TABLE 5 RESULT OF SYNGAS OPERATION

RUN NO. 10112-15
CATALYST CO/TH +UCC-101,#10252-46C 80 CC 37.2GM (52.1 AFTER RUN +15 G)
FEED H2:CO:ARGON OF 50:50: 0 @ 400 CC/MN OR 300 GHSV

RUN & SAMPLE NO.	10112-15-06	112-15-07	112-15-08	112-15-09
FEED H2:CO:AR	50:50: 0	50:50: 0	50:50: 0	50:50: 0
HRS ON STREAM	146.5	163.5	170.5	187.5
PRESSURE,PSIG	302	300	302	301
TEMP. C	269	270	269	269
FEED CC/MIN	400	400	400	400
HOURS FEEDING	7.00	24.00	7.00	24.00
EFFLNT GAS LITER	94.55	326.45	94.30	328.00
GM AQUEOUS LAYER	14.55	49.89	14.55	49.89
GM OIL	6.71	23.01	5.88	20.15
MATERIAL BALANCE				
GM ATOM CARBON %	100.50	101.89	98.59	99.45
GM ATOM HYDROGEN %	100.39	101.30	97.96	99.16
GM ATOM OXYGEN %	99.42	100.08	99.44	99.78
RATIO CHX/(H2O+CO2)	1.0334	1.0559	0.9737	0.9896
RATIO X IN CHX	2.4875	2.4874	2.5214	2.5200
USAGE H2/CO PRODT	1.6872	1.6911	1.6860	1.7093
RATIO CO2/(H2O+CO2)	0.2121	0.2136	0.2099	0.2017
K SHIFT IN EFFLNT	0.15	0.15	0.14	0.14
CONVERSION				
ON CO %	40.12	40.43	38.74	38.31
ON H2 %	66.85	67.26	66.47	65.97
ON CO+H2 %	53.48	53.81	52.56	52.12
PRDT SELECTIVITY,WT %				
CH4	22.57	22.63	24.24	24.15
C2 HC'S	2.95	2.99	3.23	3.23
C3H8	3.05	2.98	3.15	3.14
C3H6=	2.16	2.22	2.34	2.34
C4H10	2.33	2.22	2.37	2.32
C4H8=	3.37	3.29	3.72	3.56
C5H12	2.42	2.38	2.41	2.43
C5H10=	3.29	3.60	3.68	3.84
C6H14	2.81	2.72	2.69	2.72
C6H12= & CYCLO'S	2.02	2.06	2.09	2.07
C7+ IN GAS	13.06	13.88	12.88	13.28
LIQ HC'S	39.97	39.03	37.20	36.92
TOTAL	100.00	100.00	100.00	100.00

SUB-GROUPING				
C1 -C4	36.43	36.33	39.05	38.74
C5 -420 F	40.39	41.04	39.43	39.90
420-700 F	17.06	16.65	15.90	15.78
700-END PT	6.13	5.98	5.62	5.58
C5+-END PT	63.57	63.67	60.95	61.26
ISO/NORMAL MOLE RATIO				
C4	0.1292	0.1370	0.1316	0.1327
C5	0.2615	0.2540	0.2620	0.2473
C6	0.4047	0.4006	0.3968	0.3892
C4=	0.0000	0.0000	0.0000	0.0000
PARAFFIN/OLEFIN RATIO				
C3	1.3523	1.2831	1.2830	1.2776
C4	0.6684	0.6503	0.6155	0.6289
C5	0.7168	0.6438	0.6376	0.6146
LIQ HC COLLECTION				
PHYS. APPEARANCE		CLDY GR		CLDY GR
DENSITY		0.747		0.769
N, REFRACTIVE INDEX		1.4316		1.4319
SIMULT'D DISTILATN				
10 WT % @ DEG F		291		293
16		318		320
50		462		460
84		694		692
90		755		754
RANGE(16-84 %)		376		372
WT % @ 420 F	42.00	42.00	42.14	42.14
WT % @ 700 F	84.67	84.67	84.89	84.89

TABLE 6 RESULTS OF SYNGAS OPERATION

RUN NO. 10225-16
CATALYST CO/TH -UCC-103 11684-120 80 CC 37.5GM (37.8AFTER RUN =.1 G)
FEED H2:CO:ARGON OF 50:50: 0 @ 400 CC/MIN OR 300 GHSV

RUN & SAMPLE NO.	10225-16-01	225-16-02	225-16-03	225-16-04	225-16-05
FEED H2:CO:AR	50:50: 0	50:50: 0	50:50: 0	50:50: 0	50:50: 0
HRS ON STREAM	19.5	27.0	43.0	51.0	67.5
PRESSURE,PSIG	295	292	296	295	291
TEMP. C	272	272	272	272	272
FEED CC/MIN	400	400	400	400	400
HOURS FEEDING	19.50	7.50	25.50	8.00	24.50
EFFLNT GAS LITER	170.65	61.90	197.60	68.25	210.90
GM AQUEOUS LAYER	48.67	18.58	58.21	21.05	64.46
GM OIL	26.00	10.24	32.09	10.70	32.76
MATERIAL BALANCE					
GM ATOM CARBON %	93.54	89.04	89.44	89.51	89.57
GM ATOM HYDROGEN %	98.20	94.85	95.19	96.02	97.06
GM ATOM OXYGEN %	96.79	91.01	90.25	91.90	91.26
RATIO CHX/(H2O+CO2)	0.9342	0.9578	0.9820	0.9478	0.9627
RATIO X IN CHX	2.5007	2.4683	2.4750	2.4583	2.4720
USAGE H2/CO PRODT	1.2848	1.3391	1.3878	1.4202	1.4456
RATIO CO2/(H2O+CO2)	0.4051	0.3725	0.3517	0.3231	0.3153
K SHIFT IN EFFLNT	0.27	0.24	0.21	0.18	0.18
CONVERSION					
ON CO %	70.87	69.40	67.12	64.87	64.48
ON H2 %	88.85	88.63	88.11	87.64	87.28
ON CO+H2 %	80.08	79.32	77.94	76.65	76.33
PROT SELECTIVITY,WT %					
CH4	20.71	19.59	20.03	19.26	19.89
C2 HC'S	3.61	3.36	3.42	3.34	3.34
C3H8	4.77	4.19	4.06	3.91	4.00
C3H6=	1.63	1.54	1.49	1.58	1.53
C4H10	4.00	3.62	3.53	3.53	3.54
C4H8=	1.23	2.59	2.59	2.66	2.63
C5H12	4.75	4.33	4.26	4.22	4.30
C5H10=	1.95	1.84	1.82	1.88	1.88
C6H14	5.92	5.39	5.26	5.32	5.36
C6H12= & CYCLO'S	1.55	1.45	1.50	1.51	1.59
C7+ IN GAS	9.70	9.25	8.92	9.61	9.00
LIQ HC'S	40.19	42.86	43.13	43.17	42.92
TOTAL	100.00	100.00	100.00	100.00	100.00

SUB-GROUPING					
C1 -C4	35.95	34.88	35.12	34.29	34.94
C5 -420 F	47.75	45.76	45.40	46.14	45.60
420-700 F	15.22	17.30	17.41	17.16	17.07
700-END PT	1.08	2.06	2.07	2.40	2.39
C5+-END PT	64.05	65.12	64.88	65.71	65.06
ISO/NORMAL MOLE RATIO					
C4	0.0244	0.0236	0.0242	0.0246	0.0238
C5	0.1079	0.1050	0.1078	0.1022	0.1078
C6	0.3000	0.2989	0.3064	0.3002	0.3087
C4=	0.5027	0.1711	0.1739	0.1675	0.1729
PARAFFIN/OLEFIN RATIO					
C3	2.7932	2.6012	2.5963	2.3579	2.4957
C4	3.1539	1.3454	1.3154	1.2785	1.3012
C5	2.3633	2.2937	2.2711	2.1800	2.2281
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))	0.7776		0.8044		0.8047
RATIO CH4/(1-A)**2	4.1874		5.2355		5.2161
LIQ HC COLLECTION					
PHYS. APPEARANCE	CLR OIL		CLR OIL		CLR OIL
DENSITY	0.748		0.750		0.751
N, REFRACTIVE INDEX	1.4176		1.4200		1.4198
SIMULT'D DISTILATN					
10 WT % @ DEG F	255		258		258
16	263		288		290
50	391		410		410
84	544		586		590
90	599		642		647
RANGE(16-84 %)	281		298		300
WT % @ 420 F	59.44	54.83	54.83	54.67	54.67
WT % @ 700 F	97.32	95.20	95.20	94.43	94.43

