In the case of the *alcohols* and *water*, the values of $\frac{\partial \mu}{\partial t}$ are remarkably small; also in the case of the *alcohols* a regular increase with growing molecular weight is observable:

While in the case of *water* the value of $\frac{\partial \mu}{\partial t}$ is 1,0 Erg per degree,

it is for CH_3OH: 0,67 Erg per degree.
for C_2H_5OH: 0,94 Erg per degree.
and for C_3H_7OH. 1,10 Erg per degree.

On later occasions other regularities of this kind will be pointed out.

Groningen, Holland, June 1915.

Laboratory for Physical and Inorganic Chemistry of the University.

Chemistry. — "*Investigations on the Temperature-Coefficients of the free Molecular Surface-Energy of Liquids between* — 80° *and* 1650° *C.*" **XI.** *The Surface-Tension of homologous Triglycerides of the fatty Acids.* By Prof. F. M. JAEGER and Dr. JUL. KAHN.

§ **1.** In the following we give the measurements made with the neutral ethers of glycerol and the fatty acids. The information about the surface-energy of the simple fats and its temperature-coefficient must be considered of high importance for practical reasons, because it allows conclusions to be made about the corresponding values for the natural fats, those being mixtures of the simple fats. The temperature-coefficient of μ appears furthermore to have very exceptional values for some of these derivatives which may be considered as a fact in many respects also of interest from a theoretical point of view.

Finally we give here again some measurements of the specific surface-energy χ and its temperature-coefficient, for natural butter and for margarine, which measurements were made with the purpose of finding out, if a reliable criterion could perhaps be obtained for the discrimination of pure natural butter from that which had been adulterated by vegetable fats. Although the temperature-coefficient of χ in the case of margarine evidently differs from that for natural butter, we think these differences too slight to found

a reliable method upon these for the decision of the said questions.

§ **2.** The eleven compounds investigated are:

Glycerol, Glyceryltriformiate, Glyceryltriacetate, Glyceryltributyrate, Glyceryltricaproate, Glyceryltricaprylate, Glyceryltricaprinate, Glyceryltrilaurinate, Glyceryltripalmitate, Glyceryltristearate and *Glyceryltrioleate.*

The butter and margarine used were both of the best kind; when molten, a heavier white precipitate is formed, consisting of salts and other components, mixed with water. Of course the measurements relating to such liquids can only have a relative value; but in any case they do not indicate any clearly evident difference between the two kinds of fats.

I.

Glycerol: $CH_2OH.CHOH.CH_2OH.$

Temperature in ° C.	Maximum Pressure H in mm. mercury of 0° C.	Maximum Pressure H in Dynes	Surface-tension χ in Erg pro cm².	Specific gravity d_{4°	Molecular Surface-energy μ in Erg pro cm².
0°	(ca. 3.1)	(ca. 4100)	(ca 88)	1.272	(ca. 1546)
13.5	(ca. 2.4)	(ca. 3200)	(ca. 69)	1.264	(ca. 1221)
26	2.297	3062.4	66.1	1.258	1156.5
35	2.182	2909.0	62.7	1.251	1101.0
50.2	2.085	2780.1	59.9	1.242	1057.0
65	2.023	2697.8	58.1	1.233	1030.2
74.5	2.010.	2679.5	57.7	1.227	1026.5
90.8	1.975	2633.6	56.7	1.218	1013.5
104.1	1.941	2588.1	55.7	1.212	999.0
121	1.913	2551.4	54.9	1.200	991.2
130	1.886	2514.4	54.1	1.194	980.0
151	1.783	2378.1	51.1	1.182	931.9
171	1.708	2277.0	48.9	1.169	898.4
184.5	1.660	2213.0	47.5	1.162	876.2
202	1.585	2113.1	45.3	1.152	840.5

Molecular weight: **92.06.** Radius of the Capillary tube: 0.04374 cm. Depth: 0.1 mm.

The anhydrous compound melts at 19° C.; it can however be enormously undercooled; at —180° C. it becomes a glassy mass. The glycerol boils at 290° C., and under a pressure of 12 mm. at 180° C. The specific gravity at 20° C. is: 1.2604; at 50° C : 1.2420; at 100° C.: 1.1636. At $t°$ in general: $d_{4^\circ} = 1.2720 - 0.000576\,t - 0.00000064\,t^2$. The temperature-coefficient of μ oscillates irregularly: in the beginning (from 13° to 50°) it is relatively great: **6.1** to **2.9** Erg.; then it decreases (between 50° and 200° C.) on: **1.8** to **1.5** Erg. per degree. The irregularities are undoubtedly connected with the embarrassing measurements in the case of this highly viscous liquid, especially at lower temperatures.

