COMPONENTS:	EVALUATOR:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Colin L. Young Department of Physical Chemistry, University of Melbourne. Parkville, Victoria, 3052 Australia. February 1986.

CRITICAL EVALUATION:

The system benzene + methane has been fairly studied extensively but there is still a need for a definitive study. The temperature and pressure ranges studied to date are as follows: Frolich et al.(1), 298 K up to 11 MPa, Schoch et al.(2), 311 K up to 36 MPa, Elbishlawi and Spencer (3) 338.7 K up to 33 MPa, Lin et al.(4) 421 K to 501 K up to 24 MPa, Savvina (5), 313 K to 423 K up to 38 Mpa, Ipatieff and Monroe (6), 373 K to 523 K up to 16 MPa, Sage et al. (7), 311 K to 377 K up to 21 MPa, Stepanova et al. (8) at 273 to 333 K up to 36 Mpa and Legret, Richon and Renon, 313.2 K up to 37 MPa.

The data of Frolich et al.(1) were presented in graphical form and are not of high accuracy. These data are classified as doubtful. It is possible to compare the data of Schoch et al., Savvina, Stepanova et al., Sage et al. and Legret et al. at approximately the same temperature (313.2 K). There are significant disagreements between the measurements (i.e. up to 0.05 for liquid mole fractions and 0.035 for the vapor mole fractions. Legret et al.'s data are broadly consisent with the K-values of Savvina. However, the data of Schoch et al., Stepanova et al. and Sage et al. are all broadly consisent with each other but deviate from Legret et al.'s data in the opposite direction to the data of Savvina. The data of Legret et al. show less scatter than the data of other workers in this temperature region and are probably the most accurate.

It is very difficult to establish which sets of data are the more reliable at high temperatures. The data of Savvina are in disagreement with the data of Lin et al. particularly as regards the gas phase composition. At high temperatures the data of Lin et al. are probably the most accurate. The older data of Ipatieff and Monroe are considerably less precise than the more recent data of Lin et al. and while detailed comparison is not possible it appears that the liquid mole fraction data of Ipatieff and Monroe are slightly too large.

Therefore, although there is a need for a definitive study of this system, the data of Lin et al. (4) and of Legret et al. (7) are classified as tentative at present.

References.

1. Frolich, P. K.; Tauch, E. J.; Hogan, J. J.; Peer, A. A.
Ind. Eng. Chem., 1931, *23*, 548.
2. Schoch, E. P.; Hoffmann, A. E.; Kasperik, A. S.; Lightfoot, J. H.; Mayfield, F. D.
Ind. Eng. Chem., 1940, *32*, 788.
3. Elbishlawi, M.; Spencer. J. R.,
Ind. Eng. Chem., 1951, *43*, 1811.
4. Lin, H.-M.; Sebastian, H. M.; Simnick, J. J.; Chao, K.-C.;
J. Chem. Eng. Data, 1979, *24*, 146.
5. Savvina, Ya. D.;
Tr. Vses. Nauchno-Issled. Inst. Prir. Gazov., 1962, *17*, 189.
6. Ipatieff, V. N.; Monroe, G. S.;
Ind. Eng. Chem., 1942, *14*, 166.
7. Sage, B. H.; Webster, D. C.; Lacey, W. N.;
Ind. Eng. Chem., 1936, *28*, 1045.
8. Stepanova, G. S.; Vybornova, Ya.I.; Velikovskii, A. S.;
Gaz. Delo. Nauchno-Teckniche, Sbornik., 1965, *9*, 3.
9. Legret, D.; Richon, D.; Renon, H.;
Am. Inst. Chem. Engnrs. J., 1981, *27*, 203.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Frolich, P.K.; Tauch, E.J.; Hogan, J.J.; Peer, A.A. *Ind. Eng. Chem.* 1931, *23*, 548-550
VARIABLES: Pressure,	PREPARED BY: C.L. Young

EXPERIMENTAL VALUES:

