for the chlorides of potassium, sodium and lithium. The logarithm of the ratio of the dissociation constants at infinite dilution from conductance data is $\bar{1}.441$. The agreement between the observed values of log $K_{A_xB_0}$ and those calculated by equation 4 is poorer for the points below 0.5 *M*.

Table II gives the dissociation constant of acetic acid in methyl and ethyl alcohol and ethylene glycol. The K_c/K_a ratios are in accord with the results for benzoic acid in the same solvents.

TABLE II

THE DISSOCIATION CONSTANT OF ACETIC ACID IN ALCOHOLS

T, 25°; solvent salt, LiCl

Electrolyte, mole/liter	CH_3OH $K_{A_xB_0}$	CH_3OH 10^{10} K_c	K_c/K_a	C_2H_5OH $K_{A_xB_0}$	C_2H_5OH 10^{10} K_c	K_c/K_a	$(CH_2OH)_2$ $K_{A_xB_0}$	$(CH_2OH)_2$ 10^{10} K_c
0	0.576	2.42	1.00	0.680	0.592		...	
0.05	.573	13.2	5.46	.680	9.40	15.9	0.447	101
.10	.580	21.9	9.05	...			...	

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[CONTRIBUTION FROM THE DEPARTMENT OF CHEMISTRY OF THE UNIVERSITY OF PENNSYLVANIA AND THE DEPARTMENT OF CHEMISTRY OF ILLINOIS INSTITUTE OF TECHNOLOGY]

The Dissociation Constants of Acids in Salt Solutions. III. Glycolic Acid

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The dissociation constant of glycolic acid has been determined in salt solutions using acetic, benzoic and the solvated proton as reference acids.

The equilibrium constants for the reaction

$$HG + B_0 \rightleftharpoons A_0 + G^- \qquad (1)$$

where HG represents glycolic acid and A_0 represents the reference acid, have been determined by the experimental method given in papers I[1] and II[2] of this series.

The results are summarized in Table I for the reference acids, benzoic, acetic and the solvated proton. The agreement between the experimental results is satisfactory. Extrapolation of the values for the equilibrium constant of equation (1) to infinite dilution yields 1.51 and 1.45×10^{-4} for the dissociation constant of glycolic acid on the basis of 6.32×10^{-5} for benzoic acid and 1.745×10^{-5} for acetic acid. The values in the literature for the dissociation constant of glycolic acid are 1.475[3] and 1.54×10^{-5}.[4]

TABLE I

DISSOCIATION CONSTANTS OF GLYCOLIC ACID AT 25°

Electrolyte moles/liter Reference acid →	$K_{A_xB_0}$ Benzoic	$K_c \times 10^4$ Benzoic	$K_{A_xB_0}$ Acetic	$K_c \times 10^4$ Acetic	$K_c \times 10^4$ Hydrochloric	K_c/K_a
Lithium chloride						
0.05	2.47	2.26[a]	8.40	2.21[b]	2.34	1.50[c]
.10	2.39	2.65	8.47	2.68	2.62	1.82
.20	2.64	3.03	8.52	2.79	2.77	1.89
.30	2.50	2.97	8.57	2.91	2.99	1.97
.40	2.60	3.36	8.59	3.15	3.03	2.14
.50	2.56	3.32	8.63	3.13	3.05	2.12
.60	2.54	3.30	8.64	3.12	3.12	2.12
.70	2.51	3.25	8.66	3.11	3.13	2.11
.80	..		8.61	3.08	3.19	2.09
.90	..		8.77	3.18	3.25	2.16
1.00	2.53	3.26	8.83	3.20	3.21	2.17
1.50	2.54	3.20	9.05	3.21	3.13	2.18
2.00	..		9.60	3.05	3.06	2.07
2.50			10.51	2.83	2.99	1.92
3.00			10.75	2.77	2.85	1.88
Sodium chloride						
0.05	2.43	2.22	8.36	2.12	2.04	1.44
.10	2.43	2.44	8.35	2.33	2.26	1.58
.20	2.52	2.42	8.42	2.51	2.58	1.70
.30	2.48	2.82	8.53	2.67	2.70	1.81
.40	2.52	2.97	8.51	2.76	2.71	1.87
.50	2.53	3.01	8.65	2.83	2.86	1.92
.60	2.52	2.99	8.52	2.76	2.94	1.87
.70	2.50	2.95	8.75	2.80	2.82	1.90
.80	2.53	2.97	8.82	2.74	2.84	1.86
.90	2.52	2.91	8.83	2.70	2.86	1.83
1.00	2.54	2.89	8.97	2.68	2.82	1.82
1.50	2.53	2.65	9.38	2.56	2.58	1.74
2.00	2.60	2.39	9.82	2.27	2.33	1.54
2.50	2.63	1.99	10.1	1.88	1.98	1.27
3.00	2.68	1.74	10.4	1.63	1.80	1.10
Potassium chloride						
0.05			8.29	2.15	2.20	1.46
.10			8.07	2.28	2.38	1.55
.20			8.39	2.43	2.55	1.65
.30			8.48	2.54	2.64	1.72
.40			8.53	2.60	2.68	1.76
.50			8.70	2.65	2.72	1.80
.60			8.75	2.66	2.72	1.80
.70			8.69	2.55	2.70	1.73
.80			8.79	2.54	2.68	1.72
.90			8.79	2.51	2.53	1.70
1.00			8.82	2.43	2.51	1.65
1.50			9.12	2.23	2.20	1.51
2.00			9.20	1.93	1.86	1.31
2.50			9.30	1.60	1.53	1.08
3.00			9.45	1.35	1.21	0.92

[a] Based on K_c values from paper I.[1] [b] Based on K_c values from paper II.[2] [c] K_c from column 5; $K_a = 1.475 \times 10^{-4}$.

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(1) M. Kilpatrick, THIS JOURNAL, **75**, 584 (1953).

(2) M. Kilpatrick and R. D. Eanes, *ibid.*, **75**, 586 (1953).

(3) L. F. Nims, *ibid.*, **58**, 987 (1936).

(4) J. Böeseken and H. Kalshoven, *Rec. trav. chim.*, **37**, 130 (1918).