their observations of weather, cloud and sky, at the sunrise or sunset moments indicated, either to some scientific journal or to the address, Lunar Eclipses, Harvard College Observatory, Cambridge, Mass., U. S. A.

WILLARD J. FISHER
HARVARD COLLEGE OBSERVATORY

RESEARCH ON VIRUSES CAUSING PLANT DISEASES

BECAUSE of failure to determine the nature of filterable viruses by microscopic or culture methods, plant pathologists have for some time been attempting to obtain less direct evidence on the nature of these disease-causing agents by studying their resistance to various treatments, such as desiccation and exposure to chemicals. The results of such studies are very valuable but are often difficult to interpret, because the virus, as heretofore studied, has been contained in a complex medium, the host plant extract.

It is well known that the properties of colloids may be greatly modified by the addition of certain substances. For example, Mines[1] has shown that the addition of certain protective proteins to colloidal gold may cause the latter to exhibit properties characteristic of proteins. Similarly, it appears possible that protective colloids, as well as other factors in the complex plant extract, may so modify the properties of a virus as to give an erroneous impression of its real nature.

The marked resistance of some of the viruses to toxic chemicals suggests the possibility that such viruses may remain infective after various purification treatments and may therefore be obtained in a fair degree of purity. The properties of such purified or partly purified virus should be more reliable as an indication of its nature than properties exhibited by a virus contained in complex plant extract.

A study of the literature on viruses and enzymes has suggested the possibility that the operations recently used by Sherman, Caldwell and Adams[2] and others in attempting to isolate enzymes may be successfully used in similar attempts to purify viruses. Among the operations which may be useful in such work are selective adsorption, treatment with microorganisms, precipitation, cataphoresis, centrifugation, sedimentation and dialysis.

While numerous studies on virus properties such as longevity, resistance to drying and chemicals, and inactivation by certain plant juices have been made, it appears that the available evidence, although very valuable, is insufficient to warrant conclusions as to the animate or inanimate nature of the viruses. Other similar experiments which appear promising for furnishing further evidence on this question are listed below.

(1) Since the protozoa appear to be particularly susceptible to high oxygen concentrations, Cleveland[3] has suggested that evidence on the nature of the viruses might be obtained by subjecting them to oxygen treatments. The influence of the absence of oxygen should also be very interesting.

(2) Test viruses for tropisms.

(3) Cataphoresis of a virus at various hydrogen-ion concentrations and before and after treatment with other ions.

(4) Attempt to inactivate a virus by mixing it with colloids of known composition. If inactivation is successful attempt to reactivate the virus by methods similar to that used by Johnson-Blohm[4] in reactivating rennet. These methods may also be useful in reactivating a virus which has been inactivated by certain plant juices.

(5) Attempt to separate the causal agent into several components by dialysis or other separation methods.

(6) Test host tissues for compounds often produced by microorganisms.

(7) Attempt to detect respiration in the viruses.

T. E. RAWLINS
PLANT PATHOLOGY DIVISION,
UNIVERSITY OF CALIFORNIA

NATIVE AMERICAN APPLES

THE indigenous apples of America form an interesting group of species that have been neglected because the cultivated apple, Pyrus Malus, with better and larger fruit, came from Europe more than three centuries ago. However, a few trees with large fruits have been found among wild American apples. During many years the writer has made a study of these large-fruited sports found in the woods of our western states, especially Iowa, Illinois, Missouri, Wisconsin and Minnesota. Many hybrids have been originated at the South Dakota Experiment Station, and it is now time to publish some of this material. I would like information concerning any large-fruited trees of the wild American apple, with specimens of the fruit and notes as to the history and location of the trees. Please help in this search so that a list may be published for future use.

N. E. HANSEN
SOUTH DAKOTA STATE COLLEGE,
BROOKINGS, SOUTH DAKOTA

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