T/K	P/MPa	Solubility*	Mole fraction of methane in liquid,+ x_{CH_2}
298.15	1.0	5	0.018
	2.0	11	0.039
	3.0	18	0.062
	4.0	26	0.087
	5.0	34	0.111
	6.0	42	0.133
	7.0	51	0.157
	8.0	60	0.180
	9.0	70	0.204
	10.0	80	0.226
	11.0	90	0.248

* Data taken from graph in original article. Volume of gas measured at 101.325 kPa pressure and 298.15 K dissolved by unit volume of liquid measured under the same conditions.

\+ Calculated by compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Static equilibrium cell. Liquid saturated with gas and after equilibrium established samples removed and analysed by volumetric method. Allowance was made for the vapor pressure of the liquid and the solubility of the gas at atmospheric pressure. Details in source.

SOURCE AND PURITY OF MATERIALS:

Stated that the materials were the highest purity available. Purity 98 to 99 mole per cent.

ESTIMATED ERROR:

$\delta T/K = \pm 0.1$; $\delta x_{CH_4} = \pm 5\%$

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8 2. Benzene; C_6H_6; [71-43-2]	Sage, B. H.; Webster, D. C.; Lacey, W. N. *Ind. Eng. Chem.* 1936, *28*, 1045-1047.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K (T/°F)	p/psi	P/MPa †	Mass fraction of methane	Mole fraction † of methane, x_{CH_4}
310.9	1448	9.983	0.0431	0.1797
(100)	2390	16.48	0.0757	0.2849
344.3	1456	10.04	0.0431	0.1797
(160)	2354	16.23	0.0757	0.2849
377.6	1432	9.873	0.0431	0.1797
(220)	2310	15.93	0.0757	0.2849

† calculated by compiler.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
PVT cell charged with mixture of known composition. Pressure measured with pressure balance. Bubble point determined from the discontinuity in the pressure, volume isotherm. Details of apparatus in ref. (1).	1. Prepared from natural gas, treated for removal of higher alkanes, carbon dioxide and water vapor. Final purity 99.9 mole per cent. 2. Thiophene-free sample.
	ESTIMATED ERROR: $\delta T/K = \pm 0.1$; $\delta P/MPa = \pm 0.02$; $\delta x_{CH} = \pm 0.002$ (estimated by compiler).
	REFERENCES: 1. Sage, B. H.; Lacey, W. N. *Ind. Eng. Chem.* 1934, *26*, 103.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene, C_6H_6; [71-43-2]	Schoch, E. P.; Hoffmann, A. E.; Kasperik, A. S.; Lightfoot, J. H.; Mayfield, F. D. *Ind. Eng. Chem.* 1940, *32*, 788-791.
VARIABLES: Pressure	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K	P/MPa	Mole fraction of methane in liquid, x_{CH_4}
311.08	10.51	0.1946
	13.71	0.2453
	17.33	0.3025
	20.77	0.3550
	21.46	0.3642
	24.24	0.4075
	28.13	0.4685
	31.48	0.5340
	35.08	0.6285
	35.56	0.6671
	35.84	0.7601

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Rocking equilibrium cell fitted with stirring paddles. Temperature measured with Beckmann thermometer calibrated against standard platinum resistance thermometer. Pressure measured with Bourdon gauge. Details in source. Samples injected into cell using mercury displacement, equilibrium pressure measured. Bubble point determined from change in slope of pressure-volume isotherms. Details in source.

SOURCE AND PURITY OF MATERIALS:

1. Crude sample treated for removal of oxygen, carbon dioxide, water vapor and liquids condensible at 200 K. Distilled.
2. Sample distilled, details in source.

