

sclerosis. The site of the injections was examined as in the previous study after 24 to 48 hours following the injection. The results are enumerated in Table I, where a negative reaction indicates no erythema or induration, and a + reaction a wheal or raised, reddened, indurated area  $\frac{1}{2}$  cm. to 1 cm. in diameter, and a ++ reaction from 1 cm. to 3 cm.

The cases diagnosed clinically as thrombo-angiitis obliterans show a positive skin test with Rickettsia organisms which suggests the possibility of previous typhus fever infection. Moreover, a number of the cases diagnosed as thrombo-angiitis obliterans came from typhus infected areas.

Of course the series is small and likewise further controls are required by skin-testing other vascular conditions as well as skin tests with further control suspension, such as tunica vaginalis and guinea pig testicle. Such experiments are now under way.

We have submitted evidence based upon a skin test with formalized Rickettsia suspension for the possibility that thrombo-angiitis obliterans is related to a previous typhus fever infection.

## 8082 P

### A Skin Test Indicating a Previous Typhus Infection.

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The recent studies of Zinsser<sup>1</sup> concerning the possible relationship of Brill's disease to a previous typhus fever infection suggests the importance of determining by a simple test a previous infection with typhus fever.

Inasmuch as many such patients are of foreign birth, and in whom infection had probably occurred some years previous, the clinical history is not always readily obtained. Likewise, a Weil-Felix reaction usually becomes negative with, or soon after convalescence and therefore cannot be used for this purpose.

The present work described the use of formalized Rickettsia suspension for this purpose. Fleck and Kurkowski<sup>2</sup> found that filtrates of Proteus X 19 were ineffective. Our tests were carried out with

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<sup>1</sup> Zinsser, H., *Am. J. Hyg.*, 1934, **20**, 513.

<sup>2</sup> Fleck and Kurkowski, *Z. fur Immunitatsforsch.*, 1931, **72**, 282.

a formalized *Rickettsia* suspension made from tunica vaginalis scrapings kindly furnished us by Zinsser of Harvard University.

Accordingly, a series of 12 males who had had typhus fever, the diagnosis having been established 6 months previously in one case, and in the remainder from one year to 8 years were given the test about to be described. These cases were obtained through the courtesy of Dr. J. Rosenbluth, of the Bureau of Communicable Diseases of the New York City Department of Health. In all these cases the diagnosis had been confirmed by a positive Weil-Felix reaction with the exception of one in which the Weil-Felix had not been carried out.

For the control, 10 adults with no previous history of typhus fever infection were given a similar skin test. The test consisted of an intracutaneous injection of 0.1 to 0.2 cc. of formalized *Rickettsia* suspension. The patients were observed 24 to 48 hours after the injection. None of the controls gave any reaction, whereas all the 12 with the previous history of typhus infection showed an erythematous indurated area from 1 cm. to 4 cm. in diameter. None of the controls showed any skin reaction whatsoever. Another individual similarly tested one week after convalescence, likewise gave a positive reaction 2 cm. in diameter.

TABLE I.

Type of Case	Age	Reaction to <i>Rickettsia</i> Suspension	Reaction to <i>Proteus</i> X19 Filtrate
Normal	45*	—	—
	40*	—	—
''	38	—	—
''	29	—	—
''	33	—	—
''	28	—	—
''	31	—	—
''	30	—	—
''	30	—	—
''	32	—	—
''	39	—	—
Arterio-sclerosis	64	—	—
''	58	—	—

\*Females.

These results suggest that patients recovered from typhus fever display a sensitivity to *Rickettsia* bodies as indicated by the observations herewith reported. Whereas all of these had a positive skin reaction we have 10 controls which showed no such reaction. There was no correlation between the size of the skin reaction and the time that had elapsed from the date of the typhus fever infection

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TABLE II.

Type of Case	Age	Reaction to Rickettsia Suspension	Reaction to Proteus X19 Filtrate	Interval between Infection and Test	Size of Reaction cm.
Recovered	19	++	—	2½ yrs.	4
"	40	++	—	1 yr.	2
"	46	++	—	4 "	2½
"	41	+	—	3 "	1½
"	55	+	—	4 "	1
"	38	++	—	4 "	3
"	55	+	—	4 "	1
"	46	+	—	5 "	1
* "	T.A.O. 53	+	—	6 mos.	1
* "	T.A.O. 47	+	—	8 yrs.	1
Convalescent Typhus	38	++	—	1 week	2½

\*Had symptoms of thrombo-angiitis obliterans.

and the time of the test. Although this series is a small one, these findings suggest that the skin sensitivity lasts a considerable length of time. Whether or not this constitutes an evidence of a latent infection with Rickettsia bodies must as yet be determined.

## 8083 P

## Conditions Determining Melanosis of a Virus-Induced Rabbit Papilloma (Shope).

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The Shope papilloma, a growth caused by a virus<sup>1</sup> and having the immediate characters of a tumor,<sup>2</sup> is frequently colored gray, brown or black with melanin.<sup>1</sup> Bits of the proliferating tissue when implanted in the leg muscles and viscera of the host grow vigorously, and portions of the resulting mass are often melanotic, and occasionally it is darkly pigmented everywhere.<sup>2</sup> This paper is concerned with the conditions determining the pigmentation.

The possibility that certain strains of the causative virus determine the pigmentation was investigated first. Two virus suspensions were prepared from glycerinated fragments of 2 peritoneal autotransplants in a wild rabbit. One of the growths was coal black, the other unpigmented. The suspensions were inoculated by tattooing them into numerous spots in the shaved skin of the sides

<sup>1</sup> Shope, R. E., *J. Exp. Med.*, 1933, **58**, 607.

<sup>2</sup> Rous, Peyton, and Beard, J. W., *J. Exp. Med.*, 1934 **60**, 701.