

fore surprised to find "Ferri et Quiniæ Citras." when estimated by this process, showing very low percentages of quinine. If the alkalinized aqueous layer which has been shaken with ether be tasted it will nearly always be found very bitter, and, if shaken up with chloroform, will yield to the latter an additional quantity of quinine. In three cases recorded in my note-book chloroform extracted an additional 2 per cent. or thereabouts of quinine, in each case the ethereal and aqueous layers having been allowed to remain in contact for several hours before the underlying layer was drawn off.

The same experimental results, however, that condemn beforehand the use of *ether* for the determination of quinine in "Ferri et Quiniæ Citras" indicate at the same time the employment of *chloroform* for that purpose. When a watery solution of from 8 to 12 grains of the sample, contained in the "pear-shaped evaporating vessel," is *strongly* alkalinized with ammonia, twice shaken with chloroform, and treated in the way described above, the whole of the quinine contained in the citrate will be found in the two chloroformic layers. The process, thus carried out, for accuracy, simplicity, and rapidity, leave nothing to be desired. After the precipitated quinine has been shaken up in the separating vessel with chloroform, the latter need not remain longer than half an hour before being drawn off. The addition of the ammonia to *strong* rather than *faint* alkalinity is rendered necessary by a fact to be referred to presently, while this excess, as we already know, in no way affects the accuracy of the determination. Of course, if a preliminary experiment should show that only a portion of the alkaloid precipitated from the citrate, on addition of ammonia, is dissolved when shaken with a suitable quantity of ether, the total alkaloid obtained by this method will have to be dissolved in dilute acid, and the amount of quinine therein determined by any of the approved processes. Citrate of ammonium being absent from this solution, ether may now be relied on for taking up all the quinine precipitated in it, and unless employed in too great excess, for separating this from the other cinchona alkaloids present.

Samples of "Ferri et Quiniæ Citras," yielding by the chloroform method of analysis just described 13 per cent. of pure waterless quinine, will answer to the pharmacopœia tests; but the citrates sold as "P.B." of the best makers seldom contains less than 14 per cent. And when the substance referred to is made according to the process of manufacture recommended in the pharmacopœia, I do not think a much higher percentage of quinine than this will in general be obtained. Four samples of different makers (all of them of high repute and standing) gave, by the chloroform method, 14, 14.2, 14.4 and 15.37 per cent. respectively of the pure dry alkaloid.

When by addition (from a burette) of a dilute solution of ammonia to an aqueous solution of "Ferri et Quiniæ Citras," the latter has become distinctly alkaline to red litmus paper, further