ESTIMATED ERROR:

$\delta T/K = \pm 0.01$; $\delta P/MPa = \pm 0.5\%$;
$\delta x_{CH_4} = \pm 0.001$ (estimated by compiler).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8]	Ipatieff, V. N.; Monroe, G. S.
2. Benzene; C_6H_6; [71-43-2]	*Ind. Eng. Chem. Anal. Edn.*
	1942, *14*, 166-171.
VARIABLES:	PREPARED BY:
	C. L. Young

EXPERIMENTAL VALUES:

T/K	T/°C	P/atm	P/MPa	Solubility[a]	Mole fraction of methane x_{CH_4}
373	100	31	3.1	1.3	0.060
		71	7.2	3.4	0.142
		99	10.0	4.8	0.189
		103	10.4	5.1	0.199
398	125	34	3.4	1.35	0.062
		73	7.4	3.4	0.142
		103	10.4	5.0	0.196
		113	11.4	6.0	0.188
423	150	39	4.0	1.4	0.064
		80	8.1	3.65	0.151
		109	11.0	5.7	0.217
		122	12.4	7.0	0.254
448	175	43	4.4	1.55	0.070
		87	8.8	4.0	0.163
		119	12.1	6.7	0.246
		132	13.4	8.2	0.285
473	200	50	5.1	1.75	0.077
		96	9.7	4.6	0.183
		134	13.6	8.5	0.293
		142	14.4	9.6	0.319

[a] g of methane per 100 g benzene.

(cont.)

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
Rotating bomb of 3.5 dm^3 capacity. Pressure measured with a Bourdon gauge and temperature measured with thermocouple. Methane in both liquid and gaseous samples determined by stripping out benzene at low temperature and estimating methane volumetrically. Benzene estimated gravimetrically.	1. Carbide and Carbon Chemicals Corp. sample, containing about 96.0 mole per cent methane and 4.0 mole per cent nitrogen. 2. Baker C.P. thiophene-free sample n_D^{20} 1.5012.
	ESTIMATED ERROR:
	$\delta T/K = \pm 0.5$; $\delta x_{CH_4} = \pm 5\%$ (estimated by compiler).
	REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8]	Ipatieff, V. N.; Monroe, G. S.
	Ind. Eng. Chem. Anal. Edn.
2. Benzene; C_6H_6; [71-43-2]	1942, *14*, 166-171.

EXPERIMENTAL VALUES:

T/K	T/°C	*P*/atm	*P*/MPa	Solubility[a]	Mole fraction of methane x_{CH_4}
498	225	58	5.9	2.1	0.093
		104	10.5	5.55	0.213
		153	15.5	13.2	0.391
		153	15.5	11.9	0.367
523	250	71	7.2	2.7	0.116
		117	11.9	7.9	0.278
458	185	91	9.2	4.2	0.170
338	65	91	9.2	4.0	0.163
488	215	101	10.2	5.1	0.199
393	120	101	10.2	5.0	0.196
		101	10.2	4.9	0.193
513	240	111	11.2	6.5	0.240
428	155	111	11.2	5.9	0.223
395	122	111	11.2	5.9	0.223
525	252	121	12.3	9.0	0.305
450	177	121	12.3	6.9	0.252
420	147	121	12.3	6.9	0.252
468	195	131	13.3	8.1	0.283
445	172	131	13.3	8.1	0.283
481	208	141	14.3	9.6	0.319
471	198	141	14.3	9.5	0.316

[a] g of methane per 100 g benzene.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Elbishlawi, M.; Spencer, J.R. *Ind. Eng. Chem.* 1951, *43*, 1811-5
VARIABLES: Pressure	PREPARED BY: C.L. Young

EXPERIMENTAL VALUES:

T/K	P/MPa	Mole fraction of methane in liquid, x_{CH_4}	in vapor y_{CH_4}
338.71	0.689	0.014	0.925
	1.034	0.022	0.947
	1.379	0.030	0.957
	2.758	0.060	0.977
	4.137	0.090	0.980
	5.516	0.118	0.980
	6.895	0.146	0.977
	10.34	0.213	0.974
	13.79	0.278	0.964
	17.24	0.340	0.963
	20.68	0.400	0.956
	24.13	0.455	0.950
	27.58	0.514	0.935
	28.96	0.538	0.923
	30.34	0.565	0.900
	31.72	0.603	0.865
	33.09	0.695	0.775

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Equilibrium cell fitted with vapor sampling port. Calibrated mercury injection pump. Details in source. Components charged into cell, pressure raised by injection of mercury. Cell rocked to establish equilibrium. Portions of mercury withdrawn and curve relating change in volume to pressure obtained. Bubble point established from change in slope. Vapor phase sample analysed. Details in source.