TABLE 7 RESULT OF SYNGAS OPERATION

RUN NO. 10225-16
CATALYST CO/TH UCC-103 11684-12C 80CC 37.9G (37.8 AFTER RUN -.1 G)
FEED H2:CO:ARGON OF 50:50: 0 @ 400 CC/MN OR 300 GHSV

RUN & SAMPLE NO.	10225-16-06	225-16-07	225-16-09	225-16-11	225-16-12
FEED H2:CO:AR	50:50: 0	50:50: 0	50:50: 0	50:50: 0	50:50: 0
HRS ON STREAM	74.0	91.5	116.3	139.5	144.8
PRESSURE,PSIG	298	298	302	299	298
TEMP. C	272	272	272	272	272
FEED CC/MIN	400	400	400	400	400
HOURS FEEDING	6.50	24.00	24.75	23.25	5.25
EFFLNT GAS LITER	57.15	210.80	241.24	228.23	48.65
GM AQUEOUS LAYER	17.49	64.59	67.53	64.00	14.54
GM OIL	8.63	31.88	31.83	25.61	6.54
MATERIAL BALANCE					
GM ATOM CARBON %	90.73	91.68	97.03	94.14	92.13
GM ATOM HYDROGEN %	97.63	99.14	101.91	99.21	98.14
GM ATOM OXYGEN %	92.88	91.90	98.79	98.08	94.87
RATIO CHX/(H2O+CO2)	0.9525	0.9951	0.9619	0.9129	0.9383
RATIO X IN CHX	2.4665	2.4599	2.5047	2.5215	2.4844
USAGE H2/CO PRODT	1.4618	1.4893	1.4819	1.5121	1.5368
RATIO CO2/(H2O+CO2)	0.3037	0.2966	0.3025	0.2805	0.2666
K SHIFT IN EFFLNT	0.16	0.16	0.16	0.14	0.13
CONVERSION					
ON CO %	62.91	63.38	60.19	57.26	58.13
ON H2 %	87.08	87.46	86.21	85.15	86.00
ON CO+H2 %	75.44	75.89	73.52	71.57	72.51
PRDT SELECTIVITY,WT %					
CH4	19.64	19.43	21.42	22.06	20.57
C2 HC'S	3.31	3.28	3.61	3.79	3.44
C3H8	3.94	3.85	4.35	4.42	4.16
C3H6=	1.62	4.59	1.68	1.80	1.72
C4H10	3.53	3.41	3.81	4.00	3.69
C4H8=	2.70	2.54	2.67	2.93	2.71
C5H12	4.34	4.21	3.98	4.25	3.88
C5H10=	1.97	1.81	1.79	2.12	1.80
C6H14	5.31	5.17	5.10	5.36	5.00
C6H12= & CYCLO'S	1.55	1.49	1.02	1.52	1.02
C7+ IN GAS	9.20	8.75	10.25	10.55	10.32
LIQ HC'S	42.87	41.47	40.33	37.18	41.69
TOTAL	100.00	100.00	100.00	100.00	100.00

SUB-GROUPING					
C1 -C4	34.75	37.10	37.53	39.01	36.29
C5 -420 F	45.40	43.71	43.80	43.64	44.41
420-700 F	16.90	16.34	15.81	14.24	16.25
700-END PT	2.95	2.85	2.86	3.11	3.05
C5+-END PT	65.25	62.90	62.47	60.99	63.71
ISO/NORMAL MOLE RATIO					
C4	0.0227	0.0252	0.0000	0.0225	0.0000
C5	0.1017	0.1052	0.0982	0.0967	0.0928
C6	0.2973	0.2938	0.3312	0.3091	0.3180
C4=	0.1696	0.1751	0.1796	0.1756	0.1749
PARAFFIN/OLEFIN RATIO					
C3	2.3185	0.8011	2.4755	2.3372	2.3095
C4	1.2618	1.2935	1.3759	1.3183	1.3165
C5	2.1409	2.2600	2.1594	1.9477	2.0919
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))		0.8075	0.8098	0.8111	
RATIO CH4/(1-A)**2		5.2449	5.9207	6.1820	
LIQ HC COLLECTION					
PHYS. APPEARANCE		CLR OIL	CLR OIL	CLR OIL	
DENSITY		0.748	0.750	0.753	
N, REFRACTIVE INDEX		1.4201	1.4206	1.4208	
SIMULT'D DISTILATN					
10 WT % @ DEG F		258	257	258	
16		290	291	293	
50		411	411	411	
84		601	601	619	
90		662	665	678	
RANGE(16-84 %)		311	310	326	
WT % @ 420 F	53.71	53.71	53.71	53.33	53.71
WT % @ 700 F	93.12	93.12	92.92	91.64	92.69

TABLE 8 RESULT OF SYNGAS OPERATION

RUN NO. 10225-16
CATALYST CO/TH UCC-103 11684-12C 80CC 37.9GM(37.8 AFTER RUN -.1 G)
FEED H2:CO:ARGON OF 50:50: 0 @ 400 CC/MN OR 300 GHSV

RUN & SAMPLE NO.	10225-16-13	225-16-14	225-16-15	225-16-16	225-16-17
FEED H2:CO:AR	50:50: 0	50:50: 0	50:50: 0	50:50: 0	50:50: 0
HRS ON STREAM	163.5	171.0	187.5	195.0	211.5
PRESSURE,PSIG	296	294	302	302	292
TEMP. C	272	272	272	272	272
FEED CC/MIN	400	400	400	400	400
HOURS FEEDING	24.00	7.50	24.00	7.50	24.00
EFFLNT GAS LITER	235.88	68.85	218.65	66.10	217.70
GM AQUEOUS LAYER	66.49	20.80	66.55	20.96	67.09
GM OIL	29.91	9.64	30.84	9.25	29.59
MATERIAL BALANCE					
GM ATOM CARBON %	96.36	91.34	91.69	88.62	89.89
GM ATOM HYDROGEN %	102.31	98.64	99.21	96.76	98.39
GM ATOM OXYGEN %	97.25	92.84	92.58	90.75	92.04
RATIO CHX/(H2O+CO2)	0.9800	0.9654	0.9796	0.9508	0.9506
RATIO X IN CHX	2.4867	2.4649	2.4686	2.4574	2.4778
USAGE H2/CO PRODT	1.5507	1.5724	1.5728	1.5821	1.5800
RATIO CO2/(H2O+CO2)	0.2679	0.2506	0.2536	0.2421	0.2468
K SHIFT IN EFFLNT	0.14	0.12	0.12	0.12	0.12
CONVERSION					
ON CO %	57.84	57.96	58.76	58.27	58.11
ON H2 %	85.15	85.59	86.12	86.18	85.62
ON CO+H2 %	71.91	72.30	72.98	72.83	72.49
PRDT SELECTIVITY,WT %					
CH4	20.50	19.71	19.63	19.23	20.14
C2 HC'S	3.46	3.33	3.31	3.29	3.45
C3H8	4.20	3.96	4.23	4.01	4.06
C3H6=	1.75	1.67	1.97	1.89	1.62
C4H10	3.85	3.61	4.03	3.55	3.64
C4H8=	2.78	2.65	2.93	2.75	2.65
C5H12	4.20	3.89	3.93	4.13	4.26
C5H10=	1.94	1.85	1.30	2.08	1.94
C6H14	5.28	5.08	5.17	5.06	5.18
C6H12= & CYCLO'S	1.50	1.43	1.41	1.40	1.48
C7+ IN GAS	10.81	10.09	10.15	10.74	10.07
LIQ HC'S	39.72	42.73	41.93	41.87	41.50
TOTAL	100.00	100.00	100.00	100.00	100.00

SUB-GROUPING					
C1 -C4	36.54	34.94	36.10	34.72	35.57
C5 -420 F	45.07	45.41	44.61	45.88	45.20
420-700 F	15.48	16.59	16.28	16.37	16.23
700-END PT	2.90	3.06	3.01	3.03	3.00
C5+-END PT	63.46	63.06	63.90	65.28	64.43
ISO/NORMAL MOLE RATIO					
C4	0.0221	0.0229	0.0405	0.0237	0.0228
C5	0.0910	0.0944	0.1072	0.1087	0.1040
C6	0.2997	0.3047	0.3103	0.3114	0.3004
C4=	0.1752	0.1746	0.1839	0.1728	0.1788
PARAFFIN/OLEFIN RATIO					
C3	2.2890	2.2633	2.0418	2.0265	2.3881
C4	1.3376	1.3131	1.3266	1.2478	1.3287
C5	2.1021	2.0435	2.9388	1.9315	2.1333
SCHULZ-FLORY DISTRBTN					
ALPHA (EXP(SLOPE))	0.8088		0.8101		0.8092
RATIO CH4/(1-A)**2	5.6061		5.4462		5.5349
LIQ HC COLLECTION					
PHYS. APPEARANCE	CLR OIL		CLR OIL		CLR OIL
DENSITY	0.752		0.751		0.752
N, REFRACTIVE INDEX	1.4200		1.4201		1.4205
SIMULT'D DISTILATN					
10 WT % @ DEG F	258		258		258
16	293		293		296
50	411		410		411
84	603		599		599
90	667		664		665
RANGE(16-84 %)	310		306		303
WT % @ 420 F	53.71	54.00	54.00	53.67	53.67
WT % @ 700 F	92.69	92.83	92.83	92.77	92.77

