A. Skopal, D. Chochol
Astronomical Institute of the Slovak Academy of Sciences,
059 60 Tatranská Lomnica, Czechoslovakia

N. Bondar, N. I. Shakovskaya
Crimean Astrophysical Observatory, 334 413 Nauchny, Crimea, USSR

ABSTRACT. The spectrophotometric observations (311.0 - 750.5 nm) of the sym-
biotic star CH Cyg for the period 1980 - 1984 are presented. An enhancement of the
blue continuum, as compared to 1980, was observed in 1983 and its sharp decrease
in 1984.

1. INTRODUCTION

The inclusion of astronomical object in the class of symbiotic stars depends
on their energy distribution in their spectra. In general, this is presented in
these objects by three components: a) typical nebular emission lines which combi-
ne with the spectrum; b) cool stars (mostly M giants), and c) spectrum of a hot
source. Most of these objects are now considered to be binary interacting stars
consisting of a late red giant and star of the main sequence, or a white dwarf.
Photometrically and spectroscopically they are observed as short-term (minutes to
hours), as well as long-term (weeks to months, sometimes to years) changes in the
radiation of the electromagnetic spectrum as a whole. They have a pronounced ef-
fect in the activity phases, mainly in the UV and blue part of the optical spec-
trum (up to ≈ 500 nm).

The symbiotic star CH Cyg is known to have gone through three phases in the
past, since 1963: 1963 - 1965 (e.g., Deutsch, 1964), 1967 - 1970 (e.g., Faraggiana
and Hack, 1971) and 1977 - 1986 (e.g., Fehrenbach, 1977; Skopal, 1988). The sud-

7

den increase in the star's brightness in the U-colour (by 2 - 3 mag), observed in
1977, has had a profound effect on the character of the spectrum as a whole. The
strong blue continuum has filled the M-spectrum even in the optical region (Ipa-
tov and Yudin, 1983); the line spectra, up to 1980, were represented by FeII, [FeII]
and HI emission lines (e.g., Hack et al., 1982) and later, since 1981, a strong
absorption envelope spectrum evolved (e.g., Wallerstein, 1983). During the period
of the most recent outburst, the star's brightness changed appreciably several ti-
mes (Skopal, 1989: Fig. 1). Most recently in 1981 when it increased by about 1 mag
and its value in U, B, V-filters varied roughly between 5 and 6 mag until the sum-
mer of 1984. A sudden decrease in brightness by $\simeq$ 1.5 mag was then observed in all
three filters (e.g., Panov et al., 1985). The energy distribution in the optical
part of the spectrum was very similar to that in the spectrum of the M6III giant
(Tomov, 1984), as well as to that in the quiescent phase of 1970 -1977. In 1985,
an eclipse of the hot component by the cool giant was observed together with the
simultaneous generation of the nebular phase of CH Cygni (Mikolajewski et al., 1987).
The further evolution of the star was characterized by a gradual decrease of the
blue continuum; the star's brightness in U-colour decreased down to 11 mag in 1988
(Skopal, 1989).

The purpose of this paper is to present the original spectrophotometric ob-
servations made during the most recent activity phase, and also to show the chan-
ges in the blue continuum in 1980, 1983 and 1984 after the sudden decrease in
brightness.

2. OBSERVATIONS AND RESULTS

The spectroscopic observations (311.0 - 750.5 nm) were made with the 1.25-m
reflector of the Southern Station of the Astronomical Institute in the Crimea. The
observations were made with a resolution of 50 A. The star ιCyg (BS 7420, HD 184 006)
was used as standard. No correction to the spectrophotometric standard αLyr was
made. The results of the observations on the separate nights are shown in Figs 1a-
c, and the numerical value are given in Tab. 1. Figure 2 shows measurements made
on 3 selected nights representing the main changes in the energy distribution in
the spectrum in 1980 (i.e. before the most recent brightness increase), in 1983 (at
the time of maximum brightness) and in December 1984 (after the sudden decrease in
brightness). Table 2 summarized the measurements of the radiation flux at selec-
ted wavelengths during the intervals from July 16, 1980 (JD 2 444 437) to Oct. 24,
1983 (JD 2 445 632). These are depicted in Fig. 3.

In 1983, the intensity was observed to increase twofold in the blue continuum
as compared to 1980. Figure 2 also shows that the radiation of the hot source af-
fected the spectrum of the cool component still in the region of Hα at the time.
A similar result, relating to 1980 - 1982, was presented and discussed by Ipatov
et al. (1982) and Ipatov and Yudin (1983). The changes in this strong blue conti-
nuum then led roughly to equivalent changes in the star's brightness in all three
colours, U, B, V, which agrees with the photometric observations (most recently
summarized by, e.g., Skopal, 1989). This change in the UV radiation was observed

8

Fig. 1a) The energy distribution in the spectrum of the symbiotic star CH Cygni
made on selected nights during the phase of activity in July 17, 1980-
August 6, 1980.

9

Fig. 1b) The energy distribution in the spectrum of the symbiotic star CH Cygni
made on selected nights during the phase of activity in August 6, 1980-
September 1, 1980.

10
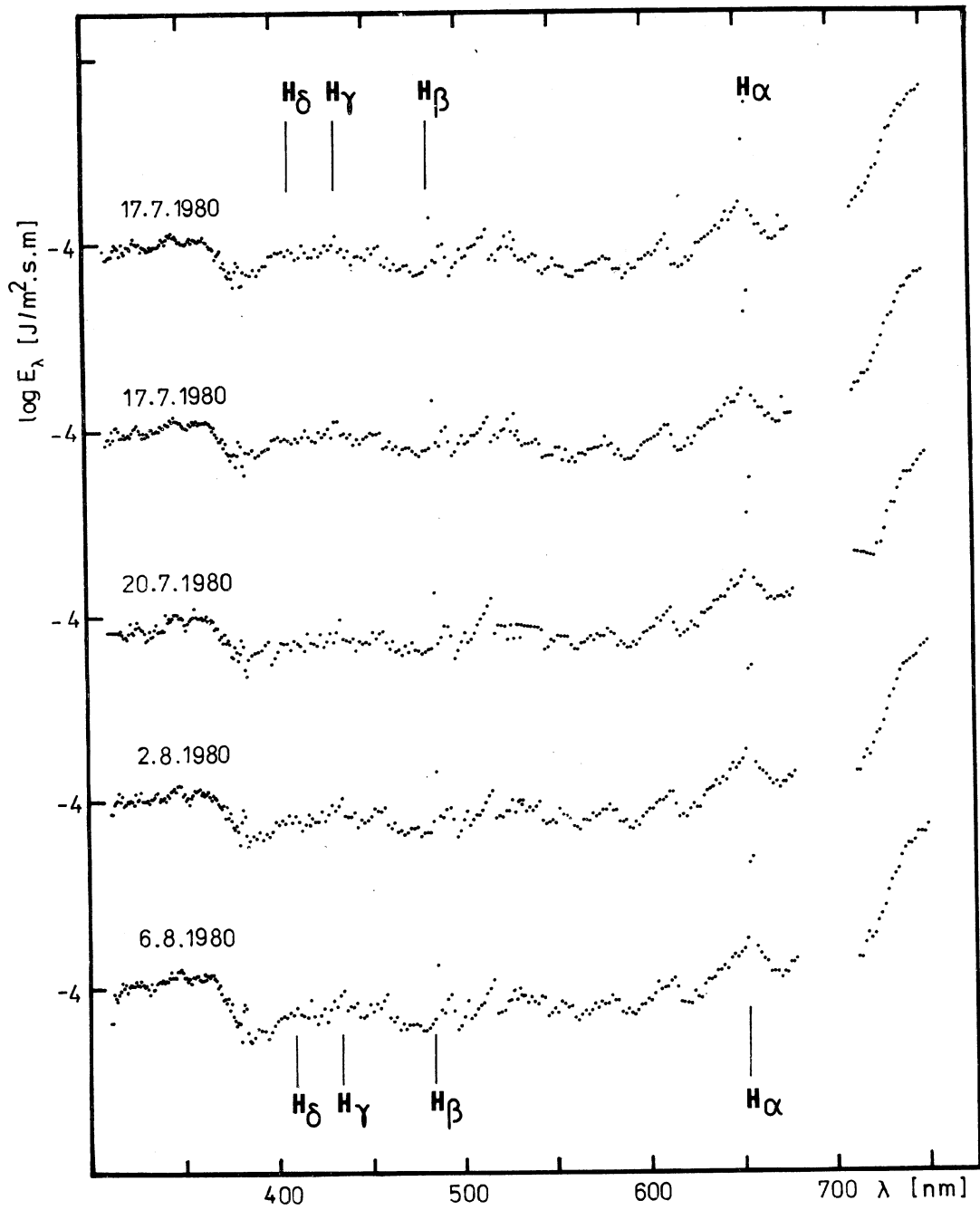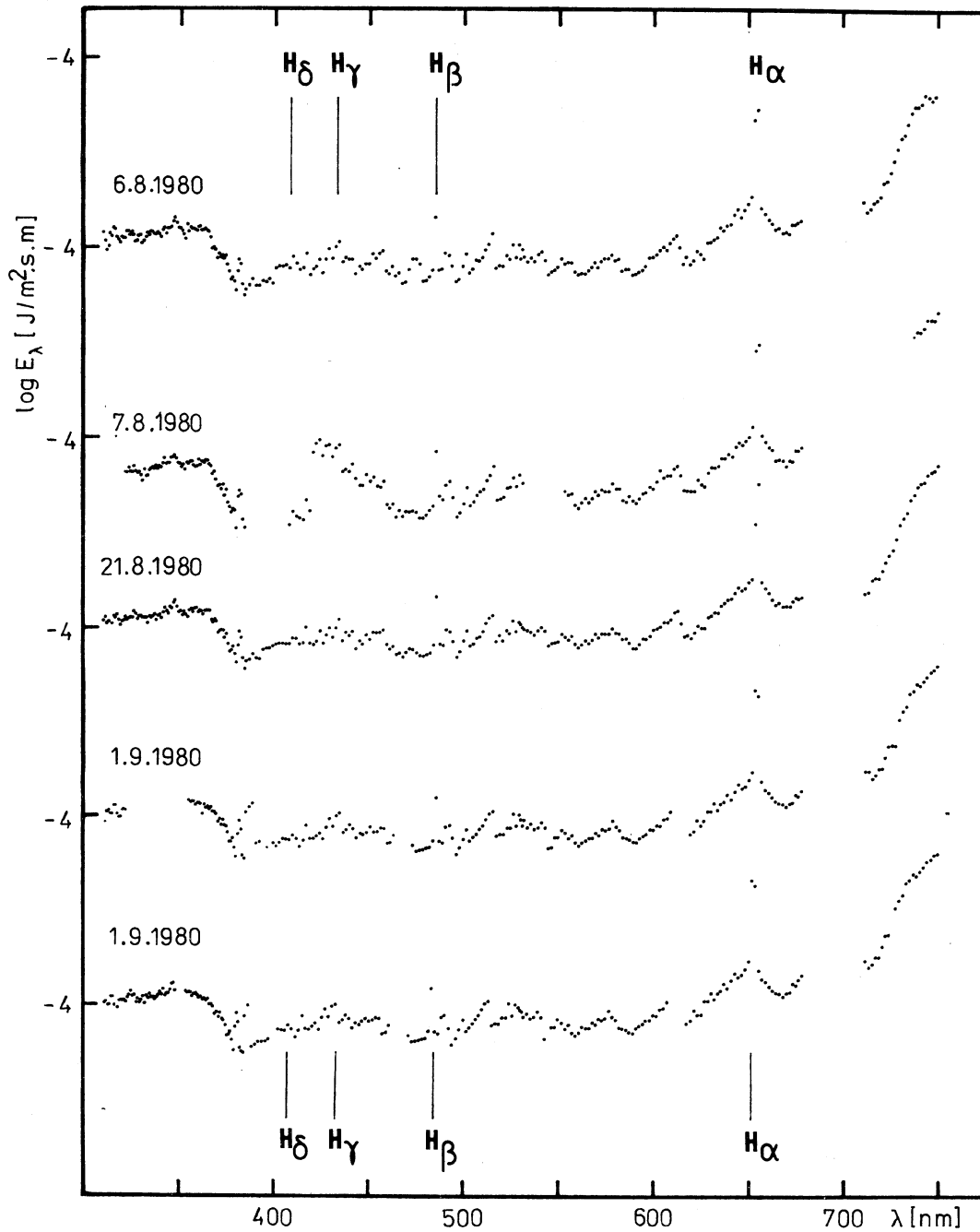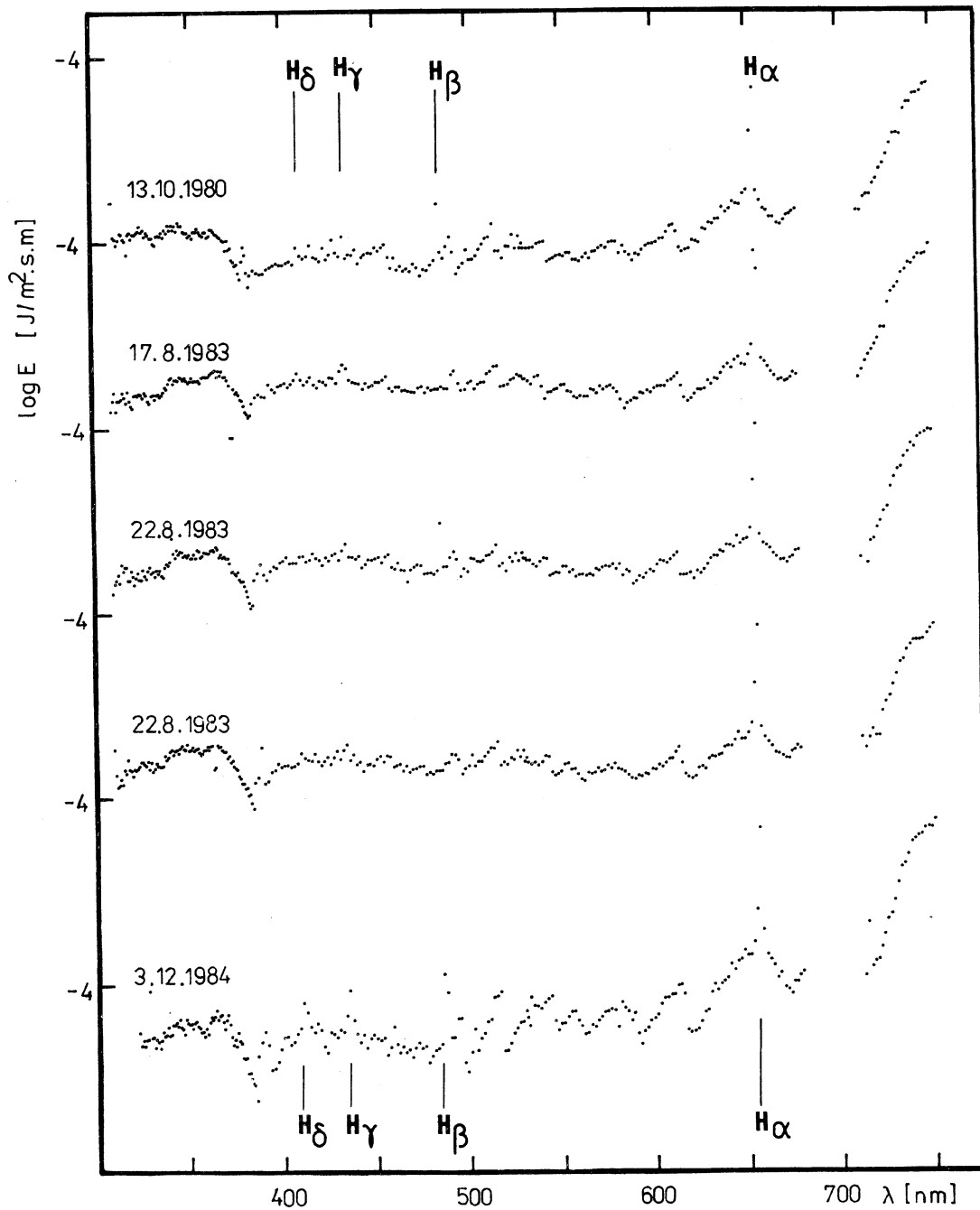
Fig. 1c) The energy distribution in the spectrum of the symbiotic star CH Cygni
made on selected nights during the phase of activity in October 13,
1980 - December 3, 1984.