SOURCE AND PURITY OF MATERIALS:

1. Phillips Petroleum Co. pure sample purity 99 mole per cent impurities ethane (~0.5 mole per cent) and nitrogen (~0.3 mole per cent) trace of carbon dioxide.
2. Commercial sample purified by distillation.

ESTIMATED ERROR:

$\delta T/K = \pm 0.7$; $\delta P/MPa = \pm 0.01$;
δx_{CH_4}, $\delta y_{CH_4} = \pm 0.001$.
(estimated by compiler).

REFERENCES:

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Savvina, Ya. D. *Tr. Vses. Nauchno-Issled. Inst. Prirodn. Gazov.*, 1962, *17/25*, 185-196.
VARIABLES:	PREPARED BY:
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K (t/ C)	P/kgcm^{-3}	P/Mpa	K-value methane	K-value benzene
313.2 (40)	20	1.96	17.94	0.013
	50	4.90	7.80	0.010
	100	9.81	4.38	0.012
	150	14.7	3.18	0.017
	200	19.6	2.59	0.024
	250	24.5	2.21	0.035
	285	27.9	2.02	0.053
	300	29.4	1.95	0.065
	320	31.4	1.83	0.105
	350	34.3	1.61	0.193
	370	36.3	1.37	0.359
	381	37.4	1.04	0.854
333.2 (60)	20	1.96	18.15	0.021
	50	4.90	8.08	0.015
	100	9.81	4.47	0.020
	150	14.7	3.32	0.028
	200	19.2	2.65	0.044
	250	24.5	2.24	0.059
	280	27.5	2.06	0.082
	300	29.4	1.94	0.101
	320	31.4	1.83	0.130
	340	33.3	1.61	0.224
	350	34.3	1.44	0.324
	362	35.5	1.13	0.703

AUXILIARY INFORMATION

METHOD APPARATUS/PROCEDURE:
Values appear to be determined using apparatus described in ref.(1).

SOURCE AND PURITY OF MATERIALS:
No details given

ESTIMATED ERROR:

REFERENCES:
1. Savvina, Ya. D.; Velikovskii, A. S.; *Tr. Vses. Nauchno-Issled. Inst. Prirodn. Gazov.*, 1962, *17/25*, 163.

COMPONENTS:	EVALUATOR:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Savvina, Ya. D. *Tr. Vses. Nauchno-Issled. Inst. Prirodn. Gazov.*, 1962, *17/25*, 185-196.

CRITICAL EVALUATION:

