and particular attention is paid to the time elapsing before the first discoloration occurs. (2) The determination of the time necessary for a given quantity of phlorizin to appear in the urine as sugar, and the period over which this glycosuria continues. Phlorizin has the property of circulating in the blood as phlorizin, but of being altered by the kidney cells to sugar. We have, therefore, a means of measuring the activity of the renal cells. The shorter the time required for sugar to appear, the greater the rapidity of secretion, the better the function of the kidney (Casper and Richter).

Other substances than those enumerated here have also been tried, but the above are the most important. Illyes and Kovesi, for example, endeavored to determine the elasticity or the capacity of the kidney to respond to a large increase in body fluid brought about by taking large quantities of water.

(3) The determination of the freezing point of urine (Δ) and of the blood (δ) after Koranyi. This also plays an important part and is chiefly advocated by Kümmel and his associates. Relying on the fact that the freezing point of any liquid is depressed below that of distilled water according to the number of molecules which it contains, it offers a means of measuring the organic and inorganic molecules in the urine (or blood). Naturally, as the concentration of the urine varies from time to time so must the freezing point, but taken in conjunction with the freezing point of the blood, which is constant in health (—.56°), but which in renal insufficiency may be depressed even to —.65° or lower, it has, if we believe Kümmel's statements, proved a valuable means of avoiding death from uræmia in operative cases. To the same subdivision belongs the estimation of the electrical conductivity of blood and urine which fulfils the same purpose, while still further tests are the estimation of the toxicity and the quantity of chlorides and other salts.

In the earlier work all these tests were applied solely to the common urine—the bladder urine—with or without careful regulation and measurement of the foodstuff and water taken within a definite period of time, and many a complicated formula has been worked out to permit the observer to determine whether the renal function was sufficient to support life and whether the individual was in a position to bear any surgical interference with his renal secretion. It must be confessed, however, that apart from the information furnished by the determination of (δ) the freezing point of the blood we were still left much in the dark as to the actual state of the kidneys. Should, however, δ be below normal there was good reason to conclude that the kidneys' function was barely sufficient to sustain life and forbade any surgical interference. It is at this point that a very important point was brought into prominence