TABLE 9 RESULT OF SYNGAS OPERATION

RUN NO. 10225-16
CATALYST CO/TH UCC-103 11684-12C 80CC 37.9GM(37.8 AFTER RUN -.1 G)
FEED H2:CO:ARGON OF 50:50: 0 @ 400 CC/MN OR 300 GHSV

RUN & SAMPLE NO.	10225-16-18	225-16-19
FEED H2:CO:AR	50:50: 0	50:50: 0
HRS ON STREAM	219.0	235.5
PRESSURE,PSIG	299	297
TEMP. C	272	272
FEED CC/MIN	400	400
HOURS FEEDING	7.50	24.00
EFFLNT GAS LITER	70.45	223.60
GM AQUEOUS LAYER	20.83	66.64
GM OIL	8.43	26.97
MATERIAL BALANCE		
GM ATOM CARBON %	91.03	90.45
GM ATOM HYDROGEN %	97.96	98.18
GM ATOM OXYGEN %	93.71	93.08
RATIO CHX/(H2O+CO2)	0.9381	0.9395
RATIO X IN CHX	2.4921	2.5037
USAGE H2/CO PRODT	1.5844	1.5859
RATIO CO2/(H2O+CO2)	0.2452	0.2468
K SHIFT IN EFFLNT	0.12	0.12
CONVERSION		
ON CO %	56.32	56.92
ON H2 %	85.08	85.28
ON CO+H2 %	71.22	71.68
PRDT SELECTIVITY,WT %		
CH4	20.69	21.15
C2 HC'S	3.49	3.73
C3H8	4.26	4.45
C3H6=	1.83	1.92
C4H10	3.78	3.86
C4H8=	2.83	2.73
C5H12	4.49	4.41
C5H10=	1.94	2.14
C6H14	5.38	5.37
C6H12= & CYCLO'S	1.50	1.49
C7+ IN GAS	11.25	10.35
LIQ HC'S	38.56	38.40
TOTAL	100.00	100.00

SUB-GROUPING		
C1 -C4	36.89	37.84
C5 -420 F	45.43	44.55
420-700 F	14.93	14.87
700-END PT	2.76	2.75
C5+-END PT	63.11	62.16
ISO/NORMAL MOLE RATIO		
C4	0.0230	0.0260
C5	0.1015	0.1063
C6	0.2981	0.3122
C4=	0.1737	0.1787
PARAFFIN/OLEFIN RATIO		
C3	2.2184	2.2126
C4	1.2883	1.3656
C5	2.2446	2.0009
SCHULZ-FLORY DISTRBTN		
ALPHA (EXP(SLOPE))		0.8052
RATIO CH4/(1-A)**2		5.5730
LIQ HC COLLECTION		
PHYS. APPEARANCE		CLR OIL
DENSITY		0.752
N, REFRACTIVE INDEX		1.4204
SIMULT'D DISTILATN		
10 WT % @ DEG F		258
16		296
50		410
84		598
90		663
RANGE(16-84 %)		302
WT % @ 420 F	54.14	54.14
WT % @ 700 F	92.85	92.85

III. Run 2 (11677-09) with Catalyst 2 (Co/Th+UCC-103+UCC-101)

This is the first in a series of catalysts combining two different Molecular Sieves. The thorium-promoted cobalt was formed in contact with UCC-103, the resulting powder was mixed with UCC-101 in a weight ratio of 9:8, and the mixture, after bonding with 15 weight percent silica, was extruded as 1/8-inch pellets. Thus the UCC-103 was in close contact with the metal component while the UCC-101 was not. The final catalyst contained approximately 4.5 percent cobalt, just over half as much as Catalyst 1 and a little under half as much as Eleventh Quarter Catalyst 7 (Run 10225-16).

Conversion, product selectivity, isomerization of the pentane, and percent olefins of the C_4's are plotted against time on stream in Figs. 33-36. Simulated distillations of the C_5^+ product are plotted in Figs. 37-38. Carbon number product distributions are plotted in Figs. 39-43. Chromatograms from simulated distillations are reproduced in Figs. 44-48. Detailed material balances appear in Tables 10-11.

The conversion was only a little lower and a little less stable than that of Catalyst 1. Initially 56 percent, it dropped during the first 120 hours on stream by about one percentage point per 24 hours. Even this relatively slow deactivation may have been due in some degree to fluctuations of the operating

temperature during this period, caused by a controller malfunction. In contrast, the two samples taken after 120 hours, when the temperature was stable, show a deactivation of only one percentage point during the last 96 hours of the test. While two samples are not enough for firm conclusions, it seems likely that under a uniform operating temperature the stability of this catalyst would be even better than it appears from the first 5 days on stream.

Noteworthy also is this catalyst's remarkably efficient use of the cobalt. With only about half the cobalt content, this catalyst converted nearly the same percentage of syngas as did Catalyst 1 and about 75 percent as much syngas as Eleventh Quarter Catalyst 7 (Run 10225-16), which was tested at a higher temperature.

As with Catalyst 1, however, the water gas shift activity was very low even for a cobalt catalyst, with only 6 percent of the oxygen rejected as CO_2 and a H_2:CO usage ratio of 2:1. Both Tenth Quarter Catalyst 3 (Run 10112-15) and Eleventh Quarter Catalyst 7 (Run 10225-16) were superior in water gas shift activity.

Like its conversion, the selectivity of this catalyst was unusually stable. Lowering the reaction temperature with time on stream, which tended to exaggerate the deactivation in conversion, may also have disguised a deactivation in selectivity. Methane production, initially 17.5 percent, rose only half a percentage point during the entire 235 hour test. Catalyst 1 produced 13 percent methane initially and 16.5 percent by the end of

the test, but if the two tests had been extended another 100 hours, and if the deactivation rates had held constant, total methane production would have been the same for both. Eleventh Quarter Catalyst 7 (Run 10225-16) began with a higher methane production of 19.9 percent and deactivated at the same rate as this catalyst; at equal hours on stream, therefore, their methane production levels would never be the same.

The production of C_2-C_4 was constant but higher than usual for a cobalt catalyst, which depressed the selectivity for C_5^+ hydrocarbons. Sixty-five percent of the hydrocarbons produced had 5 or more carbons, and 2 percent had more than 22 carbons (the heavies). Production of motor fuels was more than 63 percent initially, 61.5 percent after 112 hours on stream, and down only to 61 percent after 125 hours. Catalyst 1 produced 70.5 percent motor fuels initially but deactivated more rapidly; assuming constant deactivation rates, both should produce 60.5 percent motor fuels after 370 hours on stream. With a 420F cut point this catalyst produced 2.8 times as much gasoline as diesel oil; with a 300F cut point its gasoline and diesel oil productions were equal.

Isomerization of the pentane was lower than with Catalyst 1, and more like that of cobalt alone as with Eleventh Quarter Catalyst 7 (Run 10225-16). Evidently UCC-101 has little effect on pentane, the isomerization of which is due primarily to interactions with UCC-103, which is in much closer contact with the cobalt. The chromatograms from the simulated distillations also

show little isomerization.

The C_4 hydrocarbons consist of equal quantities of butanes and butenes, slightly more olefinic than with Eleventh Quarter Catalyst 7 but not as olefinic as with Catalyst 1.

Except for the excess methane the Schulz-Flory plots show a linear product distribution. With a fairly high paraffinic content and little isomerization, it is hard to explain why the product of this catalyst is an oil and contains no wax.

This is still another fairly stable catalyst with a good product distribution, confirming again the value of the method used in its preparation. Although the UCC-101 was physically mixed with the metal component as in Tenth Quarter Catalyst 3 (Run 10112-15), their interaction seems to be ameliorated by the much closer contact between the metal component and the UCC-103. It is this latter interaction which seems to dominate the catalyst's activity, so that any perturbation due to the additional Molecular Sieve additive is small.