11

TABLE 1

SPECTROPHOTOMETRIC OBSERVATIONS OF CH Cygni IN 1980 - 1984

[Å]   logE $[10^{-1}$ $J/m^2.s.m]$

λ	July 1980	July 1980	July 20 1980	Aug. 2 1980	Aug. 6 1980	Aug. 6 1980	Aug. 7 1980
3110.	-3.0379	-3.0770	-3.0872	-3.0669	-3.1855	-2.9199	-2.4171
3119.	-3.0796	-3.0454	-3.0872	-3.0649	-3.1855	-2.9662	-2.6172
3128.	-3.0813	-3.0432	-3.0872	-3.0670	-3.0315	-3.0182	-2.4616
3137.	-3.0694	-3.0640	-3.0872	-3.0136	-3.0541	-2.9957	-2.0629
3146.	-3.0641	-2.9990	-3.0872	-3.0063	-3.0723	-2.9252	-2.5041
3155.	-3.0663	-3.0445	-3.0872	-2.9962	-3.0342	-2.9388	-2.3457
3164.	-3.0301	-2.9833	-3.0872	-2.9542	-3.0139	-2.8947	-4.2453
3173.	-3.0016	-2.9770	-3.0889	-3.0033	-2.9720	-2.9017	-2.1844
3182.	-3.0174	-2.9969	-3.0747	-2.9719	-2.9996	-2.9448	-4.2311
3191.	-3.0264	-3.0367	-3.0979	-3.0246	-2.9806	-2.9592	-2.1961
3200.	-3.0616	-3.0343	-3.1162	-3.0148	-3.0241	-2.9763	-1.9860
3209.	-3.0011	-3.0156	-3.1134	-2.9992	-2.9932	-2.9448	-2.1238
3217.	-3.0392	-3.0375	-3.1239	-3.0073	-2.9860	-2.9525	-1.9981
3226.	-3.0520	-3.0313	-3.0925	-2.9957	-2.9872	-2.9527	-3.1841
3235.	-3.0137	-3.0213	-3.0356	-3.0031	-2.9907	-2.9146	-3.1877
3244.	-3.0170	-3.0323	-3.0846	-3.0200	-2.9651	-2.9152	-3.1621
3253.	-3.0284	-3.0080	-3.0940	-2.9611	-2.9856	-2.9362	-3.1825
3262.	-2.9893	-2.9881	-3.0598	-2.9938	-2.9882	-2.9183	-3.1852
3271.	-2.9697	-2.9818	-3.0289	-2.9892	-2.9588	-2.9336	-3.1558
3280.	-2.9977	-2.9678	-3.0533	-2.9528	-2.9829	-2.9659	-3.1798
3289.	-3.0058	-2.9917	-3.0671	-3.0000	-2.9941	-2.9659	-3.1910
3298.	-2.9980	-3.0126	-3.0732	-3.0019	-2.9874	-2.9377	-3.1843
3307.	-3.0400	-3.0340	-3.0904	-3.0035	-3.0052	-2.9338	-3.2022
3316.	-3.0130	-3.0097	-3.1338	-2.9958	-3.0360	-2.9770	-3.2329
3325.	-3.0210	-3.0329	-3.1247	-3.0123	-2.9751	-2.9654	-3.1720
3334.	-3.0251	-3.0118	-3.0776	-2.9889	-3.0096	-2.9453	-3.2065
3343.	-3.0366	-3.0239	-3.1115	-2.9915	-3.0068	-2.9220	-3.2037
3352.	-3.0336	-2.9896	-3.1067	-2.9812	-2.9778	-2.9343	-3.1747
3361.	-3.0141	-2.9885	-3.0696	-2.9618	-2.9715	-2.9136	-3.1685
3370.	-3.0292	-3.0070	-3.0426	-2.9548	-2.9642	-2.9180	-3.1611
3379.	-3.0166	-3.0059	-3.0856	-3.0032	-2.9706	-2.9283	-3.1676
3388.	-3.0174	-2.9973	-3.0815	-2.9871	-2.9547	-2.9306	-3.1516
3397.	-3.0183	-3.0021	-3.0824	-2.9923	-2.9731	-2.9214	-3.1700
3406.	-3.0164	-2.9722	-3.0720	-2.9822	-2.9591	-2.9272	-3.1560
3415.	-2.9989	-2.9787	-3.0806	-3.0027	-2.9662	-2.9437	-3.1631
3424.	-2.9724	-2.9837	-2.9895	-2.9682	-2.9442	-2.9038	-3.1412
3433.	-2.9824	-2.9612	-3.0320	-2.9796	-2.9145	-2.8962	-3.1115
3442.	-3.0033	-2.9658	-3.0105	-2.9499	-2.9453	-2.9245	-3.1423
3450.	-2.9756	-2.9688	-3.0237	-2.9452	-2.9442	-2.8981	-3.1411
3459.	-2.9506	-2.9399	-3.0086	-2.9286	-2.9439	-2.8980	-3.1409
3468.	-2.9589	-2.9520	-2.9888	-2.9532	-2.9131	-2.8888	-3.1100
3477.	-2.9404	-2.9252	-2.9888	-2.9211	-2.9096	-2.8604	-3.1066
3486.	-2.9646	-2.9444	-2.9927	-2.9170	-2.9033	-2.8398	-3.1002
3495.	-2.9576	-2.9486	-3.0095	-2.9186	-2.9185	-2.8685	-3.1154
3504.	-2.9732	-2.9552	-3.0062	-2.9761	-2.9446	-2.8953	-3.1415
3513.	-2.9922	-2.9550	-3.0156	-2.9605	-2.9454	-2.8969	-3.1424
3522.	-2.9882	-2.9702	-3.0457	-2.9981	-2.9648	-2.9109	-3.1617
3531.	-2.9995	-2.9832	-3.0755	-2.9851	-2.9510	-2.9293	-3.1479
3540.	-3.0015	-2.9854	-3.0411	-3.0189	-2.9772	-2.9551	-3.1741
3549.	-3.0056	-2.9904	-3.0228	-2.9858	-2.9416	-2.8748	-3.1385
3558.	-2.9977	-2.9589	-3.0134	-2.9690	-2.9451	-2.9158	-3.1420
3567.	-2.9802	-2.9734	-3.0036	-2.9454	-2.9335	-2.8929	-3.1304
3576.	-2.9691	-2.9468	-2.9605	-2.9531	-2.9341	-2.8989	-3.1311
3585.	-2.9972	-2.9609	-3.0043	-2.9452	-2.9552	-2.8996	-3.1521
3594.	-2.9741	-2.9458	-3.0118	-2.9350	-2.9618	-2.9038	-3.1587
3604.	-2.9770	-2.9636	-3.0098	-2.9676	-2.9598	-2.9100	-3.1567
3612.	-2.9879	-2.9550	-3.0071	-2.9535	-2.9256	-2.8909	-3.1226
3621.	-2.9920	-2.9576	-3.0193	-2.9746	-2.9543	-2.8884	-3.1512
3630.	-2.9765	-2.9536	-3.0180	-2.9661	-2.9359	-2.9065	-3.1328
3639.	-2.9827	-2.9572	-3.0015	-2.9525	-2.9442	-2.9064	-3.1411

