lagenous fibers stained intensely (*23*). In ligamentum nuchae, the elastic fibers did not stain, whether or not pectinase was used; but the interstitial material separating the fibers stained weakly before, and intensely after, pectinase treatment. Thus, a fraction II could be extracted from all sites that reacted with the periodic acid-Schiff technique either directly or after treatment with pectinase. In fact, when the fractions were subjected to the periodic acid-Schiff spot test devised by McManus and Hoch-Ligeti (*24*), the fractions II were intensely reactive, whereas the fractions I were not reactive. It was concluded, therefore, that the carbohydrate moiety of the various fractions II was responsible for the periodic acid-Schiff reactivity of connective-tissue structures.

In conclusion, the chemical investigation of a number of connective tissue structures (which stain with the periodic acid-Schiff technique either directly or after pectinase treatment) led to the isolation of carbohydrate-containing materials that are distinct from the acid mucopolysaccharides, since they invariably contain galactose, mannose, and fucose but are free of glucuronic acid.

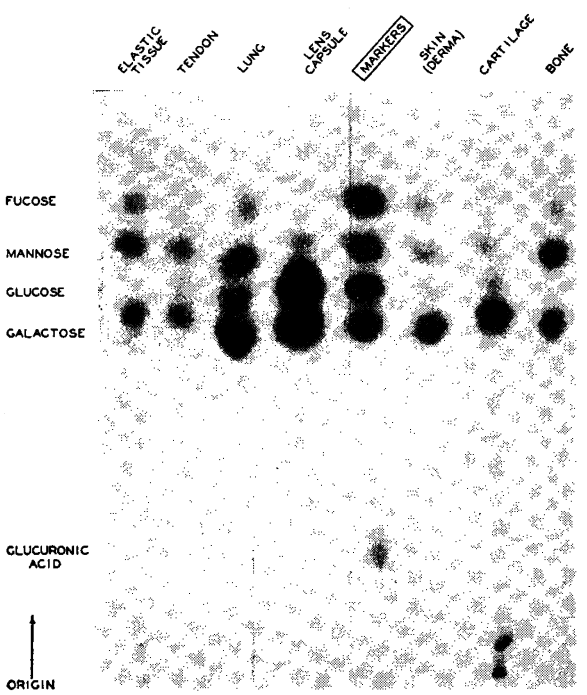

Fig. 1. Chromatographic pattern of the monosaccharides present in fraction II of various types of connective tissue and derivatives as well as in the capsule of the lens. The chromatograms were developed three times in a butanol-pyridine-water solvent (*25*) and were sprayed with aniline hydrogen oxalate (*26*). The markers (5th column) are labeled on the left-hand side. Galactose and mannose are visible in all samples. Fucose was also present in all hydrolyzates, but in some cases the spots were too faint to reproduce clearly in the photograph. (Although in this composite chromatogram the spots deviated slightly from those of the markers, individual chromatograms of each fraction showed an exact correspondence.)

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Errors in the "Isopiestic" Method for Measuring Masses of Salt Particles

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An "isopiestic" method has been applied by Woodcock and Gifford (*1*) and others to measurement of the sizes of atmospheric sea salt particles. The method consists essentially of measuring the equilibrium diameters of hemispherical water droplets containing the dissolved salt particles when exposed to a known water vapor pressure. The mass of salt in each droplet is calculated on the basis of the experimental relationship between salt concentration and equilibrium vapor pressure. The droplets sizes usually are in a range where the Thomson-Gibbs effect of curvature can be neglected.

