condition leading to deficient aeration. The heart, abdomen, and nervous system were normal. Spleen was not palpable. Urine was normal. Blood-smear was negative for malaria. The temperature was in the region of 103.4° F. On July 4, the temperature ranged from 102.4° F. The patient was dull and apathetic, and had a peculiar drunken appearance. On July 6, the rash had spread to the chest and forearms, and to the legs below the knees. It was subcuticular, consisting of discrete macular spots of a peculiar bluish-purple colour, which disappeared on pressure. There was no irritation or itching. On July 9, the eruption was well marked and had spread

all over the trunk and limbs, including the palms of the hands and soles of the feet. Some of the spots were petechial in nature. On July 10, there was an improvement in the general condition, but the patient was dull and listless and resented interference in any way. The condition remained stationary until July 15, when there was a marked change and the rash showed signs of fading. On July 16, temperature dropped to normal, the rash was decidedly on the wane, and by July 25, it had completely disappeared, leaving a fine branny desquamation. Recovery was complete and uneventful. Throughout the pyrexial period the pulse was slow in relation to the temperature.

LABORATORY FINDINGS.

July 6, 1934: Blood-culture, sterile.

	Widal		
<i>B. typhosus</i> ..	..	..	35
<i>B. paratyphosus</i> A ..	..	..	70
<i>B. paratyphosus</i> B ..	..	..	125
<i>B. paratyphosus</i> O ..	..	..	Nil

July 9. Blood-count: Total white blood cells 6,000; polymorphs 62 per cent; lymphocytes 36 per cent; mononuclears 1 per cent; eosinophils 1 per cent.

	Widal		Weil-Felix
<i>B. typhosus</i> ..	..	50	OX2—50
<i>B. paratyphosus</i> A ..	..	125	OX19—Nil
<i>B. paratyphosus</i> B ..	..	250	OXK—35
<i>B. paratyphosus</i> O ..	..	Nil	

Blood-culture: A motile Gram-negative organism was grown from the blood which gave the following sugar reactions:—

Lactose	Galactose	Maltose	Dextrose	Saccharose	Indol
—	+	—	—	—	+

The organism did not agglutinate with typhus group sera, or with homologous serum: It was sent to Kasauli for identification, but was returned as unidentifiable, it being suggested that it was of the pyocyaneus group, although it was not agglutinated by the appropriate sera. The culture was retained in the laboratory for months. Eventually a greenish coloration appeared in the medium indicating that the surmise was probably correct.

July 10: Total white cells 6,000.

July 13:—

	Widal		Weil-Felix
<i>B. typhosus</i> ..	..	50	OX2—1,000
<i>B. paratyphosus</i> A ..	..	125	OX19—35
<i>B. paratyphosus</i> B ..	..	250	OXK—25
<i>B. paratyphosus</i> O ..	..	Nil	

Blood-culture: Cocci seen; probably contamination.

July 14:—

Weil-Felix
OX2—2,500
OX19—50
OXK—50

July 15: Urine sterile.

July 18:—

Weil-Felix
OX2—2,500
OX19—50
OXK—50

## TREATMENT.

There is no specific treatment. Absolute rest, mental and physical, a plentiful supply of fresh air, light nourishing diet and careful nursing are the most potent factors in effecting a recovery. A regular action of the bowels is essential, with an adequate intake of fluids to aid elimination of toxins through the kidneys. Hypostatic congestion of the lungs is very apt to occur so that the patient's position in bed must be changed periodically. Treatment by drugs is purely symptomatic. Expectorants, diaphoretics, cardiac stimulants and narcotics being prescribed as the necessity arises. Reduction in temperature is best obtained by tepid sponging; water inside and out is a good principle. Latterly I have used urotropine intravenously with good effect. It does not materially alter the temperature, nor does it shorten the pyrexial period, but it certainly appears to ameliorate the constitutional disturbance. It is interesting to note that this drug is excreted in the cerebrospinal fluid and bile. It probably acts as an alterative. No ill-effects were experienced by its use. Glucose was given daily throughout the pyrexia.

## SUMMARY AND GENERAL REMARKS.

A general outline of the signs and symptoms of ten cases of "Fever of the Typhus Group of unknown Vector" as seen in Jubbulpore has been given. Two cases of "OX2 Fever" have been described in detail.

"Fever of the Typhus Group" undoubtedly bears a very distinct relation to true typhus. The mode of onset, typical rash, and severe constitutional disturbance render diagnosis easy. In all cases the Weil-Felix is positive, an agglutination of 1 in 250 being diagnostic. The highest agglutination occurs about the eleventh to twelfth day. The disease does not appear to be contagious. In none of my cases was there any history of tick or insect bite of any description, and exhaustive search for a possible vector proved futile. The cases were few, very scattered, and bore little or no relation to one another. True, a number of cases occurred in a particular regiment, but they occurred in men of different companies, living in different bungalows, and at different times of the year.

It is obvious that the vector (if there was one) is rare and extraordinarily immobile. Certainly not winged or gifted with even the agility of the *Pulex* family, as otherwise one would expect a greater number of cases amongst a community living in close relation to one another in a particular area.

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