Fig. 33

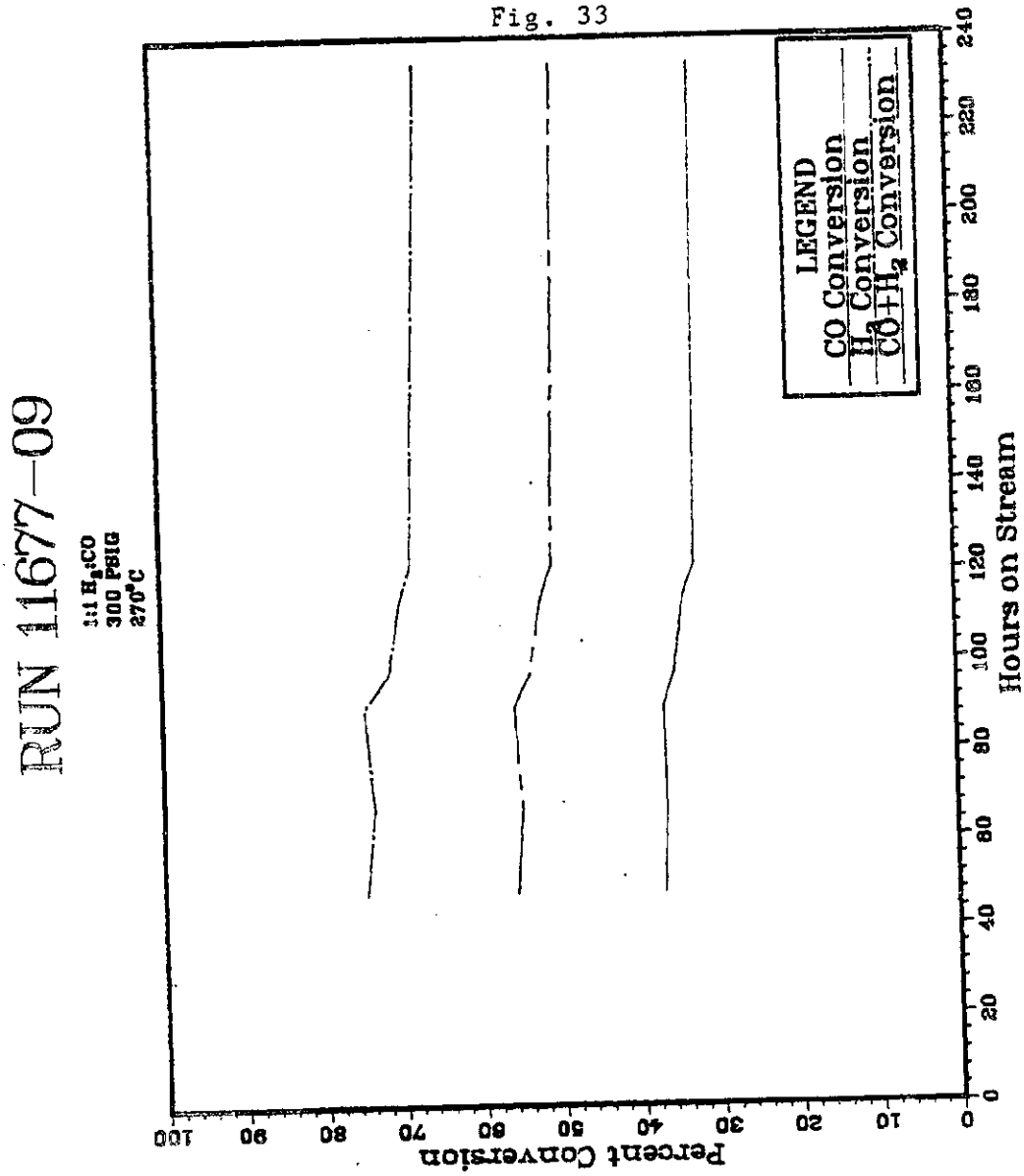

RUN 11677-09
1:1 H2:CO
300 PSIG
270°C
LEGEND
CO Conversion
H2 Conversion
CO+H2 Conversion
Percent Conversion
Hours on Stream
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100
120
140
160
180
200
220
240

Fig. 34

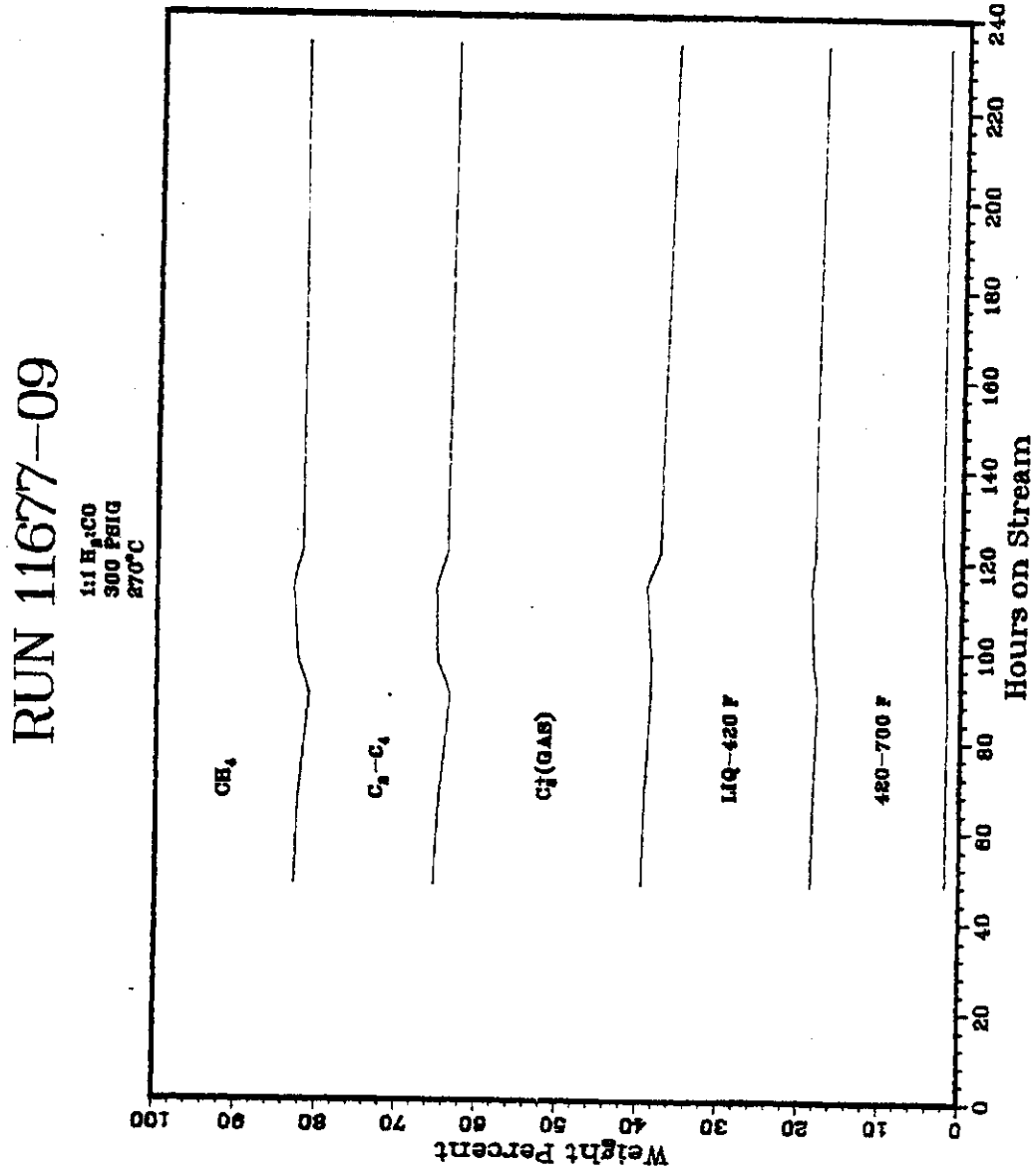

RUN 11677-09
1:1 H2:CO
300 PSIG
270°C
CH4
C2-C4
C5+(GAS)
LIQ-420 F
420-700 F
Weight Percent
Hours on Stream
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100
120
140
160
180
200
220
240

