applied very much more tightly than is done ordinarily to retain dressings, in order to affect the action or position of the diaphragm. Since the abnormality seen in these dogs is quite different from those in man, we shall not study its mechanism further.

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Serological Evidence on the European Type of Typhus Fever in China.

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Fletcher and Lesslar[1] described what they called tropical typhus from the Federated Malay States. By using several strains of *B. proteus* X for the Weil-Felix test they showed that, though clinically the same, urban cases gave a positive agglutination with the X_{19} (Warsaw) strain while those from rural districts gave positive tests only with the Kingsbury strain. Spencer and Maxcy[2] using the variants of X_{19}, X_2, and X_K (Kingsbury) found that the sera of patients with endemic typhus invariably agglutinated to a high titre the X_{19} strain, but possessed no appreciable group agglutinins for other strains. With Rocky Mountain spotted fever, however, X_{19} organisms were agglutinated significantly only in a minority of cases and to a lower titre than in endemic typhus; moreover, agglutinins for X_2 and X_K were also found in a considerable proportion of these cases. Felix and Rhodes[3] have recently studied more extensively the sera of patients with typhus and typhus-like diseases from various parts of the world and confirmed the above findings. There seems no doubt that some endemic diseases clinically simulating typhus give positive Weil-Felix reactions with the X_K strain to high or low titres, but not with the usual X_{19} strain, while still others give negative tests with any known strain. Felix and Rhodes propose to consider the various forms of typhus and typhus-like diseases as serological types of typhus. According to them the typhus nature of those diseases which give negative Weil-Felix reactions

[1] Fletcher, W., and Lesslar, J. E., *Bull. Inst. Med. Res.*, Kuala Lumpur, F. M. S., 1925, 2; 1926, 1.

[2] Spencer, R. R., and Maxcy, K. F., *Pub. Health Rep., U. S. A.*, 1930, **45**, 440.

[3] Felix, A., and Rhodes, M., *J. Hyg.*, 1931, **31**, 225.

TABLE I.

Agglutination of various *B. proteus* X strains by sera of typhus fever patients.

B. proteus strain	OX_{19}	HX_{19}	OX_2	HX_2	OX_K	HX_K
Group A.	800	200	0	0	0	0
Cases from	800	400	0	0	0	0
scattered parts	3200+	800	0	0	0	0
of the city (Peiping)	3200+	800	0	0	0	0
	400	200	0	0	0	0
	800	100	0	0	0	0
	400	100	0	0	0	0
	3200+	800	0	0	0	0
	400	0	0	0	0	0
	3200+	1600	0	0	0	0
	1600	400	0	0	0	0
	3200+	1600	0	0	0	0
	1600	400	0	0	0	0
	3200+	3200	0	0	0	0
	3200	400	0	0	0	0
	200	0	0	0	0	0
	400	0	0	0	0	0
	200	0	0	0	0	0
	800	100	100	0	0	0
	3200+	800	0	0	0	0
	200	200	0	0	0	0
	3200+	3200+	0	0	0	0
	3200+	3200+	0	0	0	0
Group B.	1600	800	100	0	0	0
Cases from an	1600	800	0	0	0	0
orphan home	3200+	800	0	0	0	0
	800	200	200	200	0	0
	800	400	200	200	0	0
	3200+	800	0	0	0	0
	1600	400	0	0	0	0
	1600	200	0	0	0	0
	1600	800	0	0	0	0
	1600	400	200	0	0	0
	200	100	0	0	0	0
Group C.	1600	800	0	0	0	0
Cases from a	1600	800	200	100	0	0
factory for	1600	800	0	0	0	0
poor children	3200+	1600	100	0	0	0
	800	200	0	0	0	0
	1600	400	100	0	0	0
	3200+	800	200	100	0	0
	1600	1600	0	0	0	0
	800	800	0	0	0	0
	3200+	3200+	0	0	0	0
	200	200	0	0	0	0
	800	400	0	0	0	0

but otherwise are typhus-like may later be proved when corresponding types or variants of *B. proteus* X are isolated.

Typhus fever as it occurs in Peiping is clinically of European epidemic type.[4] To determine whether it shows other agglutinins

[4] Cheer, S. N., and Dieuaide, F. R., *Nat. Med. J. China* (Chinese text), 1929, **15**, 355.

than those for the usual X_{19} and to detect the possible occurrence of hitherto undiagnosed typhus-like diseases which might co-exist in this city, the Weil-Felix reaction, using the "O" and "H" variants of X_{19}, X_2, and X_K,* was done in 46 cases of typhus fever and 16 cases of non-typhus fevers seen during the same season. All these cases were treated in the general medical wards of the Peiping Union Medical College Hospital from November, 1931, to May, 1932. The ordinary macroscopic agglutination technic with formalinized antigen suspensions was used. The tubes were immersed in a water bath at 37°C. for 2 hours and read after standing overnight in the ice-box. The lowest final dilution of the serum employed was 1:100 and the highest 1:3200. In many cases more than one test was done at different stages of the disease. The titre represented in Table I is the highest obtained for that particular case.

For the sake of clarity the results from the typhus fever cases are divided into 3 groups (Table I). All these cases invariably gave positive agglutination with the X_{19} strain, showing a higher titre for "O" than "H" antigen. Furthermore a few patients from an orphan home and a factory for poor children also showed group agglutinins for X_2 variants to a low titre. In no instance were we able to demonstrate agglutinins for X_K variants. This is in complete accordance with what Felix found in European typhus. Among the 16 cases of non-typhus fevers 3 agglutinated OX_{19} to the titre of 1:100 and the rest showed absolutely no agglutinins for any of the variants used.

In conclusion, it can be stated that typhus fever as it occurs in this part of China is of European or epidemic form serologically as well as clinically. No other typhus-like diseases have been encountered.

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