TABLE 4. m-*Nitrobenzoic acid.*

Conc. (10^{-3}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_\pm$	log K_a^P/K_a^1 (K_a at $P = 1$)
9·85	1	63·5	378	0·958	$(3{\cdot}1 \times 10^{-4})$
,,	1010	81·1	413	0·958	0·155
,,	2010	99·1	437	0·957	0·292
,,	2780	112·0	450	0·956	0·384
1·97	1	126·5	380	0·972	$(3{\cdot}1 \times 10^{-4})$
,,	1010	159·1	416	0·971	0·155
,,	1390	169·1	426	0·971	0·196
,,	2010	188·7	440	0·971	0·290
,,	2780	208·8	453	0·971	0·375
0·985	1	165·0	381	0·977	$(3{\cdot}1 \times 10^{-4})$
,,	1010	204·6	417	0·976	0·155
,,	2010	238·6	441	0·976	0·286
,,	2780	263·5	454	0·976	0·384
0·492	1	207·8	382	0·981	$(3{\cdot}1 \times 10^{-4})$
,,	1010	252·7	417	0·981	0·155
,,	2010	290·3	441	0·981	0·288
,,	2930	321·7	457	0·981	0·412

$\Delta V^1 = -8{\cdot}7$ c.c. mole^{-1}; $\Delta V^{3000} = -6{\cdot}2$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0008$ atm.$^{-1}$ c.c. mole^{-1}.

TABLE 5. p-*Nitrobenzoic acid.*

Concn. (10^{-3}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_\pm$	log K_a^P/K_a^1 (K_a at $P = 1$)
1·00	1	168·2	381	0·976	$(3{\cdot}3 \times 10^{-4})$
,,	1010	208·5	417	0·976	0·158
,,	2030	243·4	441	0·976	0·290
,,	2780	266·6	454	0·976	0·378
0·900	1	174·2	381	0·972	$(3{\cdot}3 \times 10^{-4})$
,,	1010	218·2	417	0·972	0·173
,,	2010	249·4	441	0·972	0·281
,,	2780	274·0	454	0·972	0·377
0·500	1	217·3	382	0·981	$(3{\cdot}6 \times 10^{-4})$
,,	1010	264·9	417	0·981	0·167
,,	2020	303·8	441	0·981	0·305
,,	2780	328·6	455	0·981	0·398
0·200	1	264·6	382	0·986	$(3{\cdot}0 \times 10^{-4})$
,,	1010	314·6	418	0·987	0·170
,,	1700	340·6	436	0·987	0·255
,,	2440	365·9	450	0·987	0·360

$\Delta V^1 = -9{\cdot}1$ c.c. mole^{-1}; $\Delta V^{3000} = -5{\cdot}9$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0011$ atm.$^{-1}$ c.c. mole^{-1}.

TABLE 6. 3,5-*Dimethyl*-4-*nitrobenzoic acid.*

Concn. (10^{-3}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_\pm$	log K_a^P/K_a^1 (K_a at $P = 1$)
0·769	1	101·6	381	0·983	$(7{\cdot}2 \times 10^{-5})$
,,	1050	131·1	417	0·983	0·173
,,	2020	155·8	441	0·983	0·299
,,	3000	180·2	457	0·982	0·422
0·769	1	106·0	381	0·983	$(8{\cdot}0 \times 10^{-5})$
,,	1010	136·0	416	0·983	0·170
,,	2030	163·2	441	0·982	0·308
,,	3000	188·7	457	0·982	0·431
1·00	1	89·7	381	0·982	$(7{\cdot}0 \times 10^{-5})$
,,	1010	116·4	416	0·982	0·176
,,	2010	139·1	441	0·981	0·303
,,	3000	160·5	457	0·981	0·418
1·15	1	86·8	381	0·982	$(7{\cdot}5 \times 10^{-5})$
,,	1010	112·6	416	0·982	0·173
,,	2010	133·8	441	0·981	0·295
,,	3000	153·5	457	0·981	0·401

$\Delta V^1 = -9{\cdot}5$ c.c. mole^{-1}; $\Delta V^{3000} = -6{\cdot}3$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0011$ atm.$^{-1}$ c.c. mole^{-1}.

The solutions in this series of experiments contained 10% (by volume) of ethanol.

