From this it is clearly seen that starting from 39° the *velocity of electrical reaction* rapidly increases, reaching a maximum at about 9° and then diminishing again.

It is worthy of note that the curve, which here represents the *velocity of electrical reaction* at different temperatures, possesses the same form as that representing the rate of crystallisation of many substances at temperatures below the melting-point [1]). I shall take up this subject more fully later, as also the study of the velocity of the following reactions:

$$Zn + Cu\,SO_4 = Cu + Zn\,SO_4$$ (DANIELL-element).

$$Zn + Hg_2\,SO_4 = Hg_2 + Zn\,SO_4$$ (CLARK-element).

$$Zn + 2\,Ag\,Cl = Ag_2 + Zn\,Cl_2$$ (WARREN DE LA RUE-element).

$$Zn + 2\,Hg\,Cl = Hg_2 + Zn\,Cl_2$$ (HELMHOLTZ element).

Amsterdam, February 1899.

Chemistry. — Prof. FRANCHIMONT presents to the library of the Academy the dissertation of Mr. L. T. C. SCHEY entitled: „*On synthetically prepared neutral glyceryl-ethereal salts — triacylins — of saturated monobasic acids with an even number of C-atoms*" and elucidates it in the following words:

Since CHEVREUL's experiments in the first quarter of this century, fats, at least animal fats, are considered as mixtures of glyceryl-ethereal salts, on account of the products formed by them after treatment with solutions of bases; but it is extremely rare that a glyceryl-ether has been extracted from it in a pure form. The difficulties attached to such separations have as yet not been sufficiently overcome.

About the middle of this century some of these glyceryl-ethereal salts have been made synthetically by BERTHELOT and others, but generally they did not obtain them in a pure condition. Now Mr. SCHEY has, with a view to the acids said to have been obtained from butter, made synthetically eight glycerides, called by him, in order to prevent confusion with polyglycerinderivatives, *triacylins* and has determined

[1]) See GERNEZ, Journal de physique (2) 4, (1885) p. 349. TAMMAN, Zeitschrift fur phys. Chemie, o. a. 23, 326 (1898). v 't HOFF, Vorlesungen über theor. und phys. Chemie (1898). S. 226.

their density, refractive power and meltingpoint. Of these eight, three were entirely unknown viz caproin, caprylin and caprin; three: butyrin, palmitin and stearin had formerly been prepared synthetically, but the former two certainly not pure; two: laurin and myristin had only been obtained from natural products, but neither quite pure.

The method of preparation adopted by Mr. SCHEY consists simply in heating glycerin with an excess of the acid up to a temperature at which neither the glycerine, nor the acid, nor the ethereal salt suffer decomposition and under circumstances in which the water formed is immediately drawn off as completely as possibly e. g. by a slight current of air and under diminished pressure in the apparatus, this being followed by fractional distillation in vacuo or crystallization from different solvents, until one of the properties mentioned underwent no further noticeable alteration by this treatment. This fact led to the conclusion of the purity of the product; Mr. SCHEY attaching little value to elementary analyses in these cases, they have not been made.

The determination of the specific gravity was always done by weighing a certain volume of the substance and an equal volume of water at the same temperature; the exactness acquired in this way holds good up to one or two unities of the 4th decimal.

The refraction-index was determined for sodium light with a refractometer of PULFRICH with which generally the 4th decimal is certain. The determination of the meltingpoint has not been so exact, but that differences of one or two tenths degrees may occur.

Mr. SCHEY has not only determined the three properties of his products, but also of the original substances (the acids), which were purified to the highest possible degree, except the two highest acids, which Dr. L. E. O. DE VISSER of Schiedam had kindly procured him in a very pure condition. Of the eight triacylins prepared, tricaprin offers the highest guarantee of purity because it crystallizes best of all and was obtained in great, clear, well-formed crystals; the lower terms are at the ordinary temperature liquids of which tributyrin alone has an intensely bitter taste.

Finally Mr. SCHEY treats of the methods by which it is possible to calculate, approximatively at least, density and refractive power of these substances. The calculation with the numbers determined by others for the atomicvolumes (even TRAUBE's with the co-volumes) and for the atomicrefractions, gives results differing pretty much from those found by him. He here points out the little certainty offered by the generally accepted values for atomicvolumes and atomicrefraction.

Another method of calculation already indicated by BERTHELOT in 1856 viz. from the molecular-volumes and the molecular-refractions of the substances that have interacted, at equal temperatures, led to better results. It has already been remarked by others, that the ethereal salts of the fatty acids in general often seem to be formed without great change of volume and this seems equally to be the case with triacylins. For caprin the result of this calculation of the molecular-volume even perfectly agrees with the one really found; it does not result therefrom that this should necessarily be the case with the other terms as well, and in the subjoined table given by Mr. SCHEY their deviations are shown.

A third method of calculation starts from what is found for one of the terms and as all of them rise or fall with an equal difference of composition, it takes into account the average value of this difference. Starting from caprin, as the purest product, the values calculated on this base and those for molecular-volumes and molecular-refraction concurred pretty well, as will be seen from subjoined tables.

As to the meltingpoints it was found that they were quite or nearly quite equal for capric acid and for tricaprin, while for the lower terms of the triacylins the meltingpoint is below that of the acid, for the higher ones on the other hand above it, which does not agree with what BERTHELOT thought to have found.

This work will be published in the Recueil des Travaux Chimiques des Pays-Bas et de la Belgique.

Physics. — „*On the Vibrations of Electrified Systems, placed in a Magnetic Field*". By Prof. H. A. LORENTZ.

(Read in the meeting of January 28th 1899).

§ 1. Many spectral lines show the ZEEMAN-effect according to the well known elementary theory, and are thus changed into triplets or, if viewed along the lines of force, into doublets, yet there are a rather large number of cases, in which the phenomena are more complicated. CORNU [1]) found that the line D_1 becomes a quartet, whose outer and inner components are polarized, the first parallel and the latter perpendicularly to the lines of force. Similar quartets have been observed in other cases. Sometimes [2]), in triplets and quar-

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[1]) CORNU, Comptes rendus, T. 126.

[2]) BECQUEREL and DESLANDRES, Comptes rendus, T 127, p. 18.