Fig. 35

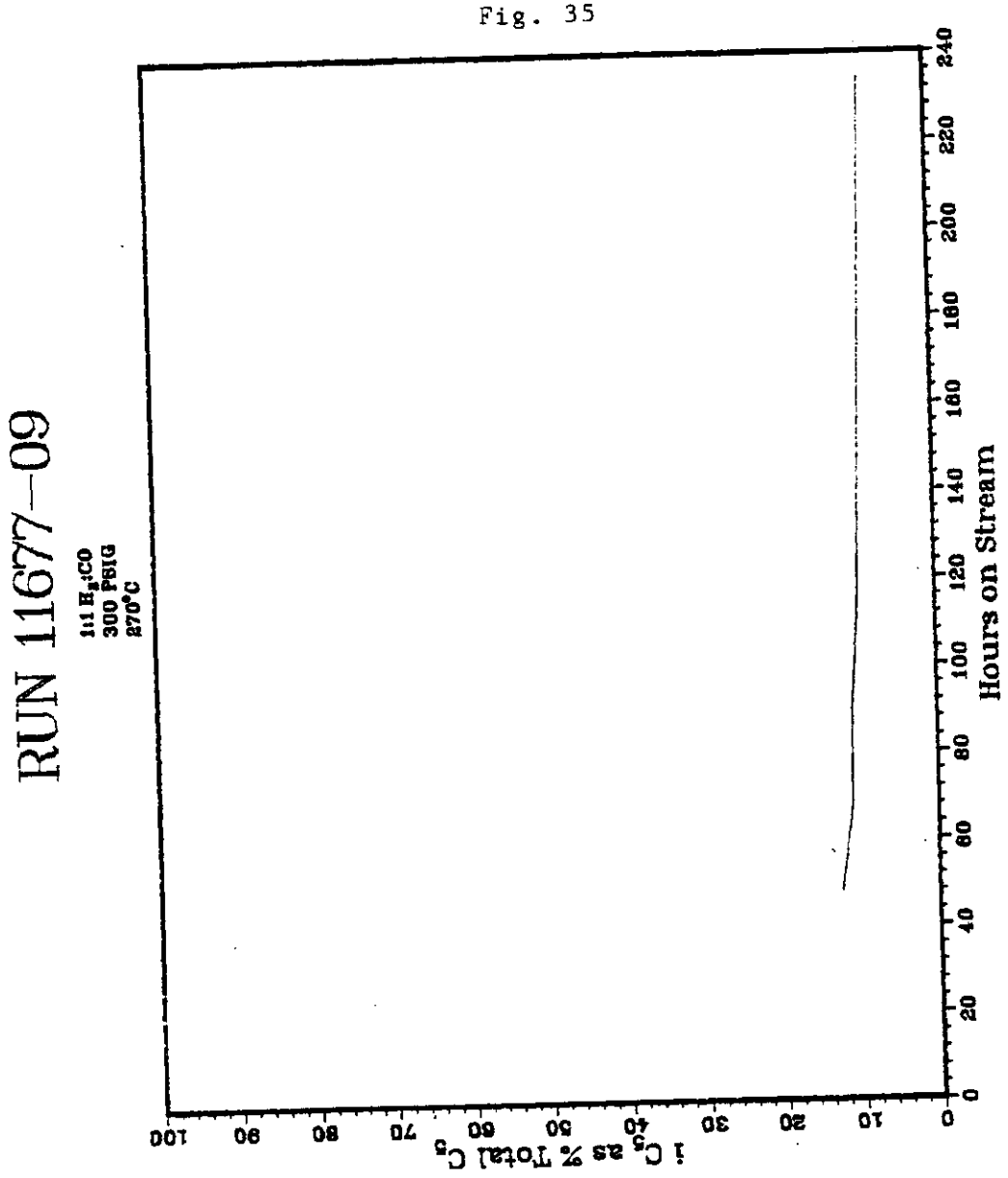

RUN 11677-09
1:1 H_2:CO
300 PSIG
270°C
i C_5 as % Total C_5
Hours on Stream
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100
120
140
160
180
200
220
240

Fig. 36

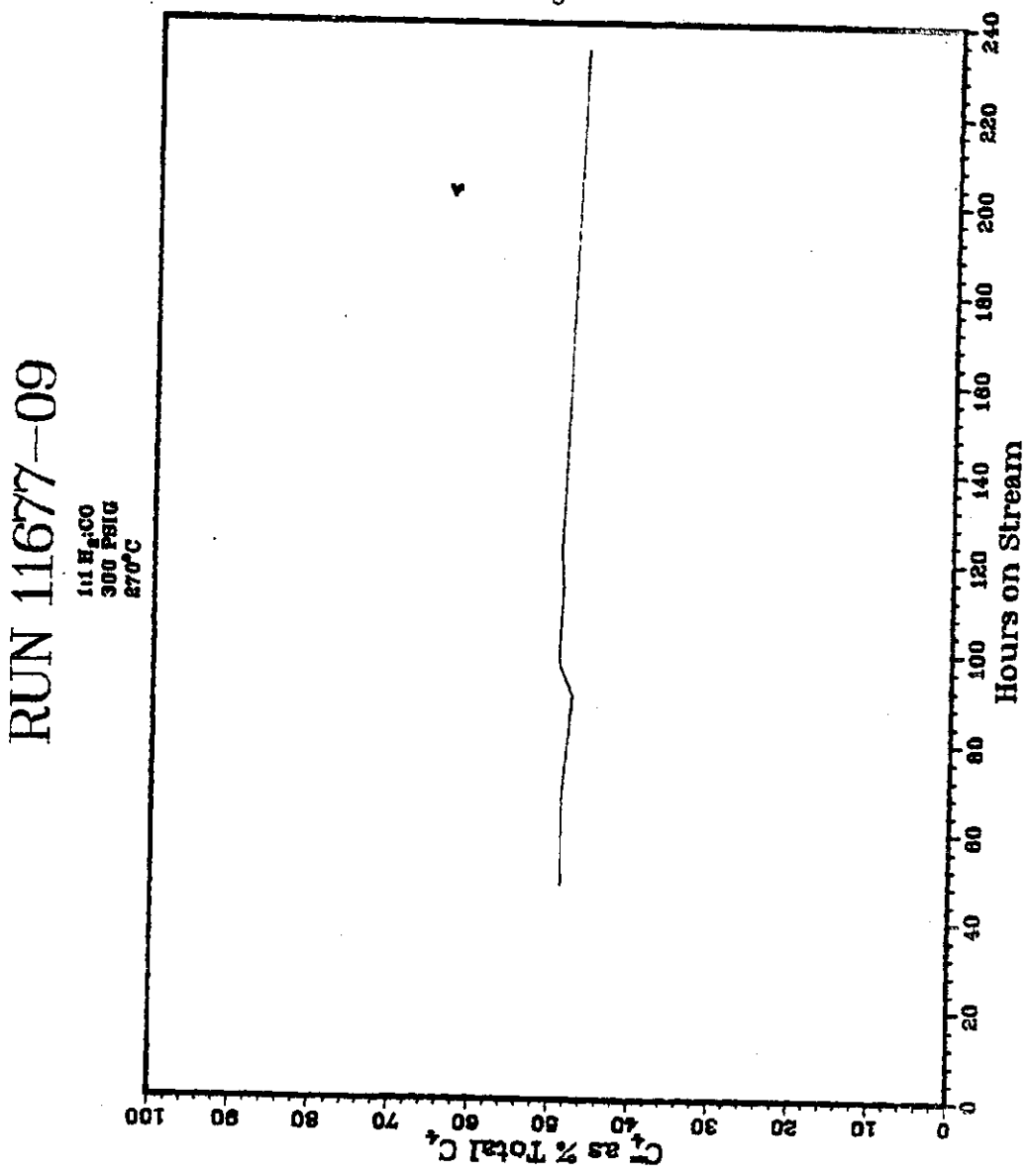

RUN 11677-09
111 H2:CO
300 PSIG
270°C
C4 as % Total C4
Hours on Stream
0
10
20
30
40
50
60
70
80
90
100
0
20
40
60
80
100
120
140
160
180
200
220
240