TABLE 7. *Salicylic acid.*

Concn. (10^{-3}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_\pm$	log K_a^P/K_a^1 (K_a at $P = 1$)
10·81	1	103·8	376	0·948	$(1{\cdot}02 \times 10^{-3})$
,,	1010	127·8	410	0·949	0·127
,,	2010	150·2	434	0·948	0·241
,,	2780	167·5	447	0·948	0·328
5·41	1	137·1	377	0·956	$(1{\cdot}03 \times 10^{-3})$
,,	1010	167·5	412	0·956	0·127
,,	2010	195·1	436	0·957	0·243
,,	2850	217·6	451	0·957	0·337
2·16	1	189·0	379	0·966	$(1{\cdot}00 \times 10^{-3})$
,,	1010	226·6	414	0·966	0·127
,,	2030	260·6	438	0·966	0·246
,,	2850	276·0	447	0·966	0·303
1·08	1	233·5	380	0·972	$(1{\cdot}00 \times 10^{-3})$
,,	1010	275·8	415	0·973	0·130
,,	2030	310·6	439	0·973	0·241
,,	2780	335·8	453	0·974	0·339
0·541	1	275·2	381	0·978	$(0{\cdot}98 \times 10^{-3})$
,,	1010	319·5	416	0·979	0·130
,,	2010	354·5	440	0·979	0·248
,,	2780	377·0	453	0·980	0·339

$\Delta V^1 = -7{\cdot}2$ c.c. mole^{-1}; $\Delta V^{3000} = -5{\cdot}8$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0005$ atm.$^{-1}$ c.c. mole^{-1}.

and potassium benzoates in water and alcohol solutions the conductance results have a similar pattern to those of the alkali halides.

The term $\Lambda^P\rho_r/\Lambda^1$ for strong electrolyte salts in water is at first increased slightly, and then decreased with increasing pressure. This arises from the two competing factors—compression, which increases the number of ions per unit volume, and the decrease in mobility of the ions as the viscosity is increased.

However, in ethanol–water there is a steady and much larger decrease in the conductance of strong electrolyte salts over the whole pressure range. The decrease is not as great as that found for pure methanol solutions by Strauss[7] and Hamann and Strauss.[8] The marked difference in behaviour between aqueous and alcoholic solutions in this regard is ascribed to the greater relative increase in the viscosity of methanol or ethanol at high pressures.[8,9]

A further difference between the solvents water and ethanol–water is that with the latter the effect of pressure on conductance shows a significant dependence on the electrolyte

Series B at 25°; Ethanol–water as solvent.

TABLE 8. *Values of* $\Lambda^{P}\rho_r/\Lambda^{1}$ (*values of* Λ^{1} *in parentheses*).

P (atm.) Solution and concn. (m)		1	1020	1700	2380	3060
0·0110	HCl	(108·1)	0·988	0·976	0·966	0·954
0·00110	HCl	(107·1)	0·980	0·967	0·951	0·937
0·0110	NaCl	(38·5)	0·874	0·804	0·738	0·702
0·00110	NaCl	(43·7)	0·862	0·787	0·719	0·663
0·00022	NaCl	(50·1)	0·862	0·784	0·710	0·659
0·110	NaOBz	(16·5)	0·859	0·778	0·708	0·649
0·0220	NaOBz	(19·4)	0·844	0·761	0·688	0·628
0·00220	NaOBz	(22·0)	0·834	0·741	0·663	0·606
0·00044	NaOBz	(23·9)	0·813	0·706	0·609	0·537
0·01456	$NaO_2C{\cdot}C_6H_4Me$-*p*	(27·6)	0·850	0·763	0·695	0·635
0·00146	,,	(31·5)	0·832	0·741	0·663	0·596
0·00029	,,	(34·3)	0·820	0·712	0·618	0·539
0·02793	$NaO_2C{\cdot}C_6H_4{\cdot}OH$-*o*	(23·3)	0·843	0·758	0·689	0·627
0·00279	,,	(25·1)	0·836	0·750	0·680	0·615
Solvent blank (specific conductance)		($4{\cdot}2 \times 10^{-6}$)	1·013	1·040	1·078	1·123