12

Table 1 (continued)

3648.	-2.9640	-2.9511	-3.0266	-2.9786	-2.9291	-2.9002	-3.1260
3657.	-2.9924	-2.9580	-3.0380	-2.9972	-2.9309	-2.9118	-3.1278
3666.	-2.9963	-2.9596	-3.0191	-2.9722	-2.9514	-2.9185	-3.1484
3674.	-3.0123	-2.9763	-3.0302	-2.9839	-2.9603	-2.9478	-3.1572
3683.	-3.0246	-2.9997	-3.0750	-2.9922	-3.0003	-3.0067	-3.1973
3692.	-3.0261	-2.9817	-3.0646	-3.0154	-2.9881	-2.9997	-3.1851
3701.	-3.0316	-3.0177	-3.0683	-3.0303	-3.0316	-3.0147	-3.2286
3710.	-3.0832	-3.0364	-3.1267	-3.0416	-3.0672	-3.0576	-3.2642
3719.	-3.0627	-3.0601	-3.1132	-3.0262	-3.0615	-3.0361	-3.2584
3728.	-3.0493	-3.0599	-3.1493	-3.0921	-3.0833	-3.0519	-3.2802
3737.	-3.0414	-3.0437	-3.1010	-3.0318	-3.0567	-3.0446	-3.2536
3746.	-3.1216	-3.0963	-3.1487	-3.0887	-3.1191	-3.0590	-3.3160
3755.	-3.1000	-3.0705	-3.1353	-3.0658	-3.0865	-3.0456	-3.2834
3763.	-3.1328	-3.1191	-3.1554	-3.1059	-3.1532	-3.0912	-3.3501
3772.	-3.1704	-3.1299	-3.2229	-3.1431	-3.1763	-3.1243	-3.3733
3781.	-3.1821	-3.1592	-3.2294	-3.1535	-3.2038	-3.1711	-3.4007
3790.	-3.1490	-3.1320	-3.1727	-3.1363	-3.1859	-3.1580	-3.3829
3799.	-3.1848	-3.1280	-3.1996	-3.1664	-3.1924	-3.1789	-3.3893
3808.	-3.2348	-3.1942	-3.2436	-3.2383	-3.2866	-3.2313	-3.4835
3817.	-3.1441	-3.1358	-3.2065	-3.1143	-3.1233	-3.1249	-3.3193
3826.	-3.0987	-3.0614	-3.1355	-3.0488	-3.0904	-3.0646	-3.2873
3834.	-3.1200	-3.0879	-3.1688	-3.0860	-3.1098	-3.0872	-3.3068
3843.	-3.2286	-3.1912	-3.2945	-3.1869	-3.2432	-3.1955	-3.4402
3852.	-3.2264	-3.2421	-3.3321	-3.2465	-3.2864	-3.2541	-3.4834
3860.	-3.1487	-3.1198	-3.2414	-3.2181	-3.2942	-3.2253	-4.8276
3877.	-3.1630	-3.1238	-3.2139	-3.1887	-3.2667	-3.2032	-3.0016
3895.	-3.1690	-3.1084	-3.2061	-3.2062	-3.2187	-3.1684	-2.9394
3913.	-3.1385	-3.1458	-3.1997	-3.1708	-3.2302	-3.2048	-2.5145
3930.	-3.1688	-3.1339	-3.1887	-3.2122	-3.2326	-3.2046	-2.9282
3948.	-3.1366	-3.1138	-3.1588	-3.1793	-3.2745	-3.1769	-2.8057
3965.	-3.1181	-3.1084	-3.1417	-3.1942	-3.2376	-3.1836	-4.6612
3983.	-3.1180	-3.0995	-3.2647	-3.1680	-3.2018	-3.1667	-2.5928
4001.	-3.0674	-3.0536	-3.2288	-3.1164	-3.1773	-3.1933	-4.5778
4018.	-3.0650	-3.0510	-3.1985	-3.1286	-3.1621	-3.1097	-2.5098
4036.	-3.0513	-3.0373	-3.1513	-3.1064	-3.1517	-3.1010	-2.2372
4053.	-3.0520	-3.0595	-3.1579	-3.1263	-3.1591	-3.1024	-2.4070
4071.	-3.0465	-3.0502	-3.1559	-3.0800	-3.1362	-3.0946	-2.2829
4088.	-3.0668	-3.0606	-3.1903	-3.1201	-3.1465	-3.1094	-3.4723
4106.	-3.0355	-3.0744	-3.1411	-3.0841	-3.1085	-3.0491	-3.4015
4124.	-3.0492	-3.0468	-3.1543	-3.1142	-3.1440	-3.0850	-3.4271
4141.	-3.0870	-3.0668	-3.1696	-3.1620	-3.1527	-3.1183	-3.4344
4159.	-3.0759	-3.0407	-3.1943	-3.1286	-3.1599	-3.1080	-3.4456
4176.	-3.0130	-3.0025	-3.1009	-3.0750	-3.0710	-3.0349	-3.3408
4194.	-3.0489	-3.0394	-3.1528	-3.0938	-3.1557	-3.1435	-3.3975
4212.	-3.0741	-3.0614	-3.1576	-3.1158	-3.1951	-3.1155	-3.0903
4229.	-3.0746	-3.0674	-3.1706	-3.1143	-3.1497	-3.1020	-3.0434
4247.	-3.0326	-3.0121	-3.1063	-3.0585	-3.1157	-3.0636	-3.0221
4264.	-3.0734	-3.0423	-3.1748	-3.1090	-3.1859	-3.1352	-3.1074
4282.	-3.0529	-3.0221	-3.1457	-3.0746	-3.1214	-3.0661	-3.0546
4300.	-3.0144	-2.9949	-3.0991	-3.0260	-3.0741	-3.0126	-3.0514
4317.	-3.0392	-3.0456	-3.1487	-3.0555	-3.1069	-3.0585	-3.1116
4335.	-3.0118	-2.9584	-3.0939	-3.0317	-3.0482	-2.9993	-3.0666
4353.	-2.9655	-2.9535	-3.0263	-2.9901	-3.0221	-2.9722	-3.0500
4370.	-3.0514	-3.0292	-3.1359	-3.0839	-3.1258	-3.0780	-3.1904
4388.	-3.0350	-3.0227	-3.1393	-3.0912	-3.1042	-3.0540	-3.1775
4406.	-3.0773	-3.0460	-3.1477	-3.0913	-3.1111	-3.0646	-3.1907
4423.	-3.0465	-3.0256	-3.1314	-3.0666	-3.0877	-3.0641	-3.1500
4441.	-3.1180	-3.0860	-3.1937	-3.1481	-3.1589	-3.1408	-3.2270
4459.	-3.0751	-3.0555	-3.1446	-3.1046	-3.1656	-3.1024	-3.2665
4476.	-3.0719	-3.0805	-3.1596	-3.1232	-3.1534	-3.1174	-3.2641
4494.	-3.0774	-3.0520	-3.1490	-3.1094	-3.0941	-3.0872	-3.2063
4512.	-3.0932	-3.0409	-3.1586	-3.0895	-3.1326	-3.0883	-3.2407
4529.	-3.0320	-3.0207	-3.0953	-3.0467	-3.0930	-3.0376	-3.2171
4547.	-3.0599	-3.0290	-3.1286	-3.0615	-3.1156	-3.0605	-3.2677
4564.	-3.0307	-3.0270	-3.1035	-3.0642	-3.0746	-3.0354	-3.2715
4582.	-3.0233	-3.0214	-3.0888	-3.0425	-3.0433	-3.0221	-3.2402
4600.	-3.1169	-3.1052	-3.1533	-3.1347	-3.1651	-3.1263	-3.3620
4617.	-3.1303	-3.0977	-3.1871	-3.1564	-3.1864	-3.1411	-3.3834

13

Table 1 (continued)