Glyceryltriformiate: $C_3H_5(O.COH)_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity d_{4^0}	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
*—20°	(1.972)	(2629.1)	(56.0)	1.352	(1438.7)
* 0	1.752	2335.8	49.6	1.332	1287.0
* 13.5	1.705	2273.1	48.3	1.318	1262.1
26	1.629	2171.9	46.7	1.305	1228.4
35	1.598	2130.7	45.8	1.296	1210.3
50.3	1.536	2048.4	44.0	1.281	1171.8
64.7	1 488	1983.6	42.6	1.266	1143.5
75.2	1.452	1934.1	41.5	1.256	1119.8
91.2	1.385	1847.2	39.6	1.240	1077.8
105	1.347	1797.0	38.5	1.225	1056.4
121	1.279	1705.5	36.5	1.210	1009.7
130.4	1.257	1671.8	35.8	1.200	995.9
151	1.182	1575.8	33.7	1.179	948.5
170	1.096	1461.2	31.1	1.159	885.4
184.8	1.015	1353.2	28.8	1.144	827.1

Molecular weight: **176.06.** Radius of the Capillary tube: 0.04374 cm.; in the determinations indicated by *, it was: 0.04320 cm. Depth: 0.1 mm.

The ether was prepared by Prof. VAN ROMBURGH (Proc. Kon. Ak. v. Wet. Amsterdam **9**, (109), (1907)) and kindly lent to me for the purpose of measurement. Under a pressure of 14 mm. it boils constantly at 147° C.; in a refrigerant mixture of alcohol and solid carbondioxide it crystallises slowly, and then melts at 18° C. At —20° C. the viscosity of the liquid is too great, to allow reliable measurements. Above 140° a slow decomposition sets in, acid vapours being evolved; the χ-t-curve therefore falls more rapidly to the t-axis.

At the boilingpoint (266° C.) χ has a value of about 16.5 Erg.

The specific gravity at 50° C. was: 1.2812; at 75° C.: 1.2560; at 100° C.: 1.2305. At t° C.: $d_{4^0} = 1.3319 - 0\,001014\ t$.

The temperature-coefficient of μ is up to 150° C. fairly constant, and oscillates round a mean value of **2.20** Erg per degree; later on it increases, because of the reasons mentioned above, very rapidly to about **3.6** Erg per degree.

III.

Glyceryltriacetate: $C_3H_5(O.CO.CH_3)_3$.

Temperature in ° C.	Maximum Pressure H in mm. mercury of 0° C.	Maximum Pressure H in Dynes	Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
−19°	1.580	2106.7	37.8	1.212	1204.9
0	1.543	2057.2	36.9	1.187	1192.6
21	1.488	1983.8	35.6	1.161	1167.8
35.2	1.456	1941.7	34.8	1.144	1152.8
50.2	1.419	1892.1	33.9	1.127	1134.2
65	1.382	1842.7	33.0	1.110	1115.3
75.2	1.349	1798.9	32.2	1.100	1092.4
90.2	1.300	1732.6	31.0	1.085	1063.8
99.8	1.262	1683.1	30.1	1.075	1039.3
115	1.200	1600.7	28.6	1.060	996.8
125	1.160	1546.5	27.6	1.051	967.4
139.8	1.089	1452.1	25.9	1.040	914.2
155	1.027	1369.6	24.4	1.028	868.0
169.2	0.977	1303.6	23 2	1.016	831.8
185.2	0.916	1221.1	21.7	1.007	782.6
200.3	0.862	1149.6	20.4	0.997	740.6

Molecular weight: **218.1.**

Radius of the Capillary tube: 0.03636 cm.
Depth: 0.1 mm.

At −78° C. the liquid gets glassy, at −20° it is again very viscous. Under a pressure of 40 mm. the liquid boils at 172°.5 C.; under atmospheric pressure at 260° C. The density at 25° C. is: 1.1562; at 50° C.: 1.1271; at 75° C.: 1.1001; at 100 C.: 1.0752. At $t°$ C.: $d_{4°} = 1.1874 - 0.00129\,t + 0\,0000017\,t^2$.

