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SOME BIOPHYSICAL PROBLEMS OF VIRUSES*

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BIOPHYSICAL methods have done much towards obtaining purified viruses and getting from them information useful for the control of disease. The following discussion is not a review[1] of this information but rather a statement of some of the problems which must be met as further progress is made. These problems are threefold, dealing (a) with the concentration, purification and physicochemical properties of viruses, (b) with similar studies of the specific anti-substances that are an animal's response to infection, and (c) with the deeper investigation of virus-antibody interaction that purification makes possible. Their answers are bound to indicate better ways of recognizing viruses and to help in the treatment of disease with antisera and in its prevention with vaccines.

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[1] Literature references to all but current papers can be found in any one of a number of reviews (see, for example, Lennette, SCIENCE, 98: 415, 1943) and will therefore not be repeated here.

Because of the size of their particles, purified viral suspensions must have the physicochemical properties associated with colloids. The methods of colloid chemistry were developed to study particles with sizes ranging downwards from about the lower limit of microscopic vision to the larger chemical molecules. For years it was presumed that the particles in all colloidal suspensions were heterogeneous aggregates of smaller particles or molecules, the prevailing sizes being determined more by physical conditions of formation than by ultimate chemical composition. Often this is true, as with inorganic sols, many polysaccharides and the polymers that are the basis of our new plastics, textile fibers and the like: their particles vary, often widely, about some mean value. But Svedberg's demonstration that the particles of many pure proteins are molecules as alike as other molecules in size and shape brought to light an entirely different type of colloid.[2] Some proteins have molecular