4635.	-3.0830	-3.0677	-3.1435	-3.1265	-3.1619	-3.1022	-3.3589
4652.	-3.1470	-3.1099	-3.2030	-3.1737	-3.2317	-3.1518	-3.4286
4670.	-3.1160	-3.0953	-3.1934	-3.1675	-3.1968	-3.1365	-3.3937
4688.	-3.1507	-3.1344	-3.2206	-3.1889	-3.2314	-3.1917	-3.4283
4705.	-3.1424	-3.1101	-3.1719	-3.1811	-3.2046	-3.1853	-3.4015
4723.	-3.1263	-3.1016	-3.2040	-3.1551	-3.2059	-3.1176	-3.4029
4740.	-3.1226	-3.1015	-3.1549	-3.1583	-3.2014	-3.0635	-3.3984
4758.	-3.1575	-3.1213	-3.1936	-3.1511	-3.2093	-3.0620	-3.4063
4775.	-3.1834	-3.1372	-3.1990	-3.1987	-3.2379	-3.0870	-3.4349
4793.	-3.1758	-3.1470	-3.2146	-3.1833	-3.2379	-3.1794	-3.4349
4811.	-3.1670	-3.1181	-3.2041	-3.1807	-3.2221	-3.1762	-3.4190
4828.	-3.1594	-3.1151	-3.1930	-3.1798	-3.1993	-3.1538	-3.3963
4846.	-3.1324	-3.1054	-3.1870	-3.1178	-3.1759	-3.1194	-3.3729
4863.	-2.8667	-2.8470	-2.8876	-2.8531	-2.8874	-2.8420	-3.0843
4881.	-3.0984	-3.0748	-3.1632	-3.0902	-3.1263	-3.1193	-3.3232
4898.	-3.1068	-3.0938	-3.1266	-3.0968	-3.1416	-3.1151	-3.3385
4916.	-3.0259	-3.0119	-3.0652	-3.0564	-3.0694	-3.0318	-3.2663
4934.	-3.0135	-2.9911	-3.0691	-3.0461	-3.0450	-3.0458	-3.2419
4951.	-3.0795	-3.0703	-3.1198	-3.1047	-3.1300	-3.0988	-3.3270
4969.	-3.1795	-3.1439	-3.2431	-3.2024	-3.2329	-3.1829	-3.4299
4986.	-3.1363	-3.1235	-3.2013	-3.1698	-3.2114	-3.1698	-3.4083
5004.	-3.1093	-3.0830	-3.1528	-3.1112	-3.1628	-3.1011	-3.3598
5022.	-3.0425	-3.0378	-3.1060	-3.0664	-3.0777	-3.0366	-3.2747
5039.	-3.0850	-3.0858	-3.1573	-3.1388	-3.1717	-3.1360	-3.3686
5057.	-3.0748	-3.0722	-3.1403	-3.1089	-3.1530	-3.1143	-3.3499
5075.	-3.0349	-3.0380	-3.1084	-3.0836	-3.1203	-3.0673	-3.3172
5092.	-3.0275	-3.0374	-3.0614	-3.0879	-3.1003	-3.0723	-3.2973
5110.	-3.0168	-3.0243	-3.0296	-3.0621	-3.0892	-3.0553	-3.2862
5128.	-2.9790	-3.0033	-3.0030	-3.0194	-3.0413	-3.0180	-3.2382
5145.	-2.9755	-2.9687	-2.9622	-2.9863	-3.0120	-2.9884	-3.2090
5163.	-2.9329	-2.9390	-2.9212	-2.9570	-2.9663	-2.9265	-3.1633
5181.	-3.0916	-3.0754	-3.1095	-3.1023	-3.1445	-3.1111	-3.3414
5198.	-3.0693	-3.0373	-3.0622	-3.0899	-3.1368	-3.0970	-3.3338
5216.	-3.0987	-3.0560	-3.0658	-3.0966	-3.1276	-3.1013	-3.3245
5234.	-3.0425	-3.0151	-3.0713	-3.0645	-3.0796	-3.0459	-3.2766
5251.	-3.0285	-3.0062	-3.1424	-3.0646	-3.0758	-3.0646	-3.2728
5268.	-2.9716	-2.9526	-3.0615	-3.0072	-3.0260	-2.9906	-3.2229
5286.	-3.0309	-3.0210	-3.1375	-3.0717	-3.0719	-3.0550	-3.2689
5303.	-2.9492	-2.9252	-3.0608	-3.0149	-3.0116	-2.9911	-3.2085
5320.	-2.9941	-3.0171	-3.1341	-3.0323	-3.0552	-3.0162	-3.2522
5310.	-3.0416	-3.0421	-3.0588	-3.0089	-3.0486	-3.0618	-4.2802
5328.	-3.0758	-3.0677	-3.0627	-3.0109	-3.0526	-3.0525	-2.4843
5346.	-3.1025	-3.0973	-3.0667	-3.0672	-3.0911	-3.0774	-2.5213
5363.	-3.0940	-3.0869	-3.0696	-3.0450	-3.0596	-3.0571	-2.0684
5381.	-3.1087	-3.0870	-3.0728	-3.0640	-3.0857	-3.0755	-2.5175
5399.	-3.0836	-3.0811	-3.0757	-3.0425	-3.0967	-3.0402	-2.4082
5417.	-3.0699	-3.0638	-3.0781	-3.0165	-3.0573	-3.0256	-4.2887
5435.	-3.0767	-3.0912	-3.0915	-3.1183	-3.0636	-3.0694	-2.2760
5453.	-3.1599	-3.1591	-3.1981	-3.1355	-3.1612	-3.1458	-4.3927
5470.	-3.1742	-3.1504	-3.1851	-3.1261	-3.1460	-3.1288	-2.3614
5488.	-3.1501	-3.1466	-3.1457	-3.1139	-3.1205	-3.1187	-2.0824
5506.	-3.1408	-3.1473	-3.1564	-3.1289	-3.1454	-3.1036	-2.2760
5524.	-3.0926	-3.1072	-3.1221	-3.0518	-3.0838	-3.0621	-2.0959
5542.	-3.1296	-3.1073	-3.1267	-3.0841	-3.0982	-3.0871	-3.2951
5560.	-3.1365	-3.1755	-3.1275	-3.0890	-3.1169	-3.0814	-3.3139
5577.	-3.1391	-3.1212	-3.1312	-3.1063	-3.1097	-3.0827	-3.3067
5595.	-3.1829	-3.1825	-3.1745	-3.1441	-3.1688	-3.1304	-3.3657
5613.	-3.1928	-3.1624	-3.1959	-3.1525	-3.1859	-3.1454	-3.3828
5631.	-3.1955	-3.1843	-3.1974	-3.1647	-3.1555	-3.1367	-3.3525
5649.	-3.1623	-3.1405	-3.1646	-3.1115	-3.1338	-3.1411	-3.3307
5667.	-3.1605	-3.1409	-3.1602	-3.1136	-3.1564	-3.1219	-3.3534
5685.	-3.1589	-3.1473	-3.1426	-3.1187	-3.1323	-3.1054	-3.3292
5702.	-3.1289	-3.1208	-3.1253	-3.0810	-3.0983	-3.0813	-3.2952
5720.	-3.1246	-3.1166	-3.1509	-3.0960	-3.1190	-3.1071	-3.3160
5738.	-3.1146	-3.1101	-3.1157	-3.0842	-3.0870	-3.0750	-3.2840
5756.	-3.1210	-3.1091	-3.1241	-3.0634	-3.0992	-3.0603	-3.2961
5774.	-3.1011	-3.1000	-3.1241	-3.0621	-3.0967	-3.0590	-3.2937
5792.	-3.0844	-3.0514	-3.0850	-3.0337	-3.0553	-3.0424	-3.2522

14

Table 1 (continued)

5810.	-3.0978	-3.1004	-3.1039	-3.0675	-3.0827	-3.0704	-3.2797
5828.	-3.0990	-3.0892	-3.1149	-3.0653	-3.0832	-3.0625	-3.2801
5846.	-3.1531	-3.1479	-3.1773	-3.1238	-3.1434	-3.1262	-3.3403
5864.	-3.1509	-3.1217	-3.1558	-3.1284	-3.1527	-3.1157	-3.3496
5881.	-3.1524	-3.1557	-3.1732	-3.1183	-3.1238	-3.1153	-3.3207
5899.	-3.2040	-3.1758	-3.1906	-3.1609	-3.1466	-3.1440	-3.3435
5917.	-3.1782	-3.1694	-3.1869	-3.1637	-3.1576	-3.1403	-3.3546
5935.	-3.1279	-3.1692	-3.1606	-3.1268	-3.1358	-3.1287	-3.3328
5953.	-3.1501	-3.1579	-3.1747	-3.1468	-3.1073	-3.1193	-3.3042
5971.	-3.1477	-3.1292	-3.1438	-3.0999	-3.1033	-3.1007	-3.3002
5989.	-3.1056	-3.1011	-3.1096	-3.0804	-3.0743	-3.0554	-3.2713
6007.	-3.1034	-3.0858	-3.1034	-3.0597	-3.0852	-3.0519	-3.2821
6025.	-3.0820	-3.0747	-3.0839	-3.0606	-3.0466	-3.0389	-3.2435
6043.	-3.0699	-3.0673	-3.0769	-3.0306	-2.9847	-3.0180	-3.1816
6061.	-3.0809	-3.0539	-3.0332	-3.0139	-3.0264	-3.0006	-3.2233
6079.	-3.0608	-3.0421	-3.0480	-3.0154	-3.0145	-3.0178	-3.2115
6096.	-3.0254	-3.0161	-3.0175	-3.0012	-3.0125	-2.9767	-3.2095
6114.	-3.0036	-2.9901	-2.9972	-2.9697	-2.9787	-2.9552	-3.1756
6132.	-2.9704	-2.9892	-2.9753	-2.9698	-2.9621	-2.9369	-3.1591
6150.	-3.0486	-3.0444	-3.0569	-3.0357	-3.0122	-3.0034	-3.2092
6168.	-3.1320	-3.1093	-3.0992	-3.1014	-3.0929	-3.0871	-3.2899
6186.	-3.1296	-3.1302	-3.1318	-3.0910	-3.0958	-3.0511	-3.2927
6204.	-3.1441	-3.1285	-3.1129	-3.1018	-3.0981	-3.0907	-3.2951
6222.	-3.1336	-3.1109	-3.0982	-3.0602	-3.0988	-3.0698	-3.2957
6240.	-3.0957	-3.0644	-3.0529	-3.0322	-3.0351	-3.0223	-3.2320
6258.	-3.1119	-3.0966	-3.0723	-3.0522	-3.0643	-3.0382	-3.2612
6276.	-3.0873	-3.0557	-3.0832	-3.0525	-3.0722	-3.0613	-3.2691
6294.	-3.0200	-3.0101	-3.0051	-2.9918	-2.9974	-2.9745	-3.1944
6312.	-3.0169	-3.0145	-3.0082	-2.9655	-2.9704	-2.9720	-3.1673
6329.	-3.0005	-3.0001	-2.9890	-2.9557	-2.9733	-2.9600	-3.1703
6347.	-2.9883	-2.9843	-2.9816	-2.9444	-2.9629	-2.9465	-3.1598
6365.	-2.9717	-2.9681	-2.9461	-2.9123	-2.9244	-2.8948	-3.1214
6383.	-2.9557	-2.9638	-2.9398	-2.9310	-2.9224	-2.9103	-3.1193
6401.	-2.9261	-2.9218	-2.9234	-2.8959	-2.9013	-2.8851	-3.0983
6419.	-2.9396	-2.9500	-2.9245	-2.9079	-2.9140	-2.8767	-3.1110
6437.	-2.8984	-2.8911	-2.8665	-2.8561	-2.8611	-2.8289	-3.0580
6455.	-2.8514	-2.8559	-2.8339	-2.8204	-2.8390	-2.8034	-3.0360
6473.	-2.8969	-2.8780	-2.8639	-2.8440	-2.8538	-2.8435	-3.0507
6491.	-2.8547	-2.8735	-2.8559	-2.8224	-2.8309	-2.8043	-3.0279
6509.	-2.8358	-2.8363	-2.8153	-2.7975	-2.8105	-2.7731	-3.0074
6527.	-2.7989	-2.7997	-2.7820	-2.7444	-2.7554	-2.7345	-2.9524
6545.	-2.4588	-2.3889	-2.4688	-2.3116	-2.3522	-2.3320	-2.5491
6563.	-2.2592	-2.2800	-2.2810	-2.2898	-2.3210	-2.2776	-2.5180
6581.	-2.8440	-2.8422	-2.8222	-2.8174	-2.8006	-2.7981	-2.9975
6599.	-2.8750	-2.8732	-2.8605	-2.8503	-2.8360	-2.8284	-3.0329
6617.	-2.9226	-2.9038	-2.8651	-2.8626	-2.8653	-2.8551	-3.0622
6635.	-2.9201	-2.9048	-2.8920	-2.8812	-2.8775	-2.8750	-3.0744
6653.	-2.9730	-2.9498	-2.9374	-2.9044	-2.9329	-2.9052	-3.1299
6671.	-2.9624	-2.9372	-2.9275	-2.9293	-2.9292	-2.8974	-3.1261
6689.	-2.9987	-2.9682	-2.9405	-2.9171	-2.9321	-2.9251	-3.1291
6707.	-3.0033	-2.9806	-2.9252	-2.9499	-2.9621	-2.9197	-3.1591
6724.	-2.9910	-2.9777	-2.9192	-2.9192	-2.9329	-2.9315	-3.1298
6740.	-2.8765	-2.8513	-2.9302	-2.9199	-2.9376	-2.8806	-3.1345
6757.	-2.9532	-2.9350	-2.9031	-2.8884	-2.8840	-2.8795	-3.0810
6773.	-2.9505	-2.9325	-2.9187	-2.8944	-2.8836	-2.8693	-3.0806
6790.	-2.9341	-2.9289	-2.8820	-2.8645	-2.8647	-2.8606	-3.0616
7120.	-2.8338	-2.8140	-2.6802	-2.8625	-2.8604	-2.7599	-4.0921
7138.	-2.7996	-2.7765	-2.6822	-2.8626	-2.8625	-2.8139	-2.2942
7157.	-2.7799	-2.7701	-2.6870	-2.8005	-2.7825	-2.8000	-2.2127
7175.	-2.7299	-2.7236	-2.6870	-2.7563	-2.7306	-2.7639	-1.7394
7193.	-2.7509	-2.7261	-2.6956	-2.7808	-2.7602	-2.7527	-2.1920
7212.	-2.7050	-2.7096	-2.7009	-2.7175	-2.7350	-2.7329	-2.0465
7230.	-2.6700	-2.6655	-2.7044	-2.6597	-2.6642	-2.6612	-2.8955
7248.	-2.6239	-2.6192	-2.6401	-2.6448	-2.6291	-2.6483	-1.8415
7267.	-2.6049	-2.5778	-2.6323	-2.5984	-2.5855	-2.6052	-3.8170
7285.	-2.5428	-2.5249	-2.5588	-2.5366	-2.5053	-2.5465	-1.7207
7303.	-2.4768	-2.4619	-2.4699	-2.4665	-2.4527	-2.4820	-1.4146

