constant occurrence of lichenase in the digestive tract of the invertebrates studied, suggests that the ability to hydrolyze lichenin may be a characteristic of invertebrates as contrasted with vertebrates. The presence of an inulase or raffinase in the species studied was not constant. Lichenase to judge from the present series of experiments is not invariably associated with inulase as has been suggested (existence of an inulo-lichenase). The following species were studied; sponge, earthworm, leech, starfish (2 species), sea urchin, chiton (2), mussel (3), snail (2), crab (2), shrimp, grasshopper, tunicate, gold fish, frog (adult and tadpole stages), horned toad, garter snake, terrapin (2), domestic fowl, wild rabbit, pig, sheep, dog, and man (saliva). The strongest reactions were obtained with the star fish (*Asterias ochracea*), snail (*Planorbis trivolvum*), and grasshopper (*Melanoplus differentialis*).

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Further studies in serum sickness.

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In a previous paper,[1] I showed by anaphylactic methods that the blood of human beings who had received large injections of therapeutic horse serum contained not only horse serum, but antibodies thereto, at some stage of the serum sickness. Since that time I have approached the same problem by means of the precipitation method, which is very much the more delicate method for the purpose. Remnants of horse serum in the blood are demonstrated by precipitation with the serum of a rabbit immunized to horse serum. Antibodies to horse serum are demonstrated by precipitation of horse serum by the human serum. By this method it has been possible to demonstrate the presence of horse serum in the blood from the time of injection up to more than twenty-one days thereafter, in constantly diminishing amount. Antibody is, as a rule, demonstrable within seven to ten days after the thera-

[1] Weil, R., *Proc. Soc. for Exp. Biol. and Med.*, 1914, xii, 37.

peutic injection, and in increasing amounts thereafter, for at least two to three weeks. As a rule, antibody can be demonstrated either at the onset of the serum sickness or within one or two days thereafter. Thus, these two factors coexist in the blood throughout the s -um sickness, and even for some days after its subsidence.

The bearing of these facts upon the interpretation of serum sickness is not easy to determine. In the first place, it is not probable that the coëxisting antigen and antibody correspond to one another; in all likelihood they represent different fractions of the complex antigen, namely horse serum. According to present conceptions, the antigen is progressively neutralized by the antibody, both of the cells and of the circulating blood. Reasoning by analogy, this neutralization, when it takes place within the blood, produces no symptoms of any kind. When it takes place within the cells, it produces a multiform group of symptoms, summarized under the name of anaphylaxis. It is probable, therefore, that the serum sickness represents the progressive combination of cellular antibody with antigen. Why the symptoms should cease while the antigen is still in the blood, is perhaps explainable upon the theory that the desensitized cells failed to react further.

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Some suggestions for rational auto-serum therapy.

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Assuming that certain dermatoses as well as intestinal and respiratory disturbances may be due to hypersensitiveness of certain individuals to various proteins, a number of investigators suggested that the onset of acute pathologic phenomena in such cases may be due to the appearance in the circulation of specific protein, causing anaphylactic reaction. On the basis of this assumption various authors have successfully applied the method of immunization in the treatment of such conditions. In cases