

is to find out the amount of phosphoric acid excreted, and this is approximately arrived at by precipitating the total amount of phosphates present and estimating the relative amount. This need occupy only a few seconds, and I believe it will soon constitute one of the common tests in every examination of the urine. Dr. Dana, of York, whose article in the *New York Medical Record* will well repay perusal, uses long tubes about half an inch in diameter and thirty inches in length. The tube is filled three parts with the sample to be examined, and the balance of the tube filled with a mixture composed of magnesia sulph. and ammonium chloride of each one part, liquor ammonia one part, and distilled water eight parts. This causes a precipitation of ammoniamagnesium phosphate, which in about twenty-four hours has settled firmly to the bottom, and the depth of the sediment shows the proportion which it bears to the normal.

With whatever form of test-tube used, a number of experiments with the urine of persons in good health, will soon determine the average depth, and any marked deviation therefrom will indicate the relative amount being excreted. Of course several analyses will be necessary before any conclusion can be arrived at. This may seem rather a crude test, but careful quantitative analyses show that it is sufficiently accurate for all practical purposes.

The simple test is of the utmost importance in many doubtful diagnoses, but unfortunately it has not been uniformly studied from this aspect. Many observers have studied the earthy and alkaline salts separately, whilst others have only taken note of them when precipitated as a sediment. As I intimated before, my observations lead me to the conclusion that whether the acid is excreted in combination with an earthy or alkaline base, depends generally on diet or digestion, and is possessed of comparatively little clinical value. But the total amount of phosphate giving an approximation of the amount of phosphoric acid excreted is an event of much greater importance, as observation has shown that whilst the amount of base is regulated chiefly by the diet, that of phosphoric and uric acids varies only with constitutional conditions. Notwithstanding the different methods of studying the subject, there are many useful points on which prominent writers are agreed.

For instance, Roberts, Tyson, Wolff, Belfield, and Hoffman and Ultzman agree that the total amount of phosphates are increased in acute diseases of the nerve centres and diminished in the chronic stage of the same, with the exception of epilepsy. There is also a pretty general agreement that they are increased during, and for some time after, nervous strain. Dr. Beemer, Assistant Superintendent of the London Asylum for the Insane, who has written an able monograph on brain exhaustion, expresses the same view. I am inclined to believe that when the condition becomes sufficiently serious to justify the term "brain exhaustion," rather than nervous excitement, the phosphates will be found diminished to a marked degree, and reason tottering on her throne.

It is also becoming a recognized fact in the diagnosis of chronic renal diseases that the phosphates are diminished. Purdy, in his valuable work on Bright's disease, places it as one of the symptoms in his table of differential diagnosis. But, while we have these few points apparently established, there are a great many others on which the authorities totally disagree. Thus, Hoffman and Ultzman find an increase in febrile affections, whilst Wolff says they are diminished, but increased during convalescence. Many authors consider that an increase of phosphates is only an indication of dyspepsia, but Hoffman and Ultzman find them diminished in "severe disorders of digestion." Hoffman and Ultzman find an increase in bone disease; Belfield says you would expect it to be so; but, in fact they are diminished. And so there seems to be a disagreement with regard to many other diseases which, doubtless, in time by the accumulation of clinical evidence, will be removed.

In two cases I found the phosphates notably diminished in the late stage of chronic diabetes mellitus. In one of these there was not for several weeks during which the case was under observation, the slightest trace of phosphate to be found in the urine by the most careful tests. Being anxious to know what became of all the phosphoric acid, I had the fæces of this patient cremated and the ash submitted to a careful analysis by a competent chemist. I expected to find an increase in the fæces when there was none in the urine, but the result of my few experiments would seem to show that such is not the case, and that when not