Table 1 (continued)

7322.	-2.4103	-2.4166	-2.4207	-2.4310	-2.4173	-2.4252	-1.5479
7340.	-2.3973	-2.4017	-2.4222	-2.3776	-2.3893	-2.4093	-1.4015
7358.	-2.3473	-2.3466	-2.3438	-2.3277	-2.3199	-2.3519	-2.5168
7377.	-2.3175	-2.2973	-2.3013	-2.2916	-2.2804	-2.2908	-2.4773
7395.	-2.2797	-2.2663	-2.2584	-2.2801	-2.2557	-2.2600	-2.4526
7413.	-2.2875	-2.2596	-2.2567	-2.2642	-2.2583	-2.2606	-2.4552
7432.	-2.2574	-2.2224	-2.2537	-2.2501	-2.2378	-2.2444	-2.4347
7450.	-2.2314	-2.2118	-2.2224	-2.2394	-2.1922	-2.2030	-2.3891
7469.	-2.2130	-2.1845	-2.1950	-2.1949	-2.1923	-2.2126	-2.3892
7487.	-2.2070	-2.1849	-2.1653	-2.1816	-2.1951	-2.2286	-2.3920
7505.	-2.1791	-2.1729	-2.1480	-2.1631	-2.1534	-2.2077	-2.3504

Table 1 (continued)

	Aug. 21 1980	Sep. 1 1980	Sep. 1 1980	Oct. 13 1980	Aug. 17 1983	Aug. 22 1983	Aug. 22 1983	Dec. 3 1984
3110.	-2.9703	-3.0348	-3.0370	-2.7863	-2.9042	-2.8873	-2.7328	
3119.	-2.9520	-3.0348	-2.9841	-2.7863	-2.8488	-2.8355	-2.8672	
3128.	-2.9847	-2.9818	-2.9766	-2.9710	-2.8040	-2.8151	-2.9318	
3137.	-2.9748	-2.9743	-2.9982	-2.9820	-2.9072	-2.7839	-2.9230	
3146.	-2.9646	-2.9959	-2.9954	-3.0151	-2.8508	-2.8299	-2.8907	
3155.	-2.9841	-2.9937	-2.9527	-2.9867	-2.8503	-2.7326	-2.9204	
3164.	-2.9473	-2.9504	-2.9516	-2.9512	-2.8393	-2.7669	-2.8399	
3173.	-2.9567	-2.9494	-2.9969	-2.9562	-2.8041	-2.7448	-2.8603	
3182.	-2.9387	-2.9946	0.0000	-2.9830	-2.8295	-2.7454	-2.7874	
3191.	-2.9676	-3.0130	-3.0127	-2.9926	-2.8598	-2.8152	-2.8368	
3200.	-2.9958	-3.0104	-2.9758	-3.0644	-2.7969	-2.8144	-2.8440	
3209.	-2.9751	-2.9735	-2.9727	-2.9539	-2.8503	-2.7661	-2.8758	
3217.	-2.9713	-2.9704	-2.9764	-2.9464	-2.8783	-2.7923	-2.8379	
3226.	-2.9534	-2.9741	-2.9794	-2.9734	-2.8396	-2.8430	-2.8430	-3.251
3235.	-2.9677	-2.9686	-2.9801	-2.9539	-2.8214	-2.8020	-2.8338	-3.318
3244.	-2.9601	-2.9759	-2.9580	-2.9580	-2.8168	-2.7757	-2.8232	-3.291
3253.	-2.9537	-2.9539	-2.9455	-2.9469	-2.8218	-2.8112	-2.7997	-3.320
3262.	-2.9585	-2.9420	-2.9230	-2.9372	-2.8111	-2.8130	-2.8007	-3.288
3271.	-2.9239	-2.9176	-2.9500	-2.9098	-2.8138	-2.7589	-2.8120	-3.284
3280.	-2.9377	-2.9459	-2.9464	-2.9425	-2.8328	-2.7906	-2.8211	-3.024
3289.	-2.9654	-2.9429	-2.9836	-2.9288	-2.8020	-2.8070	-2.7967	-3.274
3298.	-2.9488	-2.9801	-2.9646	-2.9677	-2.8180	-2.7659	-2.8380	-3.273
3307.	-2.9515	-2.9605	-2.9848	-2.9440	-2.8497	-2.7446	-2.8027	-3.327
3316.	-2.9568	-2.9807	-2.9732	-2.9594	-2.8621	-2.7776	-2.8509	-3.284
3325.	-2.9578	-2.9698	-2.9516	-2.9735	-2.8201	-2.7694	-2.8358	-3.297
3334.	-2.9566	-2.9481	-2.9910	-2.9741	-2.8148	-2.7943	-2.8067	-3.330
3343.	-2.9860	-2.9875	-2.9476	-3.0059	-2.8402	-2.7627	-2.8216	-3.289
3352.	-2.9503	-2.9448	-2.9610	-3.0177	-2.8163	-2.7802	-2.8263	-3.245
3361.	-2.9575	-2.9556	-2.9381	-2.9641	-2.8103	-2.7620	-2.8259	-3.267
3370.	-2.9505	-2.9341	-2.9536	-2.9619	-2.8276	-2.78885	-2.8229	-3.262
3379.	-2.9407	-2.9513	-2.9543	-2.9636	-2.8167	-2.8014	-2.7684	-3.219
3388.	-2.9693	-2.9502	-2.9669	-2.9442	-2.7987	-2.7473	-2.7898	-3.266
3397.	-2.9474	-2.9634	-2.9555	-2.9733	-2.7718	-2.7300	-2.7783	-3.260
3406.	-2.9429	-2.9526	-2.9438	-2.9297	-2.7838	-2.7378	-2.7463	-3.207
3415.	-2.9586	-2.9404	-2.9285	-2.9476	-2.7521	-2.7169	-2.7347	-3.207
3424.	-2.9327	-2.9250	-2.9393	-2.9038	-2.7299	-2.5894	-2.7624	-3.194
3433.	-2.9071	-2.9503	-2.9129	-2.9327	-2.7228	-2.6724	-2.7434	-3.214
3442.	-2.9237	-2.9112	-2.9476	-2.9053	-2.7552	-2.6975	-2.7364	-3.175
3450.	-2.9366	-3.1186	-2.9364	-2.9295	-2.7360	-2.6524	-2.7556	-3.219
3459.	-2.9032	-2.9353	-2.9355	-2.9070	-2.7361	-2.6785	-2.7265	-3.231
3468.	-2.9092	-2.9344	-2.9145	-2.9365	-2.7412	-2.6619	-2.7133	-3.258
3477.	-2.8795	-2.9128	-2.8851	-2.8916	-2.7187	-2.6647	-2.7297	-3.175
3486.	-2.8670	-2.8828	-2.8818	-2.9066	-2.7236	-2.6894	-2.7358	-3.198
3495.	-2.9016	-2.8795	-2.9207	-2.9084	-2.7365	-2.6827	-2.7062	-3.204
3504.	-2.9288	-2.9185	0.0000	-2.9395	-2.7249	-2.6922	-2.7386	-3.202
3513.	-2.9248	0.0000	0.0000	-2.9485	-2.7401	-2.6805	-2.7335	-3.227
3522.	-2.9449	0.0000	0.0000	-2.9479	-2.7528	-2.6989	-2.7199	-3.197

16

Table 1 (continued)

