

extractive substances as the cause of uræmic symptoms, but the evidence in support of this view has never been strong. The results of a personal study of this question may be briefly referred to. The extractives of the blood, that is, the substances which can be extracted by means of ether and alcohol, were determined in more than one hundred instances, including normal human and dog's blood, blood from nephritis with and without uræmic symptoms, from septicæmia, acute lobar pneumonia, etc. It was found that there is no definite relation between uræmia and the quantity of extractives in the blood.

In general the extractives are somewhat increased where the quantity of urea is increased, but there are cases of uræmia where the extractives are apparently normal in amount, and there are cases which would not usually be classed as uræmic where the extractives are markedly increased. The evidence indicates that while extractive substances in excess cannot be regarded as entirely harmless for the organism, they certainly cannot be looked upon as playing other than an auxiliary part in the production of uræmic symptoms. In this connection it may be stated that Dr. A. J. Wakeman, at my request, made a series of laborious observations on the blood of uræmic patients with the use of the Otto-Stas method, for the purpose of isolating any alkaloidal substances which might exist there. The injection into guinea pigs of the material recovered by the Otto-Stas method yielded wholly negative results.

The conclusions that have been stated regarding the extractives of the blood are applicable to the potassium salts theory of uræmia, which was originally advanced by Felz and Ritter, and which constitutes a most instructive chapter in the history of theories of uræmia. Numerous observations made by me confirm the statement of Horbaczewski that the content of potassium salts in uræmic blood may be quite normal in amount. This seems to be especially true of the blood of puerperal eclampsia. These salts are, however, distinctly increased in many instances of uræmia, but apparently never enough to make them wholly responsible for grave nervous symptoms. The potassium theory as an *exclusive* cause of uræmia has recently been revived in France by Charrier, but upon wholly insufficient grounds. It may be said at present that, while the potassium salts cannot be considered to play a leading part in the production of uræmic symptoms, their presence in excess in the blood must be regarded as a possible factor in precipitating symptoms of intoxication.

The ammonium carbonate theory of Frerichs, once so popular, has now only a historical interest and need not be discussed here. An allied hypothesis has, however, been suggested, namely, that the cause