The temperature-coefficient of μ increases gradually with rising temperature; between −19° and 0° C. it is: **0.64** Erg.; between 0° and 21° C.: **0.92** Erg.; between 21° and 35° C.: **1.05** Erg.; between 35° and 65° C.: **1.26** Erg.; between 65 and 100° C.: **2.20** Erg.; between 100° and 170° C.: **2.89** Erg.; and between 170° and 200° C. almost **3.0** Erg. per degree.

IV.

Glyceryltributyrate: $C_3H_5(O.CO.C_3H_7)_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
—20.5°	1.381	1841.1	33.0	1.080	1411 8
0	1.333	1776 7	31.8	1.060	1377.5
20.9	1.283	1710.7	30.6	1.040	1342.4
35.1	1.246	1661.2	29.7	1.024	1316.5
50.3	1.213	1617.2	28.9	1.011	1292.0
64.8	1.173	1561.7	27.9	1.005	1252.2
75.3	1.142	1523.7	27.2	0.998	1226.5
90.2	1.101	1467.8	26.2	0.979	1196.6
99.8	1.074	1431.8	25.5	0 966	1177.3
115.2	1.031	1375.2	24.5	0.954	1138.5
125.3	1.001	1333 3	23.7	0.948	1106.0
140	0.943	1259.1	22.4	0.939	1052.0
156	0.899	1199.2	21.3	0.924	1011.1
170.8	0.854	1138.5	20.2	0.911	968.0
184.5	0.817	1089.1	19.4	0.900	937.2
200.8	0.776	1034 0	18.3	0.890	890.7

Molecular weight: **302.2.**

Radius of the Capillary tube: 0.03636 cm.
Depth: 0.1 mm.

Under atmospheric pressure the liquid boils at 286° C. The density at 50° C. is: 1.0110; at 75° C.: 0.9982; at 100° C.: 0.9664. At t C.: in general $d_{4°} = 1.0596 - 0.00101\,t + 0.0000008\,t^2$.

The temperature-coefficient of μ originally increases gradually from **1.70** Erg. between —20° and 50° C., and **2.42** Erg. between 50° and 115° C., to **3.44** Erg between 115° and 140° C. Afterwards it again decreases somewhat: between 140° and 201° C. its mean value is about **2.63** Erg per degree.

V.

Glyceryltricapronate: $C_3H_5(O\ CO.C_5H_{11})_3$.

Temperature in ° C.	Maximum Pressure H in mm. mercury of 0° C.	Maximum Pressure H in Dynes	Surface-tension γ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
—20°	1.395	1859.2	33.4	1.028	1739.3
0	1.316	1754.8	31.5	1 011	1658.4
21	1.250	1666.6	29.9	0.993	1593.4
35.3	1.213	1617.2	29.0	0.982	1557.0
50.1	1.180	1573.2	28.2	0.970	1526.4
64.8	1.147	1529.2	27 4	0.958	1495.5
75.7	1.123	1496.3	26.8	0 949	1472.0
90	1.085	1446.7	25.9	0.938	1433.7
99.8	1.061	1414.5	25.3	0.931	1407.4
115.3	1.034	1376.5	24.6	0.919	1380.1
125	1.004	1338.5	23.9	0.905	1354.9
141	0.972	1295.9	23.0	0.900	1308.7
155.8	0.932	1243.1	22.2	0.890	1272.6
169.5	0.897	1190.6	21.3	0.880	1230.3
185	0.862	1149.7	20.5	0.871	1192.2
200	0.825	1100 1	19.6	0.860	1149.6

Molecular weight: 386.3. Radius of the Capillary tube: 0.03636 cm. Depth. 0.1 mm.

In a refrigerant bath of solid carbondioxide and alcohol, the liquid gets very viscous, and then solidifies very slowly at —60° C. At 50° C. the density was: 0 9699; at 75° C.: 0.9501; at 100° C.: 0.9309. At $t°$ C.: $d_{4°} = 1.0113 - 0.000852\,t + 0.00000048\,t^2$.

The values of $\frac{\partial \mu}{\partial t}$ decrease with increasing temperature gradually from **4.04** Erg per degree at —20° C. to **2.54** Erg at 35° C. Afterwards they remain relatively constant, and oscillate somewhat round a mean value of **2.49** Erg per degree.

VI.