3531.	-2.9284	0.0000	0.0000	-2.9712	-2.7464	-2.6996	-2.7393	-3.187
3540.	-2.9421	0.0000	0.0000	-2.9612	-2.7239	-2.6766	-2.7306	-3.215
3549.	-2.9560	0.0000	-2.9227	-2.9778	-2.7442	-2.7010	-2.7275	-3.224
3558.	-2.9214	-2.9210	-2.9295	-2.9397	-2.7416	-2.6519	-2.7485	-3.248
3567.	-2.9116	-2.9290	-2.9272	-2.9397	-2.7427	-2.6612	-2.7621	-3.244
3576.	-2.9315	-2.9255	-2.9287	-2.9224	-2.7402	-2.6960	-2.7546	-3.269
3585.	-2.9110	-2.9259	-2.9502	-2.9410	-2.7522	-2.6866	-2.7366	-3.227
3594.	-2.9083	-2.9473	-2.9385	-2.9573	-2.7251	-2.6680	-2.7340	-3.258
3604.	-2.9306	-2.9350	-2.9364	-2.9658	-2.7213	-2.6713	-2.7165	-3.193
3612.	-2.9202	-2.9335	-2.9456	-2.9428	-2.7203	-2.6732	-2.7336	-3.166
3621.	-2.9248	-2.9421	-2.9577	-2.9434	-2.7222	-2.6726	-2.7158	-3.181
3630.	-2.9414	-2.9952	-2.9521	-2.9717	-2.7211	-2.6546	-2.7117	-3.163
3639.	-2.9233	-2.9451	-2.9677	-2.9639	-2.7084	-2.6532	-2.8390	-3.131
3648.	-2.9199	-2.9632	-2.9632	-2.9279	-2.7015	-2.6602	-2.8300	-3.180
3657.	-2.9205	-2.9551	-2.9717	-2.9292	-2.6963	-2.6378	-2.7093	-3.157
3666.	-2.9216	-2.9686	-2.9653	-2.9392	-2.6882	-2.6500	-2.7214	-3.152
3674.	-2.9676	-2.9573	-2.9922	-2.9546	-2.7230	-2.6935	-2.7184	-3.189
3683.	-2.9826	-2.9827	-2.9920	-2.9594	-2.6914	-2.6792	-2.7377	-3.229
3692.	-2.9664	-2.9837	-3.0043	-2.9698	-2.7161	-2.6977	-2.7482	-3.183
3701.	-2.9771	-2.9961	-3.0446	-2.9747	-2.6917	-2.6900	-2.7466	-3.153
3710.	-3.0339	-3.0359	-3.0343	-2.9910	-2.7231	-2.7020	-2.7827	-3.204
3719.	-3.0228	-3.0200	-3.0611	-2.9945	-2.7232	-2.7021	-2.7689	-3.273
3728.	-3.0198	-3.0516	-3.0367	-3.0464	-2.7408	-2.7271	-2.8062	-3.314
3737.	-3.0232	-3.0253	-3.0693	-2.9923	-2.7671	-2.7759	-2.7950	-3.287
3746.	-3.0588	-3.0548	-3.0770	-3.0433	-3.0487	-2.7716	-2.8255	-3.323
3755.	-3.0392	-3.0614	-3.1015	-3.0331	-3.0501	-2.7832	-2.8362	-3.259
3763.	-3.0919	-3.0886	-3.1546	-3.0947	-2.7872	-2.7910	-2.8423	-3.294
3772.	-3.1357	-3.1393	-3.1501	-3.1039	-2.8115	-2.7744	-2.8781	-3.307
3781.	-3.1274	-3.1414	-3.1357	-3.1264	-2.8044	-2.8122	-2.8891	-3.385
3790.	-3.1071	-3.1196	-3.1801	-3.1174	-2.8191	-2.8270	-2.9172	-3.389
3799.	-3.1476	-3.1716	-3.2362	-3.1644	-2.8474	-2.8251	-2.9170	-3.385
3808.	-3.1925	-3.2188	-3.1087	-3.1989	-2.8521	-2.8491	-2.9446	-3.471
3817.	-3.1021	-3.0973	-3.0397	-3.1016	-2.8788	-2.8783	-2.9418	-3.468
3826.	-3.0271	-3.0296	-3.0876	-3.0284	-2.9120	-2.9074	-2.9830	-3.498
3834.	-3.0603	-3.0758	-3.2234	-3.0666	-2.9230	-2.9422	-2.9759	-3.522
3843.	-3.1707	-3.2118	-3.2433	-3.1623	-2.9401	-2.9699	-3.0231	-3.530
3852.	-3.2251	-3.2308	-3.2498	-3.2433	-2.9275	-2.9560	-3.0531	-3.616
3860.	-3.1854	-2.9852	-3.0572	-3.1766	-2.8654	-2.8173	-2.9119	-3.375
3877.	-3.1784	-2.9577	-3.0010	-3.1491	-2.8318	-2.7813	-2.8845	-3.301
3895.	-3.1475	-2.9374	-3.2185	-3.1663	-2.8174	-2.7336	-2.7263	-3.246
3913.	-3.1689	-3.1490	-3.2057	-3.1729	-2.8303	-2.7879	-2.9167	-3.315
3930.	-3.1763	-3.1389	-3.1903	-3.1686	-2.8328	-2.8174	-2.9054	-3.449
3948.	-3.1251	-3.1580	-3.1902	-3.1453	-2.7620	-2.7711	-2.8555	-3.443
3965.	-3.1179	-3.1709	-3.1875	-3.1338	-2.7904	-2.7463	-2.8438	-3.406
3983.	-3.1146	-3.1675	-3.1755	-3.1260	-2.8060	-2.7563	-2.8130	-3.338
4001.	-3.1062	-3.1481	0.0000	-3.1162	-2.7731	-2.7241	-2.8312	-3.278
4018.	-3.0953	-3.1661	-3.1561	-3.1228	-2.7643	-2.7154	-2.8216	-3.273
4036.	-3.0892	-3.1459	-3.1258	-3.1215	-2.7561	-2.6947	-2.8198	-3.314
4053.	-3.0911	-3.1255	-3.1288	-3.1118	-2.7779	-2.7288	-2.8314	-3.300
4071.	-3.0932	-3.1275	-3.1319	-3.1047	-2.7610	-2.7271	-2.8243	-3.258
4088.	-3.0918	-3.1311	-3.1043	-3.1190	-2.7412	-2.7265	-2.8112	-3.229
4106.	-3.0627	-3.1042	-3.1249	-3.0321	-2.7039	-2.6931	-2.7551	-3.089
4124.	-3.0658	-3.1248	-3.1673	-3.0764	-2.7411	-2.6905	-2.7825	-3.139
4141.	-3.0944	-3.1667	-3.1326	-3.0910	-2.7639	-2.7189	-2.7928	-3.221
4159.	-3.0873	-3.1316	-3.0575	-3.0732	-2.7471	-2.7113	-2.7972	-3.249
4176.	-3.0055	-3.0564	-3.1233	-3.0226	-2.7251	-2.6760	-2.7574	-3.203
4194.	-3.0904	-3.1240	-3.1267	-3.0828	-2.7636	-2.7023	-2.8008	-3.238
4212.	-3.0977	-3.1259	-3.1093	-3.0893	-2.7823	-2.7129	-2.8194	-3.325
4229.	-3.0813	-3.1085	-3.0954	-3.1044	-2.7451	-2.7404	-2.7993	-3.354
4247.	-3.0243	-3.0956	-3.1282	-3.0357	-2.7488	-2.6972	-2.7774	-3.251
4264.	-3.0912	-3.1275	-3.0654	-3.0967	-2.7636	-2.7138	-2.8147	-3.260
4282.	-3.0464	-3.0647	-3.0199	-3.0689	-2.7271	-2.6840	-2.7795	-3.278
4300.	-3.0090	-3.0199	-3.0616	-2.9934	-2.7304	-2.6758	-2.7458	-3.237
4317.	-3.0572	-3.0611	-3.0037	-3.0588	-2.7571	-2.7129	-2.7897	-3.251
4335.	-3.0086	-3.0040	-2.9937	-3.0800	-2.6938	-2.6567	-2.7408	-3.159
4353.	-2.9649	-2.9910	-3.0910	-2.9763	-2.6614	-2.6188	-2.7114	-3.028
4370.	-3.0781	-3.0919	-3.0779	-3.0904	-2.6791	-2.6933	-2.7941	-3.186
4388.	-3.0317	-3.0769	-3.0533	-3.0705	-2.7416	-2.6949	-2.7647	-3.260

17

Table 1 (continued)

4406.	-3.0504	-3.0532	-3.0716	-3.0727	-2.7524	-2.7057	-2.8174	-3.305
4423.	-3.0283	-3.0725	-3.1169	-3.0456	-2.7579	-2.6888	-2.8048	-3.265
4441.	-3.1191	-3.1198	-3.0935	-3.1180	-2.7606	-2.7517	-2.8520	-3.266
4459.	-3.0773	-3.0950	-3.1018	-3.0837	-2.7888	-2.7342	-2.8198	-3.284
4476.	-3.0939	-3.1031	-3.0858	-3.0712	-2.7584	-2.7089	-2.8150	-3.266
4494.	-3.0457	-3.0915	-3.0685	-3.0615	-2.7778	-2.7122	-2.8251	-3.284
4512.	-3.0702	-3.0629	-3.0860	-3.0659	-2.7687	-2.7042	-2.7893	-3.296
4529.	-3.0316	-3.0889	-3.0782	-3.0339	-2.7520	-2.6980	-2.7740	-3.283
4547.	-3.0364	-3.0883	-3.0661	-3.0519	-2.7534	-2.7265	-2.8055	-3.369
4564.	-3.0325	-3.0667	-3.0686	-3.0348	-2.7431	-2.6950	-2.7731	-3.331
4582.	-3.0200	-3.0706	-3.1471	-3.0205	-2.7221	-2.6828	-2.7777	-3.222
4600.	-3.0977	-3.1491	-3.1415	-3.0852	-2.7863	-2.7528	-2.8335	-3.314
4617.	-3.1220	-3.1442	-3.1051	-3.1432	-2.7990	-2.7626	-2.8253	-3.357
4635.	-3.1070	-3.1052	0.0000	-3.0874	-2.7782	-2.7309	-2.8173	-3.327
4652.	-3.1496	0.0000	0.0000	-3.1533	-2.7776	-2.7667	-2.8520	-3.355
4670.	-3.1421	0.0000	0.0000	-3.1321	-2.7978	-2.7710	-2.8275	-3.343
4688.	-3.1660	0.0000	0.0000	-3.1565	-2.7939	-2.8330	-2.8596	-3.385
4705.	-3.1413	0.0000	0.0000	-3.1462	-2.8023	-2.7674	-2.8447	-3.332
4723.	-3.1194	0.0000	-3.1568	-3.1614	-2.8074	-2.7521	-2.8392	-3.307
4740.	-3.1244	-3.1588	-3.1900	-3.1191	-2.8102	-2.7415	-2.8286	-3.334
4758.	-3.1420	-3.1902	-3.1836	-3.1393	-2.7856	-2.7464	-2.8276	-3.326
4775.	-3.1583	-3.1845	-3.1823	-3.1839	-2.7783	-2.7876	-2.8727	-3.414
4793.	-3.1591	-3.1832	-3.1740	-3.1505	-2.8121	-2.7856	-2.8595	-3.377
4811.	-3.1527	-3.1737	-3.1719	-3.1552	-2.7860	-2.7818	-2.8690	-3.348
4828.	-3.1430	-3.1715	-3.1349	-3.1257	-2.7984	-2.7893	-2.8519	-3.338
4846.	-3.1012	-3.1362	-2.9090	-3.1033	-2.7929	-2.7718	-2.8529	-3.315
4863.	-2.8473	-2.9084	-3.1375	-2.8007	-2.7924	-2.5147	-2.8514	-2.941
4881.	-3.0954	-3.1378	-3.1484	-3.0581	-2.7807	-2.7535	-2.8145	-3.040
4898.	-3.1025	-3.1484	-3.0616	-3.0897	-2.7903	-2.7495	-2.8089	-3.283
4916.	-3.0174	-3.0635	-3.0525	-3.0303	-2.7907	-2.7020	-2.7657	-3.279
4934.	-3.0285	-3.0536	-3.1192	-2.9767	-2.7157	-2.6709	-2.7712	-3.177
4951.	-3.0818	-3.1210	-3.2077	-3.0579	-2.6967	-2.7121	-2.7956	-3.176
4969.	-3.1655	-3.2078	-3.1732	-3.1750	-2.7629	-2.8051	-2.8693	-3.414
4986.	-3.1346	-3.1733	-3.1256	-3.1397	-2.7998	-2.7635	-2.8423	-3.466
5004.	-3.0772	-3.1274	-3.0746	-3.1179	-2.7959	-2.7782	-2.8272	-3.356
5022.	-3.0260	-3.0744	-3.1349	-3.0474	-2.7598	-2.7038	-2.7705	-3.234
5039.	-3.1049	-3.1361	-3.1141	-3.1007	-2.7487	-2.7098	-2.8271	-3.347
5057.	-3.0924	-3.1160	-3.0957	-3.0966	-2.7930	-2.7226	-2.8048	-3.286
5075.	-3.0628	-3.0969	-3.0729	-3.0778	-2.7675	-2.7241	-2.8047	-3.257
5092.	-3.0557	-3.0724	-3.0523	-3.0444	-2.7584	-2.7180	-2.7774	-3.194
5110.	-3.0271	-3.0553	-3.0206	-3.0206	-2.7557	-2.6930	-2.7543	-3.183
5128.	-2.9858	-3.0227	-2.9909	-2.9880	-2.7128	-2.6880	-2.7304	-3.064
5145.	-2.9596	-2.9923	-2.9773	-2.9804	-2.6991	-2.6720	-2.7318	-3.057
5163.	-2.9437	-2.9794	-3.1059	-2.9083	-2.6746	-2.6334	-2.6983	-3.034
5181.	-3.0817	-3.1066	-3.0958	-3.0564	-2.6726	-2.7500	-2.8236	-3.351
5198.	-3.0484	-3.0972	-3.0984	-3.0551	-2.7797	-2.7348	-2.8081	-3.347
5216.	-3.0767	-3.0984	-3.0637	-3.0928	-2.7738	-2.7752	-2.8206	-3.309
5234.	-3.0223	-3.0652	-3.0297	-3.0297	-2.7682	-2.7031	-2.7844	-3.257
5251.	-3.0383	-3.0644	-2.9886	-3.0329	-2.7439	-2.7257	-2.7964	-3.229
5268.	-2.9718	-2.9916	-3.0550	-2.9674	-2.7363	-2.6791	-2.7459	-3.200
5286.	-3.0284	-3.0562	-2.9959	-3.0434	-2.7159	-2.7190	-2.7802	-3.195
5303.	-2.9801	-2.9984	-3.0125	-2.9746	-2.7243	-2.6776	-2.7442	-3.137
5320.	-3.0084	-3.0558	-3.0336	-3.0176	-2.7402	-2.7084	-2.7843	-3.218
5310.	-2.9905	-3.0218	-3.0241	-3.0394	-2.7258	-2.7052	-2.8048	-3.172
5328.	-3.0137	-3.0258	-3.0621	-3.0434	-2.7388	-2.7175	-2.8088	-3.064
5346.	-3.0233	-3.0639	-3.0452	-3.0424	-2.7514	-2.7176	-2.8197	-3.109
5363.	-3.0285	-3.0463	-3.0725	-3.0401	-2.7679	-2.7390	-2.8099	-3.113
5381.	-3.0452	-3.0735	-3.0631	-3.0382	-2.7305	-2.7525	-2.8243	-3.124
5399.	-3.0216	-3.0637	-3.0365	-3.0187	-2.7224	-2.7248	-2.8069	-3.094
5417.	-3.0060	-3.0367	-3.0660	-3.0107	-2.7817	-2.7055	-2.7748	-3.076
5435.	-3.0265	-3.0649	-3.1744	-3.0060	-2.8501	-2.7112	-2.7796	-3.059
5453.	-3.1017	-3.1738	0.0000	-3.1109	-2.8131	-2.7988	-2.8633	-3.192
5470.	-3.0879	-3.1690	-3.1155	-3.0997	-2.8110	-2.7910	-2.8791	-3.242
5488.	-3.0850	-3.1174	-3.1147	-3.0929	-2.7981	-2.7816	-2.8695	-3.207
5506.	-3.0809	-3.1154	-3.0741	-3.0805	-2.7933	-2.7855	-2.8578	-3.206
5524.	-3.0407	-3.0774	-3.0930	-3.0757	-2.7725	-2.7529	-2.8146	-3.171
5542.	-3.0547	-3.0920	-3.1235	-3.0834	-2.7713	-2.7519	-2.8146	-3.143
5560.	-3.0701	-3.1230	-3.1054	-3.0652	-2.8073	-2.7824	-2.8475	-3.140