T/K (t/ C)	P/kgcm^{-3}	P/Mpa	K-value methane	K-value benzene
353.2	20	1.96	18.63	0.032
(80)	50	4.90	8.57	0.024
	100	9.81	4.58	0.030
	150	14.7	3.39	0.042
	200	19.6	2.72	0.057
	230	22.6	2.42	0.082
	250	24.5	2.27	0.087
	270	26.5	2.10	0.115
	300	29.4	1.88	0.147
	320	31.4	1.67	0.202
	340	33.3	1.31	0.473
	343	33.6	1.05	0.862
373.2	20	1.96	19.77	0.054
(100)	50	4.90	8.80	0.036
	100	9.81	4.67	0.040
	150	14.7	3.43	0.054
	200	19.6	2.69	0.074
	230	22.6	2.35	0.100
	250	24.5	2.19	0.116
	270	26.5	2.00	0.147
	300	29.4	1.72	0.214
	315	30.9	1.48	0.345
	323	31.7	1.17	0.658
393.2	20	1.96	20.46	0.082
(120)	50	4.90	8.82	0.052
	100	9.81	4.85	0.059
	150	14.7	3.37	0.072
	200	19.6	2.56	0.099
	230	22.6	2.25	0.135
	250	24.5	2.08	0.161
	270	26.5	1.90	0.200
	290	28.4	1.59	0.320
	300	29.4	1.36	0.480
	305	29.9	1.07	0.850
423.2	20	1.96	21.00	0.123
(150)	50	4.90	8.33	0.084
	100	9.81	4.36	0.092
	150	14.7	3.26	0.114
	200	19.6	2.42	0.145
	230	22.6	2.08	0.199
	250	24.5	1.80	0.286
	270	26.5	1.15	0.757

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Lin, H-M.; Sebastian, H.M.; Simnick, J.J.; Chao, K-C. *J. Chem. Engng. Data*, 1979, *24*, 146-9.
VARIABLES:	PREPARED BY:
Temperature, pressure	C. L. Young

EXPERIMENTAL VALUES:

T/K	p/atm	p/MPa	Mole fraction of methane in liquid, x_{CH_4}	in gas, y_{CH_4}
421.1	19.61	1.987	0.0252	0.6516
	33.01	3.345	0.0502	0.7630
	46.69	4.731	0.0823	0.7994
	99.50	10.082	0.1739	0.8208
	148.29	15.025	0.2651	0.8140
	200.68	20.334	0.3754	0.7809
	239.46	24.263	0.4947	0.7222
461.9	29.82	3.022	0.0346	0.5285
	50.50	5.117	0.0762	0.6439
	99.63	10.095	0.1801	0.7120
	136.79	13.860	0.2609	0.7250
	160.87	16.300	0.3179	0.7163
501.2	50.57	5.124	0.0648	0.4485
	72.01	7.296	0.1145	0.5326
	100.24	10.157	0.1806	0.5715
	125.36	12.702	0.2464	0.5564
	134.89	13.668	0.2842	0.5418
	143.67	14.557	0.3243	0.5153

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:

Flow apparatus with both liquid and gas components continually passing into a mixing tube and then into a cell in which phases separated under gravity. Liquid sample removed from bottom of cell and vapor sample from top of cell. Composition determined by gas chromatography. Details in source and ref. (1).

SOURCE AND PURITY OF MATERIALS:

1. Matheson sample with purity better than 99 mole per cent.
2. Mallinckrodt Co. sample, Analytical reagent with 0.5°C boiling point range.

ESTIMATED ERROR:

$\delta T/K = \pm 0.2$; $\delta p/MPa \leq \pm 0.03$;
δx_{CH_4}, $\delta y_{CH_4} = \pm 2\%$

REFERENCES:

1. Simnick, J.J.; Lawson, C.C.; Lin, H-M.; Chao, K-C. *Am. Inst. Chem. Engnrs. J.*, 1977, *23*, 469.

COMPONENTS:	ORIGINAL MEASUREMENTS:
1. Methane; CH_4; [74-82-8] 2. Benzene; C_6H_6; [71-43-2]	Legret, D.; Richon, D.; Renon, H. *J. Chem. Engng. Data* 1982, *27*, 165-169.
VARIABLES:	PREPARED BY: C. L. Young

EXPERIMENTAL VALUES:

T/K = 313.2

$10^{-5}p$/Pa	Mole fraction of methane in liquid, x_{CH_4}	in vapor, y_{CH_4}
36.6	0.0986	0.987
101.0	0.210	0.987[a]
	0.212	-
148.7	0.287	0.986
	0.288	-
199.8	0.369	0.984[a]
	0.367	-
250.3	0.442	0.977
	0.439	-
310.4	0.521	0.951
351.1	0.593	0.883
	0.586	-
368.7	0.661	0.836
	-	0.840
374.2	0.688	0.801
	-	0.805

[a] interpolated values.

