the usually ultramicroscopic magnitudes which determine filterability, are the following:

(1) Except for the as yet insufficiently confirmed experiments of Eagles with tissue extracts, no filterable virus has been cultivated except in the presence of living cells in tissue culture.[2]

(2) Many of the viruses have been serially cultivated in tissue culture without reversion to the bacterial form.

(3) They produce diseases which are specific and unlike those produced by any known bacteria, even those produced by the bacteria supposed to have been developed out of the viruses themselves.

(4) The pathological histology characteristic of the virus diseases is entirely unlike that of any of the true bacterial lesions but, on the other hand, there is much similarity between the histological strategies aroused in animal tissues against the various filterable agents.

(5) In the lesions of most (almost all) filterable virus diseases characteristic "inclusion bodies" are present.

(6) There are many indications which render it likely that the theater of conflict in the virus diseases is an intracellular one.

(7) Active immunization in the virus disease is (with two exceptions which are not yet clearly understood) impossible unless living virus is used.

(8) The protective bodies differ from bacterial antibodies both in their limited concentration, even with hyperimmunization, and in the difficulty and uncertainty of demonstrating any *in vitro* reactions.

(9) There is a striking concentration of virus in specific tissues like nervous system and skin.

(10) There is a likelihood of persistence of the viruses in the animal body as long as immunity persists.

In addition to these points there are many minor facts, such as resistance to glycerine, to chemical agents and to heat; relationship to oxidation and reduction and to salt concentrations such as those recently demonstrated by Clark, all of which demand more study—but which, taken together, should caution us against any rash assumptions of relationship to bacteria, however attractive and startling such speculation may appear to be.

We do not want to be understood as throwing out of court the theory of cyclic relationship between bacteria and the virus group. Indeed, the possibility of such a relationship is perhaps the most important problem confronting the bacteriologist to-day. However, there is little sense and no utility in piling up our literature with repeated assertions of the existence of such a condition, unless definite postulates of proof can be fulfilled; and such postulates we would set down as follows:

Starting with a virus capable of producing a characteristic disease with all the clinical, pathological and immunological criteria necessary for its recognition, the investigator must:

(1) Repeatedly cultivate a bacterium of a single well-defined species.

(2) He must carry this bacterium through a number of culture generations. (If he can produce the disease, in the animal susceptible to the original virus and in a characteristic way, with these cultures, all the better. But this need not be required since virulence may change with form. However, we would attach no importance to such experiments as those of Rosenow with poliomyelitis, in which the bacterium produced a disease in rabbits and ginea-pigs—species entirely resistant to the original virus.)

(3) After a number of bacterial culture generations, it must be possible to get back the virus itself—apart from the bacteria—either by culture or by animal inoculation; the culture generations must be sufficient in number to insure complete removal of the original virus by adequate dilution; and such recaptured virus must possess all the original characteristics as to filterability, specific pathogenicity, etc., of the original material.

Such demands have not, to our knowledge, been fulfilled by any of the investigators who have been protagonists of the cyclic idea. Until such postulates or similar ones—adjusted to new knowledge—are required, however, we will get no farther, and this phase of bacteriology will remain sterile. We might add to all this the modest requirement that the experiments reported in such cases should be repeatable by other qualified investigators.

We sincerely hope that our point of view will be vigorously criticized by those who hold these cyclic metamorphoses to be demonstrable facts. The questions involved are of such fundamental importance that they call for the cooperative efforts of serious bacteriologists to remove them from the realm of speculative reasoning and place them upon a basis of experimental proof comparable to that which has been demanded for every other great bacteriological discovery.

SCIENTIFIC EVENTS

PLAN FOR A CHEMICAL CENTER IN CHICAGO

ON January 30, 1932, representatives of the Chicago Section of the American Chemical Society and of the Chicago Chemists Club signed agreements by which both groups will in the future hold their meetings in the Midland Club. In addition, the Chicago Chemists Club signed a lease for quarters considerably larger than they have previously occupied in the Midland Building, 176 West Adams Street, in which the Midland Club is located. The signing of these

[2] We believe that we are correct in assuming that neither the cultivation of the so-called "globoid bodies" in poliomyelitis—nor the cultivation of the agent of mosaic disease are regarded as accomplished facts any longer—even by their original proponents.

agreements marks the termination of negotiations which have been going on for several years to secure enlarged facilities for chemical activities in Chicago. The rapidly growing attendance at meetings of the Chicago Section, which reached six hundred at a special petroleum meeting in January, was making imperative a change in meeting place. The new agreements run for five years and are renewable at the end of that time. In addition to providing accommodations for all meetings of the two organizations, the plan involves the cooperation of the chemical groups in securing tenants from the chemical industry. If this plan is successful and the building secures a considerable number of tenants who are connected with the chemical activities, the name of the building will be changed to indicate its position as a center of chemistry in Chicago.