TABLE 9. *Benzoic acid.*

Concn. (10^{-2}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_{\pm}$	$\log K_a^P/K_a^1$ (K_a at $P=1$)
11·1	1	0·503	86·2	0·940	($3{\cdot}3 \times 10^{-6}$)
,,	1020	0·696	86·0	0·928	0·272
,,	1700	0·840	85·8	0·922	0·433
,,	2380	1·004	85·2	0·913	0·588
,,	3060	1·200	84·8	0·904	0·738
2·20	1	0·991	86·7	0·959	($2{\cdot}7 \times 10^{-6}$)
,,	1020	1·380	85·8	0·953	0·294
,,	1700	1·638	85·1	0·948	0·447
,,	2380	1·947	84·2	0·943	0·601
,,	3060	2·293	83·7	0·938	0·748
0·220	1	2·73	86·7	0·978	($2{\cdot}2 \times 10^{-6}$)
,,	1020	3·65	85·6	0·974	0·265
,,	1700	4·33	84·7	0·972	0·425
,,	2380	5·09	83·6	0·969	0·580
,,	3060	5·86	83·0	0·966	0·710

$\Delta V^1 = -16{\cdot}1$ c.c. mole^{-1}; $\Delta V^{3000} = -12{\cdot}3$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0013$ atm.$^{-1}$ c.c. mole^{-1}.

TABLE 10. p-*Methylbenzoic acid.*

Concn. (10^{-3}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_{\pm}$	$\log K_a^P/K_a^1$ (K_a at $P=1$)
64·6	1	0·614	96·1	0·951	($2{\cdot}4 \times 10^{-6}$)
,,	1020	0·813	94·0	0·943	0·258
,,	1700	0·966	92·5	0·937	0·419
,,	2380	1·129	91·1	0·930	0·560
,,	3060	1·271	89·7	0·925	0·675
14·6	1	1·255	96·7	0·966	($2{\cdot}3 \times 10^{-6}$)
,,	1020	1·692	94·1	0·959	0·279
,,	1700	2·016	92·1	0·954	0·455
,,	2380	2·371	90·5	0·950	0·608
,,	3060	2·737	88·9	0·945	0·745
4·00	1	2·36	97·3	0·976	($2{\cdot}3 \times 10^{-6}$)
,,	1020	3·13	94·3	0·969	0·269
,,	1700	3·71	92·1	0·966	0·438
,,	2380	4·31	90·3	0·963	0·588
,,	3060	4·93	88·4	0·960	0·722

$\Delta V^1 = -16{\cdot}1$ c.c. mole^{-1}; $\Delta V^{3000} = -12{\cdot}3$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0013$ atm.$^{-1}$ c.c. mole^{-1}.

TABLE 11. *Salicylic acid.*

Concn. (10^{-2}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_{\pm}$	$\log K_a^P/K_a^1$ (K_a at $P=1$)
16·8	1	3·06	92·1	0·836	($1{\cdot}4 \times 10^{-4}$)
,,	1020	3·99	92·4	0·819	0·207
,,	1700	4·59	92·5	0·810	0·328
,,	2380	5·19	92·5	0·800	0·426
,,	3060	5·79	91·5	0·795	0·526
2·79	1	7·66	90·0	0·889	($1{\cdot}8 \times 10^{-4}$)
,,	1020	9·91	90·0	0·878	0·223
,,	1700	11·4	89·9	0·872	0·350
,,	2380	12·8	89·7	0·866	0·456
,,	3060	14·2	89·2	0·862	0·553

Concn. (10^{-2}m)	P (atm.)	$\Lambda\rho_r$	$\Lambda'\rho_r$	$\gamma_{\pm}$	$\log K_a^P/K_a^1$ (K_a at $P=1$)
0·369	1	18·9	88·5	0·937	($1{\cdot}9 \times 10^{-4}$)
,,	1020	23·8	88·5	0·930	0·230
,,	1700	27·0	88·2	0·927	0·361
,,	2380	30·3	87·7	0·924	0·485
,,	3060	33·0	87·1	0·921	0·590

$\Delta V^1 = -12{\cdot}7$ c.c. mole^{-1}; $\Delta V^{3000} = -9{\cdot}4$ c.c. mole^{-1}; Average $\Delta K = -0{\cdot}0011$ atm.$^{-1}$ c.c. mole^{-1}.

concentration. The changes in the pressure effects for aqueous solutions of uni-univalent electrolytes with concentrations below about 0·1m were very slight.[4] The concentration-dependence can be predicted approximately at any pressure by the Kohlrausch expression, $\Lambda = \Lambda_0 - Bc^{\frac{1}{2}}$. Hamann [2] showed that for sodium bromide in methanol the value of B calculated from the Debye–Hückel–Onsager equation was more than halved at a pressure of 3000 atm., whereas for alkali halides in water the decrease was calculated to be only about 20%. The larger decrease in B predicted for alcohol and alcohol–water solvents