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE:	SOURCE AND PURITY OF MATERIALS:
High pressure static cell fitted with magnetic stirrer. Pressure measured with transducer calibrated by comparison with Heise gauges which were checked periodically calibrated against a dead weight tester. Temperature measured with K type iron-constantan thermocouples. Sampling microcell used and samples analysed using gas chromatography. Details in ref. (1).	1. Air-Gas sample, purity at least 99.95 volume per cent. 2. Merck sample, stated purity by GC of 99.7 per cent.
	ESTIMATED ERROR: δT/K = ±0.25; δp/MPa = ±0.1; δx_{CH_4} = ±0.01; δy_{CH_4} = ±0.005.
	REFERENCES: 1. Legret, D.; Richon, D.; Renon, H. *Am. Inst. Chem. Eng. J.* 1981, *27*, 203.

COMPONENTS:	EVALUATOR:
1. Methane; CH_4; [74-82-8] 2. Methylbenzene; C_7H_8; [108-88-3]	Colin L. Young Department of Physical Chemistry, University of Melbourne. Parkville, Victoria, 3052 Australia. February 1986.

CRITICAL EVALUATION:

This system has been studied by several workers and data are available for the temperature range 188.7 K to 543.2 K. At the higher temperatures the data of Chao and coworkers (1) are thought to be reliable. These workers have recently made extensive studies of gas solubilities of hydrogen, methane and carbon dioxide in numerous solvents and, in general, their data are reliable. The data of Savvina and Velikovski (2,3) are in significant disagreement with those of Chao and coworkers (1). As pointed out by the latter workers the mole fraction of toluene in the vapour phase in Savvina data at 423.2 K are probably about one order of magnitude too small.

The low temperature range has been studied by Kobayashi and coworkers (4,5). The data of Chang and Kobayashi (4) are thought to be unreliable and are classified as doubtful. More recent work by Kobayashi and coworkers (5) has indicated considerable error in the earlier work particularly at pressures above 10 MPa which has been attributed to sampling and/or analysis errors. The data of Kobayashi and coworkers (5) for the temperature range 188.7 K to 277.6 K are classified as tentative. Legret, Richon and Renon (6) have made careful measurements at 313.2 K on this system. Comparison of their data with that of Savvina (2) and Elbishlawi and Spencer (7) suggests that the data of Elbishlawi and Spencer is inaccurate and the low temperature data of Savvina is, at least, consistent with the data of Legret, Richon and Renon (6).

Therefore the data of Chao and coworkers (1), Legret, Richon and Renon (6) and Kobayashi and coworkers are classified as tentative. The data of Savvina (2) is thought to be of reasonable accuracy at lower temperatures but inaccurate at the higher temperatures. The data of Chang and Kobayashi (4) and Elbishlawi and Spencer (7) are classified as doubtful.

References.

1. Lin, H.-M.; Sebastian, H. M.; Simnick, J. J.; Chao, K.-C.;
J. Chem. Eng. Data, 1979, *24*, 146.
2. Savvina, Ya. D.
Tr. Vses. Nauchno-Issled. Inst. Prir. Gazov., 1962, *17*, 189.
3. Savvina, Ya. D.; Velikovski, A. S.;
Zh. Fiz. Khim., 1956, *30*, 1596.
4. Chang, H. L.; Kobayashi, R.
J. Chem. Eng. Data, 1967, *12*, 517.
5. Lin, Y. N.; Hwang, S. C.; Kobayashi, R.;
J. Chem. Eng. Data, 1978, *23*, 231.
6. Elbishlawi, M.; Spencer. J. R.,
Ind. Eng. Chem., 1951, *43*, 1811.
7. Legret, D.; Richon, D.; Renon, H.;
Am. Inst. Chem. Engnrs. J., 1981, *27*, 203.