Fig. 37

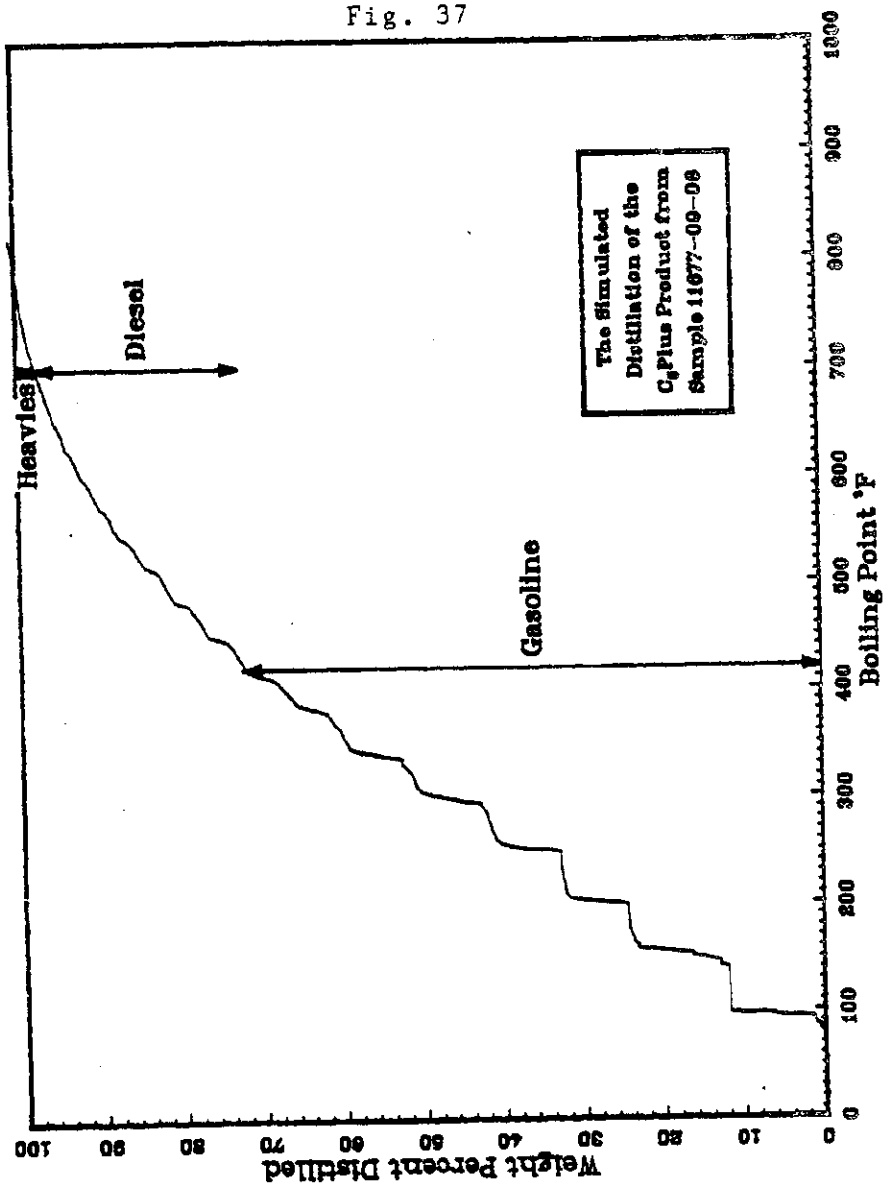

Heavies
Diesel
Gasoline
The Simulated Distillation of the C5 Plus Product from Sample 11677-09-08
Weight Percent Distilled
Boiling Point °F
0
10
20
30
40
50
60
70
80
90
100
0
100
200
300
400
500
600
700
800
900
1000

Fig. 38

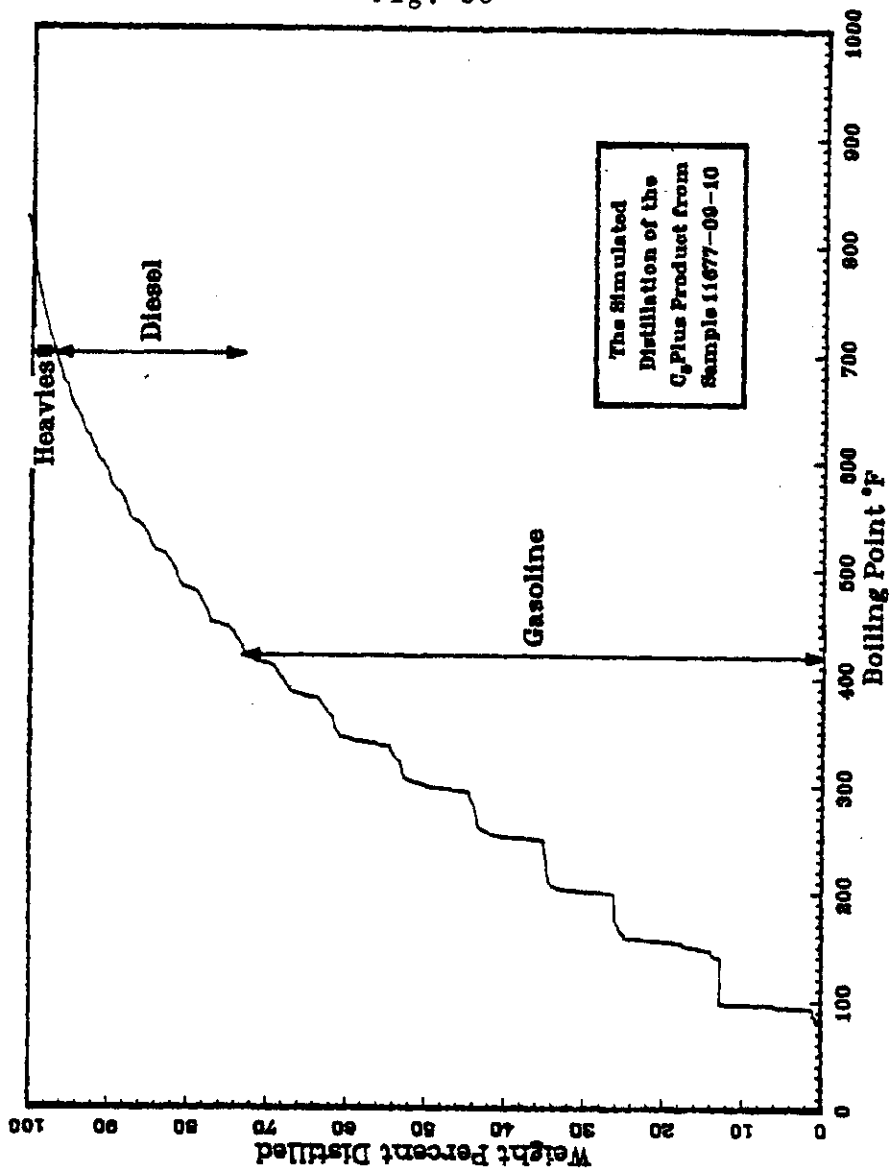

The Simulated Distillation of the C5 Plus Product from Sample 11677-09-10
Heavies
Diesel
Gasoline
Weight Percent Distilled
Boiling Point °F
0
10
20
30
40
50
60
70
80
90
100
100
200
300
400
500
600
700
800
900
1000