Glyceryltricaprylate: $C_3H_5(O.CO.C_7H_{15})_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity d_{4°	Molecular Surface-energy v in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
0°	1 258	1677 7	30.1	0.967	1861 8
21	1.218	1623.8	29.1	0.950	1821.3
35.1	1 194	1588.2	28.4	0.939	1791.4
50.3	1.156	1541.2	27.6	0.927	1756.0
65.3	1.126	1501.6	26.9	0 915	1726.3
75.7	1.106	1474.2	26.4	0 908	1702.9
90.3	1.073	1430:1	25.6	0.897	1664.8
99.8	1.052	1402.7	25.1	0.890	1640.8
115.5	1.015	1353.2	24.2	0 879	1595.2
125.2	0 994	1325.7	23.7	0.871	1571.7
140.2	0.961	1281.6	22.9	0.861	1530.5
154.8	0.924	1231.9	22.0	0.852	1480.6
170.5	0.902	1202.5	21.5	0.842	1458 4
185.8	0.863	1151.8	20.5	0.831	1402 8
200.2	0.826	1103.8	19.7	0.822	1357.9

Molecular weight: **470.4.**

Radius of the Capillary tube: 0.03636 cm.
Depth: 0.1 mm.

The compound solidifies at −22° C. slowly into a colourless crystal-aggregation; it melts again at +9° C.

The density at 50° C. is: 0.9273; at 75° C.: 0.9082; at 100° C.: 0.8897. At t° C. $d_{4^\circ} = 0.9673 - 0.000824\,t + 0.00000048\,t^2$.

The temperature-coefficient of ν is between 0° and 76° C.: **2.12** Erg.; between 76° and 155 C. its mean value is about **2.65** Erg; and between 155° and 200° C. about **2.9** Erg per degree.

VII.

Glyceryltricaprinate: $C_3H_5(O.CO.C_9H_{19})_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
35.4°	0.956	1275.7	27.6	0 923	1965.0
50.2	0.940	1253.2	27.1	0.912	1944.9
65.3	0.915	1220.9	26.4	0.902	1908.6
74.6	0.902	1202.5	26.0	0.895	1889.5
90.5	0.867	1156.8	25.0	0.884	1831.9
104.1	0.834	1113.9	24.1	0.875	1778.0
121	0.803	1068.1	23.0	0.863	1712.6
130.3	0.779	1037.8	22.4	0.856	1677.0
151	0.740	985.1	21.3	0.842	1612.1
172	0.708	950.1	20.2	0.827	1547.4
184.9	0.681	913.8	19.5	0.818	1504.7
201.2	0.655	873.2	18.8	0.807	1463.9

Molecular weight: **554.49.** Radius of the Capillary tube: 0.04374 cm
Depth: 0.1 mm.

The substance melts at 31°.1 C. The density at 50° C. is: 0.9126; at 75° C.: 0.8950; at 100° C.: 0.8777. At $t°$ C.: $d_{4°} = 0.9475—0.000698\ t$.

The temperature-coefficient of μ has a mean value of about **3,09** Erg per degree.

VIII.

Glyceryltrilaurinate: $C_3H_5(O.CO.C_{11}H_{23})_3$.

Temperature in ° G.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
64.7°	1.209	1611.7	29.2	0.891	2338.5
75 1	1.180	1573.2	28.5	0 885	2293.1
90	1.147	1529.1	27.7	0 876	2343.7
99.8	1.122	1496.2	27.1	0.870	2205.1
114.8	1.093	1456.1	26.4	0.861	2161.5
126	1.064	1419.2	25.7	0.853	2118 9
139	1.040	1386.2	25.1	0.846	2080.9
156	0.997	1331.4	24.1	0.828	2026.8
170	0.978	1303.9	23.6	0.824	1991.1
185	0.949	1261.8	22.8	0.815	1937.8
200	0.916	1221.1	22.1	0.804	1895.4

Molecular weight: **638.59.** Radius of the Capillary tube: 0.03636 cm.
Depth: 0.1 mm.

The compound melts at 46°.5 C. The specific gravity at 75° C. is: 0.8842; at 100° C.: 0.8676; at 125° C.: 0 8507. In general at $t°$ C.: $d_{4°} = 0.9005—0.00060\,(t—50) - 0.00000024\,(t—50°)^2$.
The temperature-coefficient of μ oscillates somewhat round a mean value of: **3.33** Erg pro degree.

IX.