I have performed several series of isopiestic experiments (*2*), using a small metal test chamber, in which droplets of NaCl solution were supported on surfaces

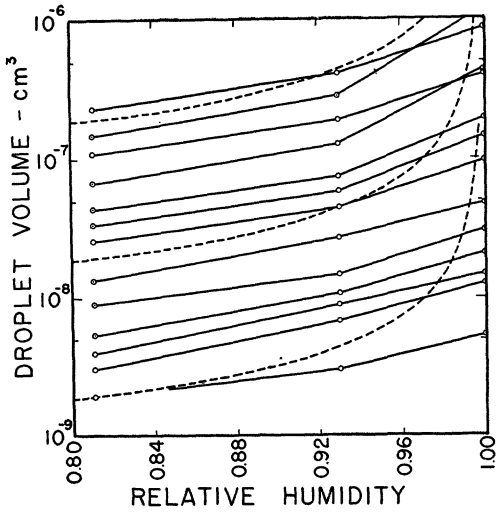

Fig. 1. Relationship between droplet volume and relative humidity for hemispherical droplets of NaCl solution on a Dri Film surface. Solid lines, experimental; dashed lines, calculated.

of Teflon or of glass coated with Dri Film SC-87 (*3*). Both of these surfaces give contact angles very close to 90°, so that the droplets were practically hemispherical. Diameters of the droplets were measured by a microscope, looking through a window in the top of the test chamber. A number of droplets were measured at three values of relative humidity, 1.00, 0.930, and 0.811, maintained by a small tray containing, successively, water, a saturated $(NH_4)H_2PO_4$ solution, and a saturated $(NH_4)_2SO_4$ solution. These solutions were chosen because they maintain relative humidity practically independent of temperature (*4*) in the region of the temperature used (25°C), thus eliminating the need for precise temperature control. After closure of the small chamber, equilibrium was reached essentially in 15 to 20 min for the smaller droplets and in about 1 hr for the largest droplets used. No measurable change in droplet size occurred thereafter in times ranging up to several days.

Representative experimental data are shown in Fig. 1, where the hemispherical droplet volumes are plotted as a function of the relative humidity. The experimental points are shown as circles; the solid lines join points applying to the same droplet. The data shown were taken with the droplets on a Dri Film support, but closely similar results were found with the Teflon support.

For comparison, calculations were made of droplet volume versus relative humidity for three NaCl masses, 5×10^{-10}, 5×10^{-9}, and 5×10^{-8} g, using the *International Critical Tables* data (*5*) for equilibrium concentration versus relative humidity and (*6*) for solution densities. The results are shown as the three dashed curves in Fig. 1. The theoretical curves are asymptotic to the line RH = 1.00 if the Thomson-Gibbs effect is neglected; inclusion of the Thomson-Gibbs effect makes no appreciable difference within the range of the graph but causes the curves to intersect RH = 1.00 several decades above the top of the graph.

Rough measurements of the sizes of the solid NaCl particles left after complete evaporation of the droplets indicate that the NaCl contents of droplets measured at 0.811 relative humidity are probably within a few percent of those calculated by the method used for the theoretical curves. The discrepancy between the forms of the experimental and theoretical curves indicates, however, that at 0.93 relative humidity the mass of NaCl will be underestimated by about 20 percent; at 0.96 relative humidity it probably will be underestimated by about 35 percent.

Although the present measurements refer to NaCl only, it is expected that similar results will be found with other salts. Errors of the afore-mentioned magnitudes may not be very important, of course, in some applications of the isopiestic method. But if it is necessary that errors be kept down to a few percent, humidities apparently should be used that will result in near-saturation of the droplets.

No satisfactory explanation has been found for the apparent difference in vapor pressure behavior between the solution in small hemispherical droplets and in larger, more or less plane, areas. It might be suspected that the discrepancy is due to a decrease in the surface free energy in the neighborhood of the 90-deg contact with the supporting surface; if this is true, it would be expected that continual convection would exist within the droplets, accompanied by gradients of concentrations and temperature. Microscopic observation of suspended particles in the droplets indicates, however, that such convection is not present.

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On the Protection against Alloxan Diabetes by Hexoses

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In earlier communications (*1, 2*) it was reported that preadministration of glucose, mannose, and fructose but not of galactose protected animals from diabetes caused by alloxan. Administration of the sugars after alloxan, however, had no protective action. Evidence for any direct reaction between glucose and alloxan could not be obtained (*1*). From these results, it was suggested that inhibition of beta cell hexokinase by alloxan was possibly the primary step in the dia-