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AMERICAN GEOLOGY, 1850–1900[1]

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IN 1850 the knowledge of geology was in an early exploratory stage, especially in America. In England and Europe sufficient progress had been made in the study of the stratified rocks and their contained fossils to contrast markedly with American lack of observations. It could not have been otherwise. The first task of a geologist, entering upon a new field, is to discover and locate the various rock formations. He must have a map, upon which to delineate their distribution. But in 1850 the mapping of America was very crude. Even the eastern country was known only in broad outline and the west was imperfectly explored. Nevertheless, by 1850, material progress had been made in determining the ages and distribution of the sedimentary rocks of the United States east of the Mississippi and of Canada. Logan of Canada, Hall of New York, the Rogers brothers of Pennsylvania and Virginia, Safford of Tennessee, and many others who felt the urge to read the record in the rocks, had identified the strata of certain great periods of geological time, had classified them in order of relative age, and had mapped them with such accuracy as the conditions permitted.

That they had been able to accomplish so much was in part due to the fact that the great leaders in English geology, Sedgewick and Murchison, had established for that country a succession of strata and fossils, which is the same as that of eastern North America.

[1] Abstract of address before the American Philosophical Society, February, 1942.

was considered to have an effect upon the longevity of viruses, experiments were designed to determine whether the absence of oxygen would prevent inactivation of certain viruses.

Two potato viruses, Y-virus and Canada streak virus, were used in these studies. These viruses when extracted in air have a longevity at 15° C. of about 72 hours and 120 hours, respectively.

In order to extract the plant juices in CO_2 a special metal box was constructed, in the front of which were two round holes to which rubber sleeves were attached, permitting the operator free movement with hands inside the box. Above these openings a pane of glass was inserted in such a manner that it could be easily removed, thus leaving an opening through which plant material and equipment could be placed inside the box. Solid carbon dioxide (dry ice) was placed in this container. After the CO_2 gas had replaced the air, the box was closed and it was ready for operation. Potato leaves infected with a virus were placed inside this chamber and crushed in a mortar. A few cc of extracted juice were then put into each of several glass tubes. After these tubes were covered with clamped rubber tubing, they were removed from the chamber and attached to a modified lyophile apparatus, which can be easily constructed.

This lyophile apparatus consists of a manifold made of an inverted 2-liter round-bottom flask (Fig. 1, A) from the sides of the bulb of which extend two

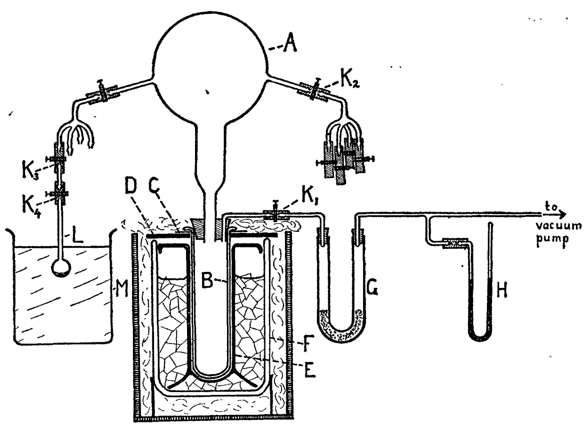

FIG. 1.

pieces of glass tubing. Each of these terminates in four outlets, to which tubes containing virus can be attached by means of rubber vacuum tubing. The sections of tubing K_3 and K_4, with screw clamps, allow removal of the tubes without releasing the vacuum. Four tubes L can be suspended in the air or be kept at a required temperature by submersion in a container M. The mouth of the flask A is fastened by means of a rubber stopper to a wide glass tube B used as a condensing chamber, which dips into a 2-gallon insulated vacuum jar F filled with a mixture of di-ethylene glycol and solid CO_2. The wire basket E permits easy removal of this chamber. The condensing chamber has a flared-out mouth which rests on a hard rubber ring D, which in its turn rests on the vacuum jar. The soft rubber washer C is used as a cushion. In the rubber stopper used to connect the manifold and condensing chamber, a glass tube (8 m.m.o.d.) is inserted which leads to a U-tube G filled with dryerite, to a manometer H, and finally to a vacuum pump. In order to facilitate cleaning, to prevent breakage and to aid in the detection of leaks, tubing and clamps K_1 and K_2 are used.

Dehydration of the virus was effected by a combination of evacuation, condensation and chemical drying, and resulted in formation of a thin film of solid particles inside the tubes L. The tubes were then clamped, removed from the lyophile apparatus, sealed and stored at room temperature. At monthly intervals a few tubes were broken and the contents of each used to inoculate 10 potato plants. Preparations of both the Y-virus and the Canada streak virus continued to produce 100 per cent. infection as long as 4 months after extraction and dehydration. Some of the tubes were improperly sealed and permitted air leakage; in all such cases the virus was invariably inactivated, indicating that oxidation had a direct or indirect effect on the destruction of the virus. Experiments are now in progress to secure additional information on this problem.

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BALDWIN, HENRY IVES. *Forest Tree Seed of the North American Temperate Regions.* Illustrated. Pp. xvi + 240. Chronica Botanica, Waltham, Mass. $4.75.

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