Fig. 39

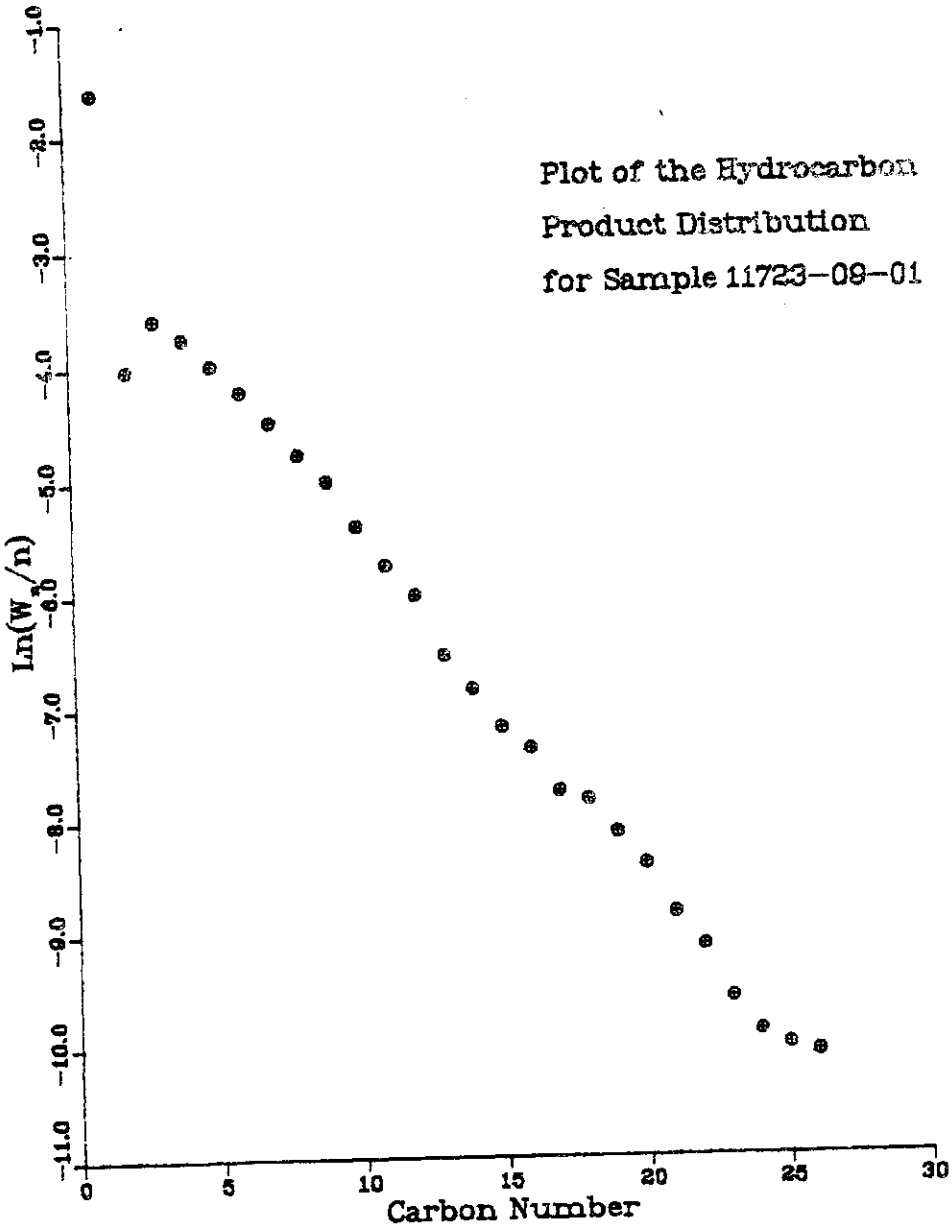
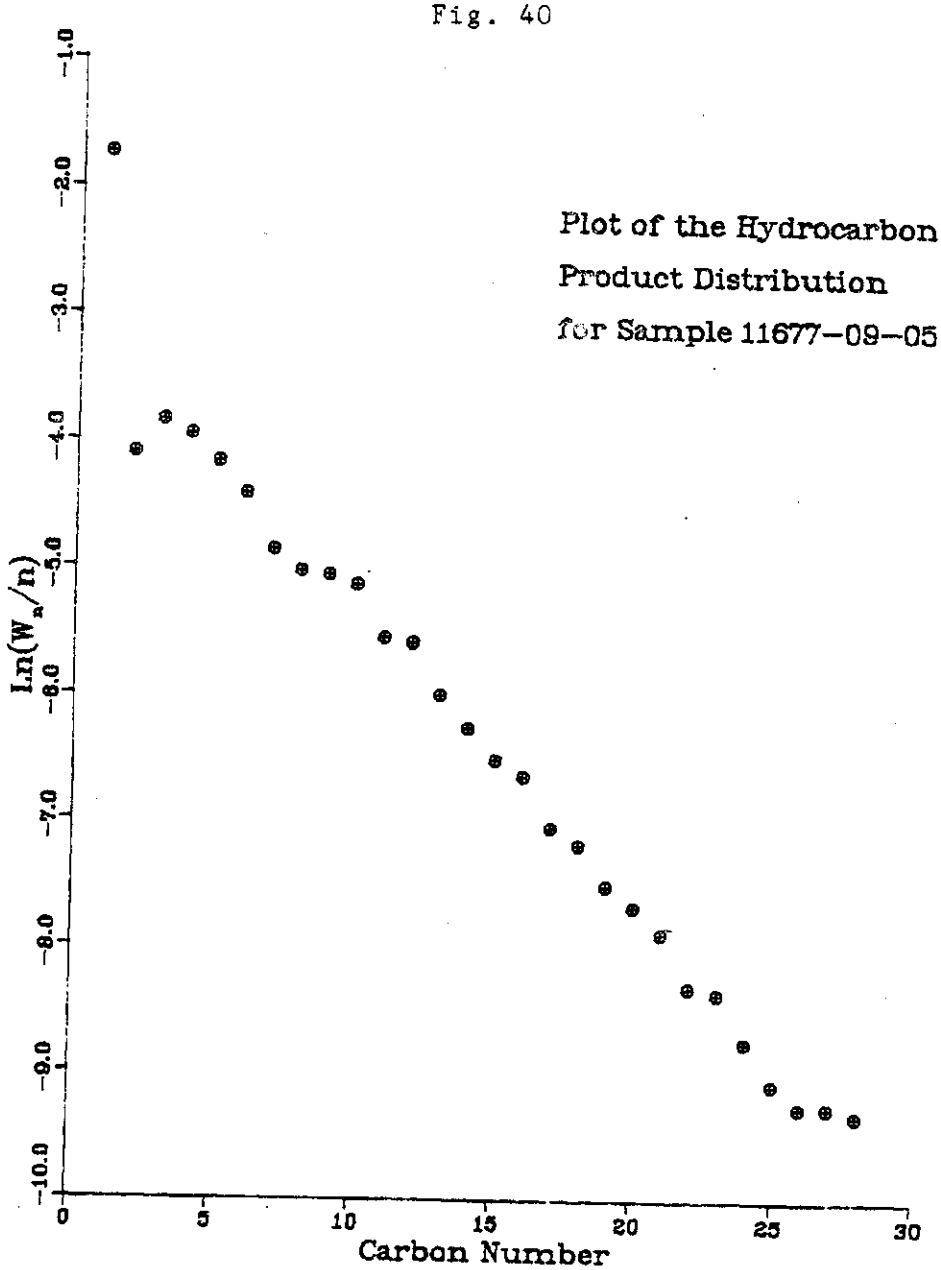

Plot of the Hydrocarbon
Product Distribution
for Sample 11723-09-01
Ln(W_n/n)
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
-11.0
0
5
10
15
20
25
30
Carbon Number

