solute resistance, of which only the *average* can be determined. It is $100\, R_{pr} \frac{V_n - \pi}{V_n}$ (Method 3).

If there is reason to believe, in comparing the resistance of two samples of blood, that under normal circumstances the volume of the protoplasmatic reticulum, or, what comes to the same, of the intracellular liquid, does not differ, then the determinations become simpler and the results of 2a, 2b or 2c may prove to be sufficient. If moreover the osmotic pressure of the serum is the same, then the first method suffices.

Chemistry. — "*The behaviour of mixtures of mercuric iodide and silver iodide*". By Prof. H. W. BAKHUIS ROOZEBOOM.

(Read May 26, 1900.)

The double iodide $HgI_2\,2AgI$ is known as one of the finest examples of a solid substance which undergoes a change at a definite temperature, because this substance changes, when heated to 45°, from the pure yellow to orange red.

There was, however, a difference of opinion as to the change which takes place here; some attributed it to the change of the compound itself into another modification; others thought that, at 45° it broke up into the two component iodides.

At my request Dr. STEGER has made a further investigation of the matter and has come to the conclusion that the two iodides mixed in varying proportions and at different temperatures are of a very varying nature. If we start from fused mixtures, it appears firstly that the melting point of HgI_2 is lowered from 257° to 242° by an admixture of 14 mol. pCt. of AgI. On the other hand the melting point of AgI is lowered from 526° to 242° by an admixture of 86 mol. pCt. of HgI_2.

By means of an accurate determination of the temperature-interval in which solidification of a certain mixture takes place, it may be found out what happens during the solidification. To do this with accuracy, a bath was used of melted $NaNO_3 + KNO_3$ which was stirred and which by judicious heating enabled us to maintain any constant temperature between 200°—500°, or to slowly vary it. The course of solidification of the different mixtures shows that two kinds of mixed crystals are formed; on the HgI_2 side with 0—4 mol. pCt. of AgI, on the other side with 18—100 pCt. of AgI. The first series has the type of the rhombic HgI_2, the other

that of the regular AgI which exist from their melting points down to 127° and 147° respectively.

After the solidification, there is therefore a hiatus in the mixing-series from 4 to 18 pCt. All intermediate mixtures consist, therefore, after solidifying of a conglomerate of the two limiting mixed crystals. Those of 4 pCt. undergo a change near 127° because the HgI_2 changes from the rhombic into the tetragonal form. The mixed crystals of 18 pCt. or more of AgI behave in a more remarkable way. Firstly, on cooling below 157° the mixed crystals having the composition $HgI_2 2AgI$ are suddenly changed into a compound of the same composition which is accompanied by a change in colour from pink to red.

This point of 157° is perfectly comparable with the solidifying point of a chemical compound deposited from a liquid mixture. But the analogy goes further. If a chemical combination can deposit from a liquid solution of the same composition, it can also do so from solutions whose compositions deviate in both directions, and the deposition then takes place at temperatures which are situated below the solidifying point of the liquid of the same composition. This also happens here. From mixed crystals which contain less AgI, the formation of the compound $HgI_2 2AgI$ occurs at temperatures which fall from 157°—118°; from those containing more AgI at temperatures from 157°—135°.

A further fall is impossible because at 118° and 135° two points appear, which present a perfect analogy with the eutectic points which are encountered when mixtures of liquids, which deposit only a single chemical compound, solidify. Just as in such points, the remaining liquid totally solidifies to a conglomerate of the compound with one or the other of its components, the remaining mixed crystals in this case form a conglomerate of the compound $HgI_2 2AgI$ with either HgI_2 or AgI.

In the case of liquid solutions the situation of the eutectic point is determined by the intersection of the line for the compound with that of the one or the other component.

The last mentioned lines then run as far as the melting points of the components.

Instead of these we have here the transition temperatures of HgI_2 (127°) and AgI (157°). The line for the transformation of mixed crystals into compound, therefore, meets on both sides:

1. The line for the transformation of regular AgI into the hexagonal form, which is lowered by admixture of HgI_2 from 147°—135°, the junction takes place here at 90 mol. pCt. of AgI.

2. The line for the transformation of HgI_2 rhombic into the tetragonal form, which is lowered by admixture of AgI from 127°—118°. This last line is, however, broken off because the mixing is not continual from 4—10 pCt. The exact composition of the mixed crystals at the eutectic point on this side is not yet known.

Below 118° and 135° all solidified mixtures are therefore transformed either into conglomerates of double salt with HgI_2 or with AgI. Whether a small admixture of the other iodide in both iodides is possible is not yet quite certain.

When those conglomerates, on further cooling, arrive at 45°, the compound changes into another condition (from red to yellow), whether it is pure or mixed with HgI_2 or AgI.

In agreement with this view it was found that the temperature at which this change took place was quite independent of the total amount of both iodides.

The most important result of the research is not however the correct interpretation of the last mentioned change which it affords, but the transformations which the mixed crystals, which are formed on solidifying, undergo between 157° and 118°.

We have here the second instance of mixed crystals changing into a chemical compound, the first instance having been observed by ADRIANI in the case of racemic campheroxim. We have, however, here the first instance of that change being connected with the change of both the components, which gives rise to a complete analogy with generally known phenomena of liquid solutions.

The discovery is particularly important because it concerns a connection between phenomena which I fancy also arise during the formation of mixed crystals from iron and carbon, but could not thus far be ascertained with certainty on account of the very high temperatures at which these changes occur.

Chemistry. — "*A new method for the exact determination of the Boiling-point*". By Dr. A. SMITS (Communicated by Prof. H. W. BAKHUIS ROOZEBOOM).

(Read May 26, 1900).

Some time ago I described a very delicate method for the determination of the increase of the boiling point, in which the boiling took place in a silver apparatus the pressure being maintained constant. In many cases it is however an advantage to be able to