Huygens Institute - Royal Netherlands Academy of Arts and Sciences (KNAW)

Chemistry. — *"On melting points in systems of optic isomers."*
By Prof. H. W. BAKHUIS ROOZEBOOM.

In order to test the views on melting points of mixtures of optic isomers, as communicated in the Proceedings of the Meeting of Feb. 25th 1899, page 312, Mr. ADRIANI has now in the first place examined two examples in which the certainty existed of the inactive substance being a racemic compound.

The first example is the dimethylic ethereal salt of tartaric acid. Here the *d-* and *l-*form have a lower melting point than the racemic compound.

The second example is the dimethylic ethereal salt of diacetyl tartaric acid, where the *d-* and *l-*form have a higher melting point than the racemic compound.

For the present only the melting points of mixtures of *d-* and *r-*forms have been examined in all their proportions. Consequently we could only get the right half of fig. 3 and 4 (vide page 312).

We found:

I. Dimethylic ethereal salt of tartaric acid.

Mol. percent racemic compound in the mixture.	Final melting point.
0	43°3
1.96	41.7
3.02	41.6
4.78	45.0
6.59	50.6
9.17	57.0
20	66.8
40	78.7
50	81.3
60	84.2
70	85.9
80	87.3
90	88.5
100	89.4

II. *Dimethylic ethereal salt of diacetyltartaric acid.*

Mol. percent of racemic compound in the mixture.	Final melting point.
0	104°3
20	99.8
40	95.8
60	90.3
70	87.4
80	84.6
90	83.4
100	83.8

If we represent the numbers graphically, we get the following figures.

Mol. °/o racemic compound.
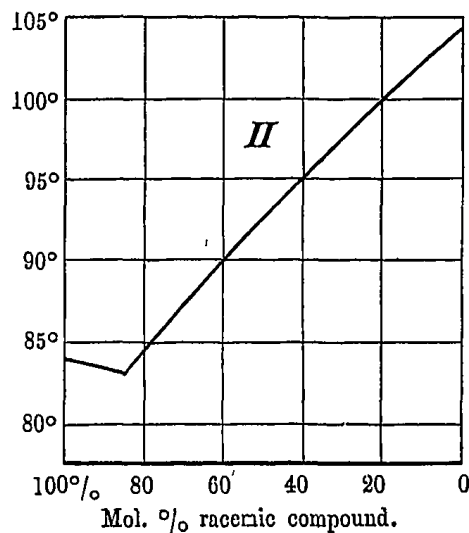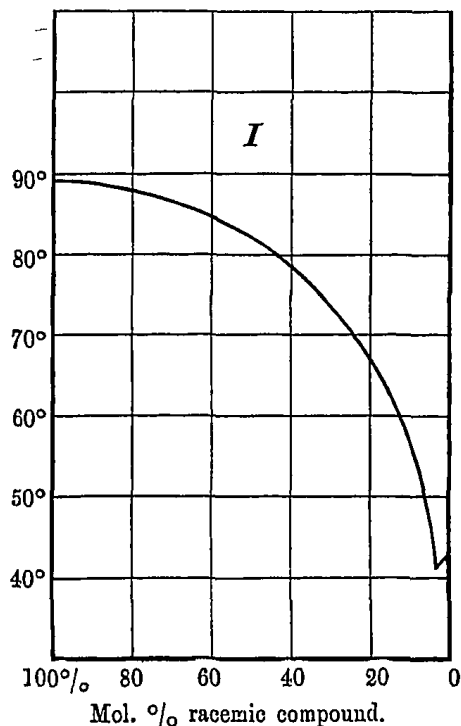
In their general form they correspond entirely with the right halves of fig. 3 and 4, page 312. In fig. I we remark however that the melting line for the racemic compound extends very consi-

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derably so as to run as far as the concentration $3^0/_0$ before meeting the melting line of the d-substance. This is connected with the flat course of the meltingline near the melting point of the racemic compound, which points to a great measure of dissociation in the two active components in the liquid state.

In fig. II it is the melting line of the racemic compound that, owing to the lower melting point, has the smallest extension (final point near $86^0/_0$) but this too has a very flat form near the melting point.

Physics. — *"On the deduction of the characteristic equation."* By Prof. J. D. VAN DER WAALS — discussion with Prof. BOLTZMANN.

In the proceedings of the former meeting Prof. BOLTZMANN has inserted a communication, accompanied by a letter. In this letter Prof. BOLTZMANN has expressed the wish that his communication would give rise to a discussion. As the result for Prof. BOLTZMANN's values of the coefficients of $\dfrac{b}{v}$, $\dfrac{b^2}{v^2}$ etc., which appear in the characteristic equation, differs from that which I have obtained, I consider the invitation to discussion as also addressed to me. And though as a rule I prefer to leave the discussion between different results, obtained in two different ways, to the gradual development and extension of our views, which is brought about in course of time, I will not abstain from complying with his request, in the hope that this discussion may be „useful to science."

I am perfectly aware of the difficulties attending this discussion. Prof. BOLTZMANN's „Vorlesungen" form a logical coherent whole, and the different results agree so well, that we may be sure that they contain a perfectly correct solution of the problem, as Prof. BOLTZMANN conceives it. On the other hand I am convinced, that also my solution, leaving same unsolved questions and some minor points out of account, gives a true explanation of the problem, as I see it. So I pass by the question whether in equation (11) p. 403 the factor of $2\,Gb$ is to be put as $1 - \dfrac{17}{32}\dfrac{b}{v} + \beta\dfrac{b^2}{v^2}$ or whether β must possibly be diminished by $\dfrac{2357}{13440}$, as this is of minor interest.

As our results differ so much, we cannot but have considered two different problems, and to get some certainty on this point, I