The Midland Building is said to be one of the newest and finest of the large club buildings in Chicago and is situated in the heart of the business district. It is fully adequate to accommodate the chemical organizations of Chicago. Negotiations were carried out under the leadership of a building committee headed by Dr. Paul Van Cleef. The chairman of the Chicago Section is Dr. Bernard E. Schaar, and the president of the Chicago Chemists Club is Dr. Ernest H. Volwiler.

THE ALLEGANY SCHOOL OF NATURAL HISTORY

THE sixth season of the Allegany School of Natural History in Allegany State Park opens on July 5 and closes on August 24. This "Summer School in the Forest" is conducted by the Buffalo Society of Natural Sciences in cooperation with the New York State Museum and is affiliated with the University of Buffalo from which its students receive college credit. Registration should be made with Mr. Harold T. Clement, Curator of Education at the Buffalo Museum of Science, or with Dr. R. E. Coker, director of the Allegany School of Natural History, Box 950, Chapel Hill, North Carolina.

Courses will be given in field zoology by Robert E. Coker (Johns Hopkins), professor of zoology, University of North Carolina; in field geology by Mr. Frederick T. Thwaites, lecturer in geology at the University of Wisconsin; in field botany by Mr. Robert B. Gordon, Ph.D. (Ohio State), instructor in botany at the Ohio State University; in the natural history of birds by Aretas A. Saunders, Ph.B. (Yale), teacher of biology, Central High School, Bridgeport, Connecticut, and in nature study by Mr. William P. Alexander, B.Sc. (Cornell), field naturalist and assistant curator of education at the Buffalo Museum of Science.

The Allegany School of Natural History is nine miles from Quaker Bridge, New York, and well above it, being located on a hillside bordering Quaker Run in its upper part at an altitude of about 1,900 feet. It is a feature of the setting of the School in Allegany State Park that within an area of some 65,000 acres under the care of the state much of the wild life is protected, and so one may occasionally see bear and deer, besides observing daily the abundant smaller mammals, chipmunks, field mice and, less frequently, jumping mice, shrews, weasels, mink and others.

Teachers in public schools and colleges, particularly those who have had little opportunity for field studies, university and college students, scout and camp leaders of various kinds, young and amateur naturalists, and those interested in the nature work of museums, public forests and parks, are invited to attend the Allegany School.

APPROPRIATIONS FOR GRANTS-IN-AID BY THE NATIONAL RESEARCH COUNCIL

AT its meeting in February the National Research Council's Committee on Grants-in-Aid made twenty-four grants for the support of research as follows:

Carl E. Howe, associate professor of physics, Oberlin College, for the measurement of wave-lengths of x-rays; Jakob Kunz, professor of theoretical physics, and J. T. Tykociner, research professor of electrical engineering, University of Illinois, for studies of the photoelectric effects of alkali vapor and films and a velocity selector for molecular rays.

W. C. Austin, professor of physiological chemistry, Loyola University School of Medicine, Chicago, for investigations on the transformation of aribose to ribose; Walter L. Badger, professor of chemical engineering, University of Michigan, for investigations on the effect of viscosity on the heat transfer coefficients between metals and boiling liquids; Harold Hibbert, professor of industrial and cellulose chemistry, McGill University, Montreal, for research on plant synthesis and immunology; I. M. Kolthoff, professor of analytical chemistry, University of Minnesota, for investigations on the internal structural changes taking place in a freshly prepared crystalline precipitate on standing; Charles P. Smyth, associate professor of chemistry, Princeton University, for research on the dielectric constants of gases.

Ernst Cloos, department of geology, the Johns Hopkins University, for a survey of the Sierra Nevada batholith; Robert S. Platt, associate professor of geography, University of Chicago, for part of the expense of a study of types of rural land occupancy in South America; H. B. Stenzel, assistant professor of geology, Agricultural and Mechanical College of Texas, for field work on the paleontology and stratigraphy of the lower Claiborne formations.

Alfred Chanutin, professor of biochemistry, University of Virginia, for research on the effect of diet in the