18

Table 1 (continued)

5577.	-3.0504	-3.1053	-3.1438	-3.0663	-2.8134	-2.7692	-2.8443	-3.191
5595.	-3.0927	-3.1459	-3.1599	-3.1029	-2.8366	-2.8064	-2.8731	-3.221
5613.	-3.1122	-3.1625	-3.1431	-3.1029	-2.8464	-2.7959	-2.8993	-3.266
5631.	-3.0984	-3.1448	-3.1134	-3.1109	-2.8324	-2.7922	-2.9088	-3.257
5649.	-3.0756	-3.1316	-3.1196	-3.0901	-2.8373	-2.7985	-2.8635	-3.215
5667.	-3.0897	-3.1214	-3.1197	-3.0705	-2.8375	-2.7902	-2.8733	-3.226
5685.	-3.0697	-3.1202	-3.0914	-3.0946	-2.7961	-2.8012	-2.8643	-3.190
5702.	-3.0412	-3.0924	-3.1035	-3.0609	-2.8023	-2.7619	-2.8391	-3.171
5720.	-3.0609	-3.1049	-3.0733	-3.0574	-2.8193	-2.7732	-2.8597	-3.144
5738.	-3.0367	-3.0734	-3.0796	-3.0435	-2.7785	-2.7572	-2.8534	-3.141
5756.	-3.0407	-3.0797	-3.0694	-3.0300	-2.7975	-2.7497	-2.8276	-3.129
5774.	-3.0396	-3.0695	-3.0307	-3.0385	-2.7861	-2.7547	-2.8423	-3.134
5792.	-3.0128	-3.0308	-3.0628	-3.0133	-2.7748	-2.7415	-2.8166	-3.225
5810.	-3.0347	-3.0610	-3.0773	-3.0080	-2.7927	-2.7639	-2.8443	-3.093
5828.	-3.0374	-3.0779	-3.1169	-3.0081	-2.8117	-2.7399	-2.8511	-3.123
5846.	-3.0667	-3.1165	-3.1215	-3.0667	-2.8561	-2.8011	-2.8609	-3.140
5864.	-3.0650	-3.1207	-3.1279	-3.0297	-2.9006	-2.7720	-2.8808	-3.190
5881.	-3.0871	-3.1275	-3.1392	-3.0625	-2.8731	-2.7818	-2.8947	-3.149
5899.	-3.1170	-3.1393	-3.1441	-3.0783	-2.8599	-2.8468	-2.8994	-3.262
5917.	-3.1168	-3.1433	-3.1190	-3.1081	-2.8448	-2.8321	-2.8833	-3.317
5935.	-3.0951	-3.1202	-3.1081	-3.0731	-2.8497	-2.8058	-2.8883	-3.250
5953.	-3.0637	-3.1068	-3.0969	-3.0780	-2.8137	-2.8140	-2.8721	-3.232
5971.	-3.0668	-3.0972	-3.0793	-3.0506	-2.8218	-2.7897	-2.8771	-3.192
5989.	-3.0495	-3.0734	-3.0772	-3.0288	-2.8060	-2.7730	-2.8474	-3.179
6007.	-3.0175	-3.0760	-3.0523	-3.0235	-2.8152	-2.7826	-2.8491	-3.161
6025.	-3.0135	-3.0526	-3.0537	-3.0211	-2.7920	-2.7460	-2.8265	-3.102
6043.	-3.0021	-3.0540	-3.0200	-3.0090	-2.7829	-2.7234	-2.8347	-3.073
6061.	-2.9796	-3.0193	-3.0156	-2.9923	-2.7814	-2.7265	-2.8139	-3.069
6079.	-2.9801	-3.0154	-2.9806	-2.9891	-2.7814	-2.7376	-2.7960	-3.056
6096.	-2.9655	-2.9799	0.0000	-2.9543	-2.7551	-2.7178	-2.7930	-3.053
6114.	-2.9291	0.0000	0.0000	-2.9209	-2.7483	-2.6974	-2.7569	-3.004
6132.	-2.9230	0.0000	0.0000	-2.9143	-2.7322	-2.6801	-2.7290	-3.001
6150.	-2.9847	0.0000	0.0000	-2.9521	-2.7139	-2.8010	-2.8149	-3.049
6168.	-3.0524	0.0000	0.0000	-3.0406	-2.7801	-2.8006	-2.8762	-3.242
6186.	-3.0448	0.0000	-3.0957	-3.0613	-2.8455	-2.7970	-2.8895	-3.254
6204.	-3.0618	-3.0945	-3.0797	-3.0496	-2.8647	-2.7866	-2.8965	-3.249
6222.	-3.0331	-3.0791	-3.0262	-3.0437	-2.8487	-2.8190	-2.8870	-3.238
6240.	-2.9976	-3.0231	-3.0492	-3.0006	-2.8251	-2.7784	-2.8431	-3.197
6258.	-3.0092	-3.0496	-3.0475	-3.0064	-2.7986	-2.7898	-2.8345	-3.146
6276.	-3.0101	-3.0248	-2.9750	-3.0156	-2.8029	-2.7686	-2.8481	-3.135
6294.	-2.9547	-2.9754	-2.9757	-2.9370	-2.7942	-2.7426	-2.7957	-3.042
6312.	-2.9449	-2.9745	-2.9323	-2.9419	-2.7522	-2.7121	-2.7829	-2.997
6329.	-2.9287	-2.9311	-2.9657	-2.9036	-2.7720	-2.6985	-2.7864	-3.030
6347.	-2.9319	-2.9667	-2.9360	-2.9100	-2.7417	-2.6997	-2.7761	-2.994
6365.	-2.8946	-2.9349	-2.9187	-2.8877	-2.7465	-2.6691	-2.7688	-2.979
6383.	-2.8806	-2.9216	-2.8856	-2.8838	-2.7141	-2.6767	-2.7290	-2.963
6401.	-2.8630	-2.8850	-2.9078	-2.8249	-2.6838	-2.6381	-2.7248	-2.891
6419.	-2.8556	-2.9098	-2.8680	-2.8506	-2.6675	-2.6409	-2.7247	-2.921
6437.	-2.8276	-2.8680	-2.8295	-2.8332	-2.6883	-2.6494	-2.6926	-2.874
6455.	-2.7979	-2.8295	-2.8489	-2.7952	-2.6484	-2.5898	-2.6506	-2.865
6473.	-2.8116	-2.8490	-2.8384	-2.8036	-2.6292	-2.6310	-2.6882	-2.818
6491.	-2.8013	-2.8390	-2.8076	-2.8104	-2.6685	-2.6085	-2.6854	-2.845
6509.	-2.7691	-2.8077	-2.7654	-2.7494	-2.6719	-2.6032	-2.6516	-2.842
6527.	-2.7540	-2.7654	-2.3355	-2.7292	-2.6166	-2.5477	-2.6015	-2.772
6545.	-2.4659	-2.3333	-2.3658	-2.4173	-2.5629	-2.2888	-2.3835	-2.599
6563.	-2.2557	-2.3649	-2.8152	-2.1844	-2.0596	-1.9846	-2.0706	-2.165
6581.	-2.7699	-2.8147	-2.8600	-2.7344	-2.1544	-2.5786	-2.6220	-2.708
6599.	-2.8015	-2.8601	-2.8749	-2.7870	-2.6376	-2.6279	-2.6753	-2.839
6617.	-2.8275	-2.8738	-2.8993	-2.8320	-2.6550	-2.6401	-2.7010	-2.867
6635.	-2.8597	-2.8982	-2.9203	-2.8407	-2.6801	-2.6562	-2.7259	-2.897
6653.	-2.8904	-2.9199	-2.9327	-2.8746	-2.7069	-2.6846	-2.7605	-2.962
6671.	-2.8782	-2.9305	-2.9365	-2.8745	-2.7281	-2.7027	-2.7652	-2.937
6689.	-2.8987	-2.9349	-2.9525	-2.9068	-2.7488	-2.7203	-2.7783	-3.016
6707.	-2.8959	-2.9508	-2.9344	-2.9151	-2.7460	-2.7183	-2.7895	-3.027
6724.	-2.8977	-2.9334	-2.9279	-2.8929	-2.7576	-2.7337	-2.7919	-3.049
6740.	-2.8697	-2.9262	-2.8852	-2.8644	-2.7509	-2.7104	-2.7561	-2.986
6757.	-2.8497	-2.8836	-2.8927	-2.8609	-2.7368	-2.7007	-2.7451	-2.986
6773.	-2.8555	-2.8916	-2.8642	-2.8480	-2.7086	-2.6694	-2.7233	-2.950

19

Table 1 (continued)

