Physiology. — *"On the formation of heterogenetic antigen by combination of hapten and protein"*. By K. LANDSTEINER (Communicated by Prof. C. H. H. SPRONCK).

(Communicated at the meeting of November 26, 1921).

In former communications,[1]) which also contain references of the literature on the subject, the author came to the conclusion, that the peculiar properties of heterogenetic antigen very likely can be explained as follows.

These antigens consist of two different parts, one an alcohol soluble part (perhaps of lipoid nature) and one a protein. The alcohol soluble-part has the property of reacting specifically in vitro, but is devoid of antigenic properties (similar substances have been called by the author hapten) whereas only the entire complex (hapten + protein) acts as an antigen. Since that time, the same opinion has been expressed by TANIGUCHI. [2])

The author deemed it desirable to confirm this view by direct proof and therefore he undertook to investigate whether it would be possible to obtain an artificial antigen bycombining the hapten with a protein which as such contains no heterogenetic antigen.

It was doubtful at the onset whether this endeavour would be successful, since similar phenomena are not yet known. The experiment however gave positive results. Each of 5 groups of rabbits was injected intraperitoneally with one of the following substances.

I. Pig serum ten times diluted with 0,9 percent saline.

II. Alcoholic-extract of 15 gr. horse kidney emulsified with 100 c.c. 0,9 percent of saline.

III. As I, but heated for a ½ hour at 80° C.

IV. The extract of horse kidney emulsified with ten times diluted pig-serum.

V. As IV but heated for a ½ hour at 80° C.

The rabbits were injected with 5 c.c. of these solutions six times,

[1]) Meeting of the "K. Akad. v. Wetensch. te Amsterdam" of Februari 26, 1921. Biochem. Zeitschr. **119**. 294 (1921).

[2]) Journ. of Path. a. Bact. **24**. 253, 254. Juli 1921.

each time with an interval of one week. After the addition of $^1/_4$ percent phenol the solutions were kept in the icebox.

A week after the last injection the hemolytic action of these sera on sheep-blood was examined.

The technique used in these experiments and the indication of the results are the same as in the former communication (m. tr. = = minim trace). In the table given below the results of hemolysis are indicated.

Injection of preparation	I				II				III			IV				V			
	0	0	0	m. tr.	0	0	0	tr.	0	0	0	c.	d.	f.	m. tr.	tr.	m	f.	a. c.

The experiments will be published extensively elsewhere.

The results obtained encourage further research on the possibility of obtaining antigenic actions by combining various non antigenic substances with proteins.