Glyceryltripalmitate: $C_3H_5(O.CO.C_{15}H_{31})_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
64°.3	1.287	1715.7	30.4	0.877	2863.4
75.3	1.257	1675.8	29.7	0.870	2812.5
90	1.206	1610.4	28.5	0.862	2715.5
99.8	1.182	1575.8	27.8	0.854	2665.3
115	1.139	1518.2	26.8	0.845	2587.7
125.5	1.124	1496.2	26.4	0.834	2571.4
140.2	1.077	1435 6	25.6	0.828	2505.6
154.8	1.060	1413.7	24.9	0.816	2460.9
170	1.031	1375.2	24.2	0.805	2413.4
184.8	1.000	1333.2	23.4	0.794	2355.2
200	0.963	1288.1	22.6	0.781	2299.8

Molecular weight **801.74.** Radius of the Capillary tube: 0.03636 cm. Depth: 0.1 mm.

The compound melts at 65°.1 C.; the metastable form melts at 46° C.
The specific gravity was at 75° C.: 0.8702; at 100° C.: 0.8544; at 125° C.: 0 8377. In general at $t°$ C.: $d_{4°} = 0.8851 \; 0.000578(t-50°) - 0.00000079(t-50°)^2$.
The temperature-coefficient of μ is up to 90° C. about **5.55** Erg per degree; afterwards it decreases gradually from **5.10** Erg to **3.41** Erg per degree.

X.

Glyceryltristearate $C_3H_5(O.CO.C_{17}H_{35})_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes			
121°	0.908	1210.5	26.0	0.840	2704.0
130	0.886	1181.2	25.3	0.834	2643.8
151	0.822	1095.9	23.5	0.820	2483.6
169	0.784	1045.2	22.3	0.807	2382.0
185	0.741	987.9	21.1	0.794	2278.3
201.2	0.725	966.6	19.8	0.782	2159.8

Molecular weight: **890.88** Radius of the Capillary tube: 0 04374 cm. Depth: 0.1 mm.

The ether melts at 71°.6 C.; its metastable form at 55° C. From 75° to 120° C. the value of χ changes only inconsiderably: from 26.9 Erg at 74°.6 C. to 26.5 Erg at 120° C. Above 120° C. the curve falls gradually; only this part of it is drawn in the diagram.
The density at 75° C. was: 0 8704; at 100° C.: 0.8542; at 125° C: 0.8373. At $t°$ C.: $d_{4°} = 0.8859 \; 0.000606(t-50) - 0.00000056(t-50)^2$.
The temperature-coefficient of μ oscillates round a mean value of **6.75** Erg per degree.

XI.

Glyceryltrioleate: $C_3H_5(O.CO.C_{17}H_{33})_3$.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².	Specific gravity $d_{4°}$	Molecular Surface-energy μ in Erg pro cm².
	in mm mercury of 0° C.	in Dynes			
—17°	1.656	2207.8	40.1	0.951	3822
0	1.535	2046.2	37 2	0.937	3580
21	1.436	1914.2	34.8	0.920	3391
35.3	1.375	1833.1	33 3	0.909	3271
50 1	1.335	1780.9	32.4	0.899	3206
65	1.304	1738.2	31.6	0.888	3153
75.8	1.273	1696.0	30.8	0.881	3089
90	1.233	1643.6	29.9	0.872	3019
99 8	1.209	1611.8	29.3	0 866	2972
114.8	1.180	1573.2	28.6	0.857	2922
125.2	1.159	1545.7	28.1	0.850	2886
141	1.131	1507.1	27.4	0.842	2832
154.8	1.106	1474.2	26 8	0.834	2788
170	1.081	1441.2	26.2	0.829	2736
185	1.056	1408 1	25.6	0.821	2691
200.6	1.031	1375.1	25.0	0.813	2645

Molecular weight: **884.82.** Radius of the Capillary tube: 0.03636 cm. Depth: 0.1 m.m.

The liquid solidifies at about — 17° C. slowly, after becoming very viscous at that temperature.

The density at 50° C. was; 0.8992; at 75° C.; 0.8822; at 100° C.: 0 8665. At $t°$ C.: $d_{4°} = 0\ 9371 - 0.00081\ t + 0.00000104\ t^2$.

The temperature-coefficient of μ decreases gradually with rising temperature, and rather greatly from about **14** to **8.4** Erg. between — 17° and 21° C., to **4.7** Erg. between 21° and 90° C., and **3.25** Erg. between 90° and 200° C.

XII.

