

1. Whether the precipitant be ammonia, potash, or soda, whether added in slight or in large excess, whether the quinine solvent be ether or chloroform is quite indifferent. In any case, and in all cases the actual quantity of quinine present in the fluid operated upon is obtained.

2. The association of sugar or of glycerine with the quinine in the fluid under examination does not in any way affect the accuracy of the process when the precipitated quinine is dissolved by shaking up the mixture with *chloroform*, and drying the residue of evaporation of the latter at 260° - 270° until its weight is constant, Mr. Allen has shown that ether also in the presence of sugar takes up all the quinine thrown down by an alkali. I believe this is also the case in the presence of glycerine. In one experiment undertaken with a view to satisfy myself hereon I recovered all the quinine present but in a second only .1 grm. out of .106 grm. It is possible, however, that in the latter case a little of the ether was spilled. I have had neither time nor inducement to proceed any further with the investigation of this particular point.

3. Nor does any loss of quinine occur when it is determined in presence of citrate of ammonium, so long as chloroform is the solvent employed.

4. But when in the last case ether is substituted for chloroform, the ethereal layer contains only a portion of the quinine present, the remainder being held entangled in the aqueous layer, from which it can be extracted by shaking the latter with chloroform, and this is still so even when the aqueous and watery layers are allowed to remain in contact for so long a time as eighteen hours. I may say that in such cases the aqueous layer, which tastes very bitter, has always a strongly ethereal smell; and from this fact as well as from other circumstances, I am inclined to think that the ethereal solution is rather mechanically entangled in the aqueous layer than that the quinine is chemically retained by it. But, however to be explained, about the fact of the retention of part of the quinine under these circumstances by the solution of citrate of ammonium, there can be no doubt at all. In one experiment 6.5 per cent. of the quinine was thus retained; in a second experiment 12.1 per cent.; in a third, 13.8; in a fourth, 37.5 per cent.; in a fifth, 50 per cent. It seemed to me that the percentage retained varied with the *strength* of the citrate of ammonium solution as distinguished from the *volume* of the latter. But I am not sure of this.

"Ferri et Quiniæ Citras" is sometimes estimated by shaking a solution of the substance with ether after addition of excess of ammonia, and weighing the residue obtained on evaporating the ethereal layer. But "Ferri et Quiniæ Citras," contains citrate of ammonium, and ether (as the results described above show) is incompetent (or at least cannot be relied on) to remove all the quinine which is precipitated in a solution of that salt. We are not there-