Communications

Specific Precipitating Activity of Plant Agglutinins (Lectins)[1]

BLOOD group specific agglutinins have been detected in the seeds and other parts of certain plants (*1–7*). They promise to have theoretical and practical importance, and we are engaged in a study of their immunochemical properties. One of us has proposed (*7*) the term "lectin" (from the Latin *lego,* to choose or pick out) for these and other antibody-like substances.

We have recently found that a number of these lectins are also specific precipitins. For instance, a protein purified from lima bean (Sieva) extracts by alcohol-water fractionation at 0° C precipitates with the salivas of secretors, but not of nonsecretors, of blood groups A and B, but not of O. This preparation also precipitates with a solution of A substance made by Morgan's method (*8*) from hog gastric mucin, but does not precipitate with the polysaccharides of *pneumococcus* I, Friedländer B, gum arabic, and other unrelated substances. An extract of *Dolichos biflorus* (*5*) precipitates with the saliva of secretors of subgroup A_1, but not with A_2 or other groups, and precipitates weakly with hog A. The proteins of beans which do not agglutinate human erythrocytes do not precipitate with any human salivas or with hog A; nor do the proteins of beans which nonspecifically agglutinate all human erythrocytes precipitate with salivas of blood group A or with hog A substance. The antibody-like behavior of the lectins thus extends to specific precipitating power for blood group substances.

It is thought that a study of this phenomenon may yield information about the quantitative course of the reaction, the heat of reaction and temperature coefficient, and the antigenic structure of the blood group antigens. A detailed account of some of our experiments is in preparation.

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Geology and Coal Resources of the Centralia-Chehalis District, Lewis and Thurston Counties, Washington

RECENT geologic investigations by the U.S. Geological Survey in the Centralia-Chehalis district, Washington, are of economic interest to the coal and petroleum industries of the state. A comprehensive report on this area, now in preparation, describes large reserves of subbituminous coal and defines areas of marine sedimentary rocks and structures that may be favorable for the accumulation of oil and gas. The information contains data useful in the development and utilization of the coal, which furnishes one of the bases for the potential industrial growth of this region and aids in delimiting new areas favorable for exploration for oil and gas.

The rocks exposed in the Centralia-Chehalis district range in age from early Tertiary (Eocene) to Quaternary. The total thickness of these rocks is more than 12,000 ft. The sedimentary sequence includes marine, brackish-water, and nonmarine sedimentary rocks with interbedded volcanics. The beds are folded and faulted and, in most places, are now buried by poorly consolidated till and outwash from Pleistocene glaciers and by Recent alluvium. The Eocene and Oligocene rocks are intruded by dikes and sills of basalt and gabbro.

The structural history of the rock units in the Centralia-Chehalis district began in Eocene time with subsidence of a north-trending geosyncline and deposition of the McIntosh formation. Upwarping and volcanic activity occurred along the margins of the geosyncline during middle and late Eocene time. Local uplifting, adjacent to the area mapped, accompanied the extrusion of andesite flows of the Northcraft formation during the early part of late Eocene time. The geosyncline was divided into a number of separate basins of deposition during this period. There was no major break in sedimentation, however, in the deeper part of the basin, which occupied most of the mapped area.

The Skookumchuck formation and the Lincoln formation of Weaver were deposited on top of the Northcraft formation in later Eocene and Oligocene time. The deposition was accompanied by periodic warping of the floor of the basin, which resulted in an interfingering of nearshore and coal-bearing deposits with marine beds. Most of the present structural features in the area were formed during early Miocene time, a period of marked deformation and erosion. Slight downwarping occurred in late Miocene and Pliocene time, and faulting has continued to the present, as is evidenced by earthquake shocks of 1950 that probably centered along one or more of the faults in the area.

At least 14 different coal beds have been mined in the Centralia-Chehalis district. The coal beds range in thickness from a few inches to 40 ft and have an average thickness of 6 to 8 ft. Most of the minable coal is