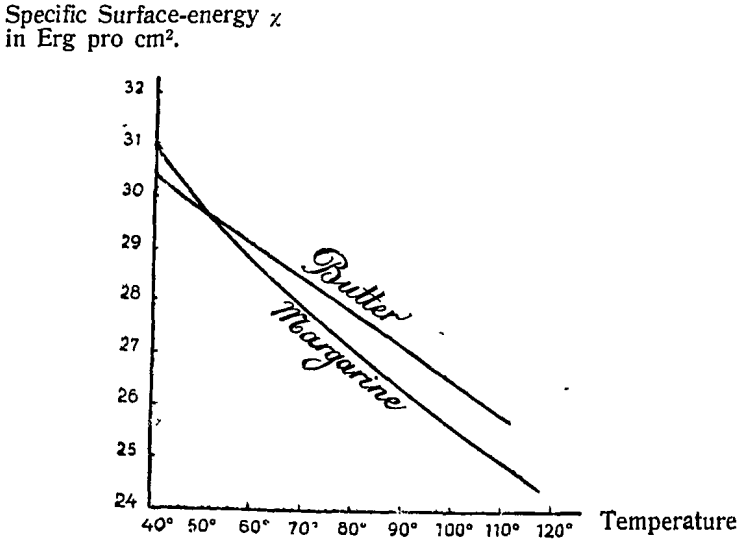
Butter.

Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg pro cm².
	in mm. mercury of 0° C.	in Dynes	
40.2°	0.994	1325.2	30.5
54.1	0.953	1270.5	29.3
76.2	0.908	1210.5	27.9
94.8	0.879	1168.4	26.9
116.5	0.843	1123.9	25.8

Radius of the Capillary tube: 0.04667 cm. Depth: 0.1 mm.

XIII.

Margarine.			
Temperature in ° C.	Maximum Pressure H		Surface-tension χ in Erg. pro cm²
	in mm. mercury of 0° C.	in Dynes	
40.2	1.009	1345.6	31.0
54.1	0.952	1268 4	29.3
76.2	0.886	1181.2	27.2
94.8	0.829	1105.6	25 8
116.5	0.795	1060.1	24 4
Radius of the Capillary tube: 0.04667 cm. Depth: 0.1 mm.			



Specific Surface-energy of Butter and of Margarine.

§ **3.** The results here obtained lead to the following remarks.

The absolute values of μ evidently increase in a regular and prominent way with augmenting carbon-content of the fatty acid; in the case of the ethers of the higher fatty acids they reach a magnitude quite comparable with that observed in the case of some molten inorganic salts. This fact certainly runs in some respects parallel with the strong increase of the molecular weight of these fats.

At the same time the temperature-coëfficients of μ regularly increase, with exception of the first term of the series, as can be seen from the following data:

Triformiate: 2,20—3,6
Triacetate: 1,05—1,26—2,20—2,89—3,0
Tributyrate: 1,70—2,42—2,60
Tricapronate: 2,49
Tricaprylate: 2,12—2,65—2,90
Tricaprinate: 3,09
Trilaurate: 3,33
Tripalmitate: 5,55—5,1—3,41
Tristearate: 6,75
Trioleate: 8,4—4,7—3,25

It will be remarked, that the μ-t-curve for *trioleate* is wholly situated *above* that for *tristearate*, which clearly demonstrates that in the case of the same number of carbon-atoms, the values of μ for the derivative of the *un*saturated acid will be greater than those for the derivative of the saturated acid with the same number of carbon-atoms.

Furthermore attention must be drawn to the fact that for the first five members of the series $\frac{\partial \mu}{\partial t}$ increases with rise of temperature; for tricaprinate, trilaurate and tristearate however it remains rather constant, while for tripalmitate, trioleate just as for glycerol [1]) itself, it decreases with rising temperature.

Most of the changes mentioned thus appear to occur in quite a regular way. It is at the moment hardly possible to give any probable explanation of the enormously great values of the temperature-coefficient of μ in the case of the higher members of this series.

With respect to the investigation of butter and margarine, we found for the butter studied here a value of $\frac{\partial \chi}{\partial t}$ of about: 0,055 Erg, and for the margarine of about: 0.087 Erg pro degree. The absolute values of χ however deviate only slightly for the two complex fats; at 50° C. both liquids must have about the same specific surface-energy of 29,8 Erg.

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[1]) For *glycerol* $\frac{\partial \mu}{\partial t}$ varies between 1,8 and 1,5 Erg pro cm^2.