Fig. 40



Plot of the Hydrocarbon Product Distribution for Sample 11677-09-05

Fig. 41

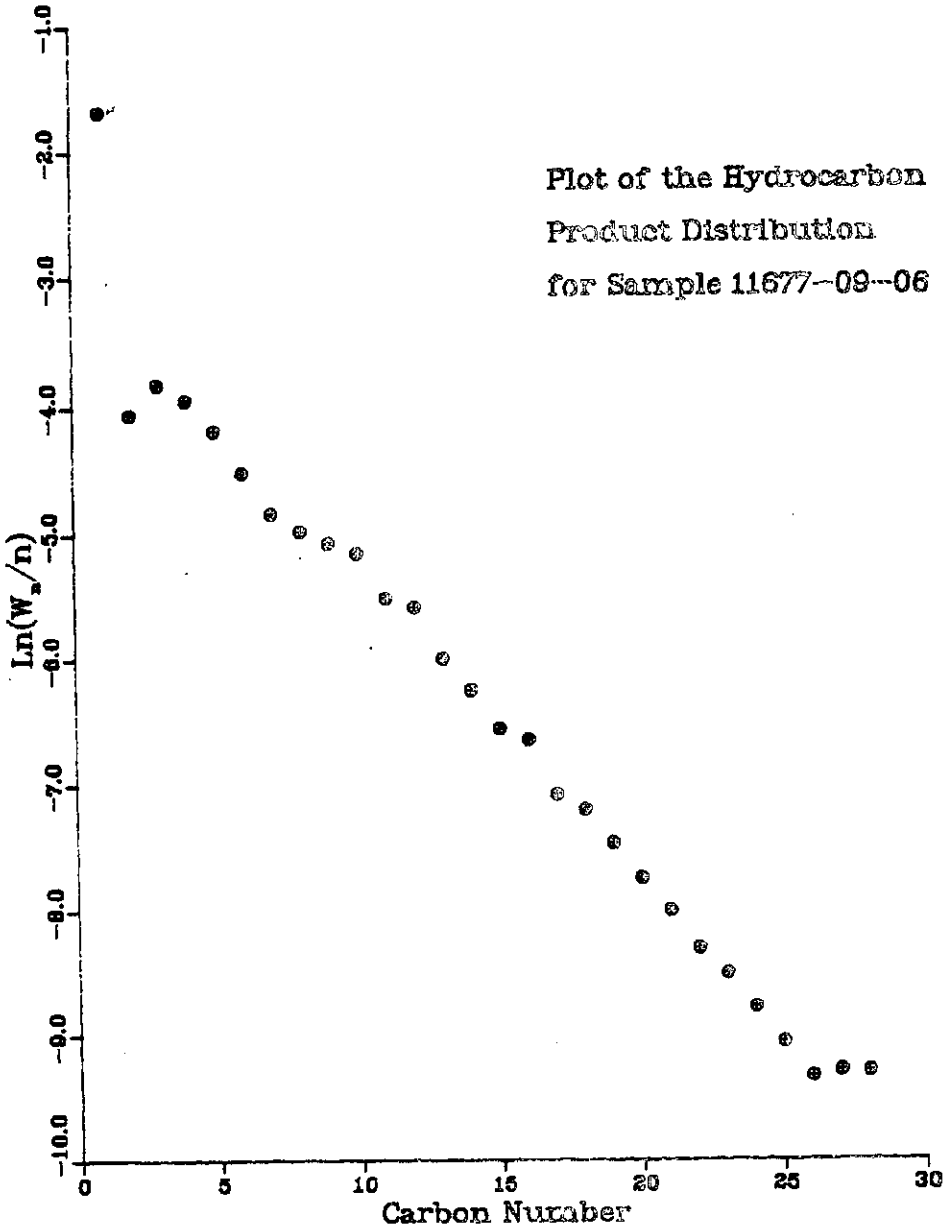
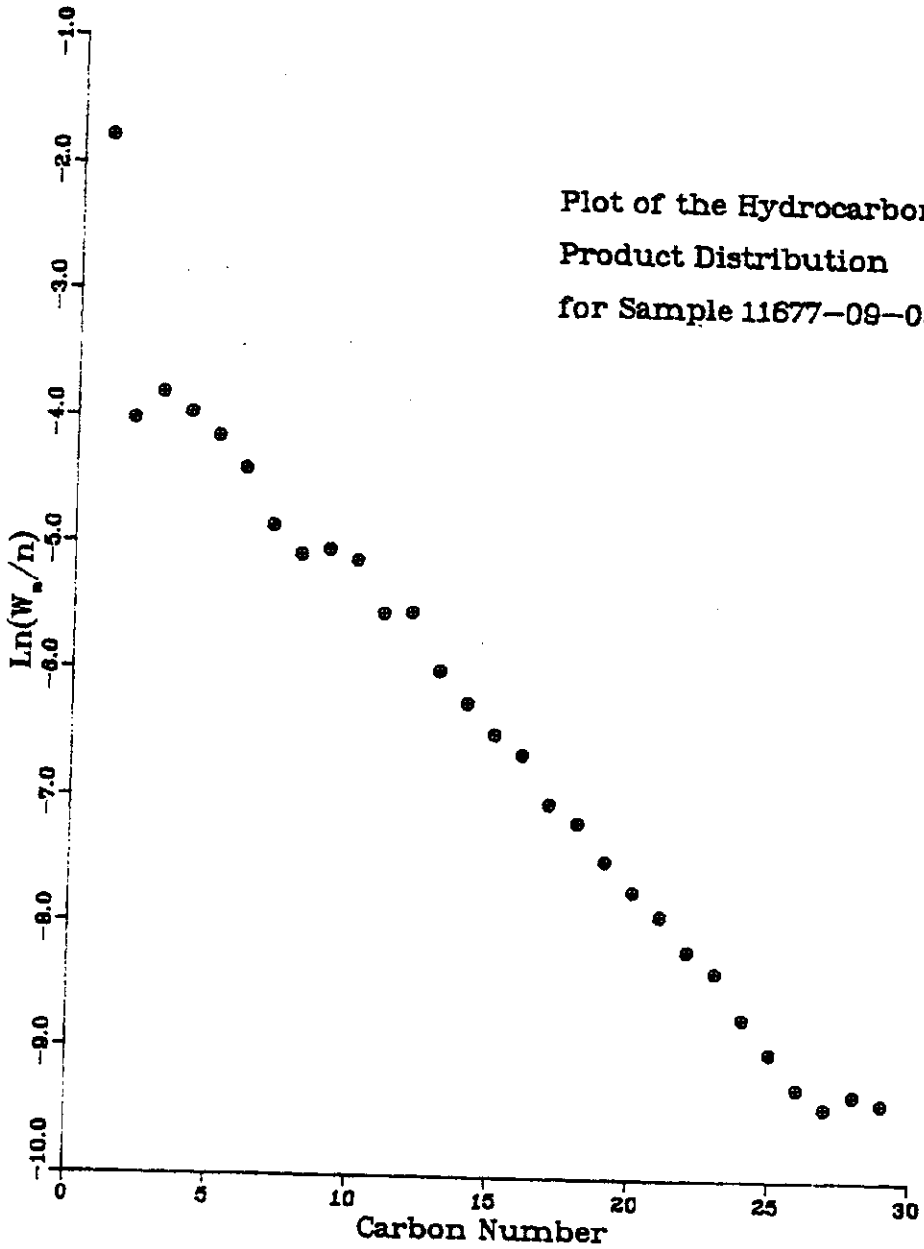
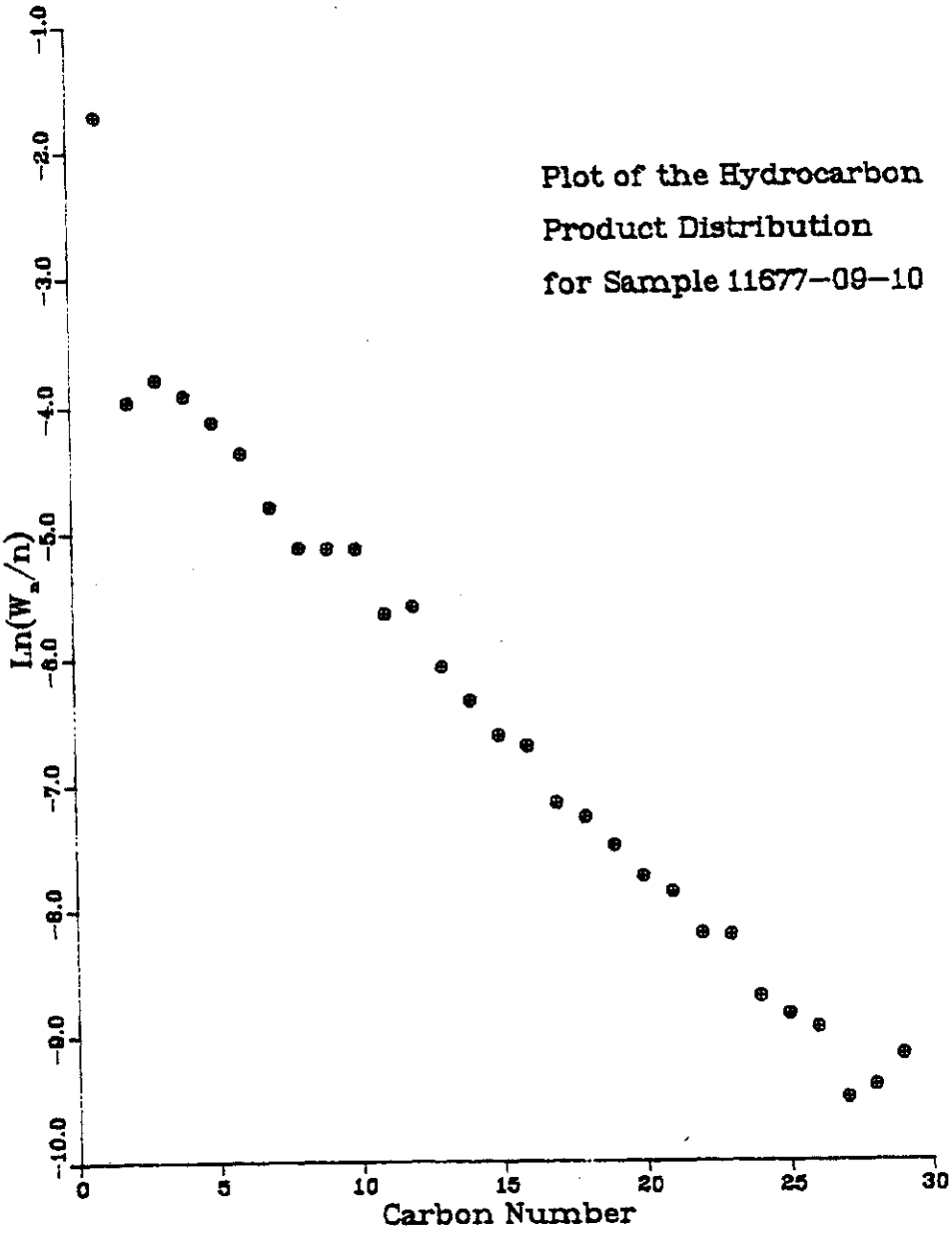

Plot of the Hydrocarbon
Product Distribution
for Sample 11677--09--06
Ln(W_n/n)
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0
5
10
15
20
25
30
Carbon Number

Fig. 42



Plot of the Hydrocarbon
Product Distribution
for Sample 11677-09-08

Fig. 43


Plot of the Hydrocarbon
Product Distribution
for Sample 11677-09-10
Ln(W_n/n)
-1.0
-2.0
-3.0
-4.0
-5.0
-6.0
-7.0
-8.0
-9.0
-10.0
0
5
10
15
20
25
30
Carbon Number