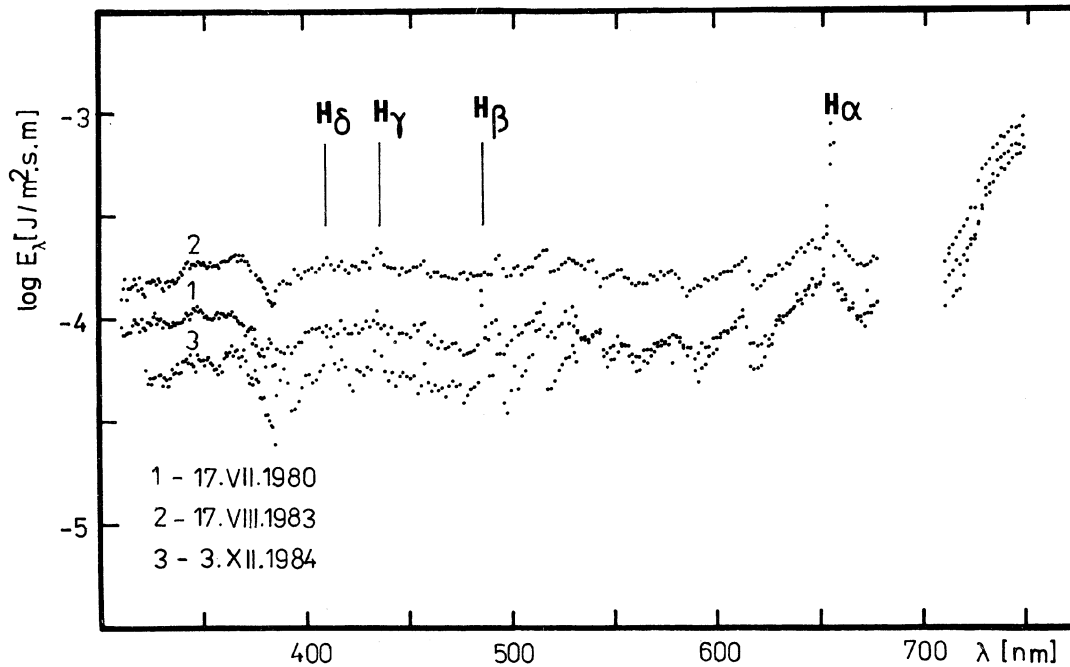|							
6790.	-2.8483	-2.8644	-2.8399	-2.8352	-2.7233	-2.6651	-2.7377	-2.930
7120.	-2.8311	-2.7594	-2.7616	-2.8409	-2.7343	-2.7078	-2.6766	-2.953
7138.	-2.8217	-2.7614	-2.7972	-2.8429	-2.6969	-3.0681	-2.7341	-2.671
7157.	-2.7611	-2.7997	-2.7809	-2.7705	-2.6522	-2.7376	-2.6792	-2.906
7175.	-2.7479	-2.7787	-2.7416	-2.7541	-2.6170	-2.6175	-2.6349	-2.878
7193.	-2.7490	-2.7483	-2.7431	-2.7561	-2.5886	-2.6039	-2.6695	-2.867
7212.	-2.7102	-2.7457	-2.6843	-2.6949	-2.5617	-2.5437	-2.6704	-2.803
7230.	-2.6651	-2.6855	-2.6285	-2.6699	-2.5286	-2.5120	-2.5406	-2.732
7248.	-2.6273	-2.6267	-2.6223	-2.6179	-2.4720	-2.4615	-2.4867	-2.653
7267.	-2.6014	-2.6229	0.0000	-2.5890	-2.4718	-2.4356	-2.4539	-2.624
7285.	-2.5430	-2.6237	-2.4790	-2.5401	-2.3390	-2.3275	-2.3960	-2.553
7303.	-2.4692	-2.4841	-2.4407	-2.4814	-2.2817	-2.2749	-2.3386	-2.461
7322.	-2.4343	-2.4407	-2.4134	-2.4267	-2.2587	-2.2331	-2.2733	-2.374
7340.	-2.4056	-2.4156	-2.3471	-2.4252	-2.2357	-2.2191	-2.2566	-2.358
7358.	-2.3374	-2.3486	-2.3293	-2.4311	-2.1790	-2.1646	-2.2080	-2.308
7377.	-2.3130	-2.3355	-2.2997	-2.2952	-2.1626	-2.1394	-2.1810	-2.239
7395.	-2.2710	-2.2982	-2.3091	-2.2602	-2.1265	-2.0957	-2.1569	-2.225
7413.	-2.2528	-2.3076	-2.2836	-2.2604	-2.1311	-2.1134	-2.1554	-2.207
7432.	-2.2441	-2.2853	-2.2624	-2.2150	-2.1040	-2.0630	-2.1537	-2.201
7450.	-2.2080	-2.2609	-2.2360	-2.2119	-2.0795	-2.0478	-2.1487	-2.167
7469.	-2.1934	-2.2353	-2.2227	-2.2027	-2.0831	-2.0349	-2.1196	-2.160
7487.	-2.1853	-2.2221	-2.2013	-2.1674	-2.0751	-2.0208	-2.0919	-2.166
7505.	-2.1572	-2.2022	-2.1919	-2.1616	-2.0276	-2.0242	-2.0707	-2.119
								-2.137

Fig. 2. Measurements made on 3 selected nights representing the main changes in the energy distribution in the spectrum.

20

TABLE 2

SPECTROPHOTOMETRIC OBSERVATIONS OF CH Cygni IN 1980 - 1983

logE $[10^{-1} J/m^2 .s.m]$ in wavelenght [Å]

DATE	2444000.+	3110.	3549.	3860.	4723.	5310.	5500.	6186.	7120.	8015.
16.07 1980	437.374		-3.010		-3.113		-3.068	-3.069		-2.274
	437.380		-2.984		-3.115		-3.056	-3.059		-2.285
	437.385		-2.998		-3.106		-3.062	-3.060		-2.282
19.07 1980	440.354		-2.916		-3.088		-3.029	-3.032		-2.278
	440.386		-2.979		-3.140		-3.071	-3.064		-2.264
	440.397		-2.927		-3.124		-3.060	-3.063		-2.270
	440.411		-2.949		-3.106		-3.049	-3.051		-2.276
	440.422		-2.978		-3.132		-3.061	-3.062		-2.258
	440.444		-2.918		-3.101		-3.036	-3.041		-2.258
20.07 1980	441.355		-3.014		-3.194		-3.105	-3.101		-2.253
	441.360		-3.056		-3.210		-3.122	-3.116		-2.282
	441.404		-3.032		-3.192		-3.115	-3.109		-2.274
	441.410		-3.053		-3.205		-3.131	-3.120		-2.277
	441.415		-2.989		-3.170		-3.095	-3.087		-2.242
	441.421		-3.028		-3.188		-3.035	-3.111		-2.248
	441.428		-3.030		-3.217		-3.114	-3.111		-2.261
2.08 1980	454.338		-3.109		-3.282		-3.072	-3.173		
	454.354		-3.108		-3.288		-3.077	-3.173		
3.08 1980	455.312		-3.036		-3.180		-3.103	-3.099		-2.285
	455.319		-3.010		-3.172		-3.091	-3.086		-2.287
	455.325		-3.010		-3.159		-3.080	-3.082		-2.256
	455.331		-2.989		-3.150		-3.076	-3.074		-2.254
	455.335		-2.984		-3.134		-3.070	-3.073		-2.237
	455.344		-3.024		-3.163		-3.094	-3.091		-2.242
	455.350		-3.020		-3.176		-3.087	-3.094		-2.244
	455.354		-3.006		-3.160		-3.080	-3.084		-2.289
	455.362		-3.016		-3.176		-3.100	-3.097		-2.250
	455.367		-3.032		-3.179		-3.103	-3.097		-2.249
	455.372		-3.057		-3.166		-3.078	-3.075		-2.307
	455.383		-3.014		-3.166		-3.085	-3.079		-2.274
	455.387		-3.062		-3.205		-3.125	-3.116		-2.260
	455.391		-3.079		-3.213		-3.132	-3.125		-2.267
	455.398		-2.984		-3.157		-3.076	-3.071		-2.241
6.08 1980	458.323		-3.033		-3.217		-3.128	-3.122		-2.258
	458.333		-2.954		-3.168		-3.082	-3.080		-2.273
	458.336		-2.957		-3.170		-3.090	-3.082		-2.254
	458.343		-2.928		-3.149		-3.035	-3.064		-2.291
	458.345		-2.965		-3.179		-3.091	-3.087		-2.265
	458.353		-2.949		-3.168		-3.081	-3.073		-2.253
	458.356		-2.917		-3.147		-3.067	-3.062		-2.260

21

Table 2 (continued)

Date	Year	JD					
7.08	1980	458.375	−2.897	−3.160	−3.056	−3.047	−2.233
		458.380	−2.907	−3.164	−3.067	−3.055	−2.228
		458.384	−2.938	−3.174	−3.052	−3.072	−2.258
		458.389	−2.940	−3.166	−3.080	−3.073	−2.256
8.08	1980	459.310	−3.047	−3.241	−3.137	−3.134	−2.204
		460.310	−2.930	−3.152	−3.070	−3.059	−2.249
		460.317	−2.972	−3.194	−3.100	−3.030	−2.288
		460.322	−2.972	−3.190	−3.099	−3.086	−2.276
		460.327	−2.953	−3.180	−3.093	−3.082	−2.281
9.08	1980	460.333	−3.000	−3.172	−3.117	−3.107	−2.270
		461.298	−3.024	−3.195	−3.109	−3.100	−2.270
		461.306	−2.971	−3.158	−3.084	−3.076	−2.246
		461.312	−2.989	−3.180	−3.094	−3.094	−2.262
		461.395	−3.061	−3.216	−3.127	−3.124	−2.242
21.08	1980	473.316	−2.884	−3.077	−3.009	−2.998	−2.236
		473.318	−2.921	−3.108	−3.046	−3.031	−2.237
		473.328	−2.965	−3.142	−3.058	−3.056	−2.248
		473.336	−2.969	−3.141	−3.059	−3.052	−2.257
		473.356	−2.939	−3.146	−3.065	−3.062	−2.248
28.08	1980	480.293	−2.886	−3.052	−3.007	−3.015	−2.272
		480.301	−2.882	−3.051	−3.005	−3.009	−2.252
		480.312	−2.889	−3.054	−3.016	−3.011	−2.253
29.08	1980	481.304	−2.894	−3.080	−3.020	−3.025	−2.266
		481.321	−2.878	−3.064	−3.018	−3.018	−2.268
		481.326	−2.892	−3.078	−3.023	−3.027	−2.263
		481.337	−2.859	−3.047	−2.994	−2.992	−2.243
		481.342	−2.866	−3.057	−3.008	−3.015	−2.272
1.09	1980	484.335	−2.863	−3.076	−3.016	−3.010	−2.248
		484.347	−2.864	−3.075	−3.009	−2.988	−2.258
		484.355	−2.898	−3.109	−3.039	−3.044	−2.269
4.09	1980	487.366	−2.852	−3.041	−2.983	−2.986	−2.243
		487.375	−2.880	−3.062	−3.004	−3.005	−2.258
		487.380	−2.899	−3.085	−3.023	−3.028	−2.252
		487.392	−2.892	−3.071	−3.010	−3.009	−2.261
		487.402	−2.914	−3.092	−3.026	−3.028	−2.246
22.09	1980	505.276	−2.967	−3.153	−3.073	−3.066	−2.270
		505.282	−2.928	−3.127	−3.047	−3.044	−2.259
		505.287	−2.958	−3.154	−3.071	−3.063	−2.276
13.10	1980	256.271	−2.902	−3.094	−3.027	−3.026	−2.264
20.10	1980	533.250	−2.879	−3.039	−2.981	−2.993	−2.231
		533.256	−2.904	−3.059	−2.990	−3.000	−2.228
30.11	1980	574.288	−3.010	−3.180	−3.063	−3.057	−2.175
		574.293	−3.047	−3.188	−3.064	−3.052	−2.152
4.06	1981	760.368	−2.967	−3.126	−3.025	−3.008	−2.163
		760.732	−3.011	−3.160	−3.049	−3.052	−2.143
17.06	1981	773.347	−2.937	−3.084	−2.812	−3.008	−2.209
		773.361	−3.003	−3.068	−3.000	−2.940	
				−3.221			

Table 2 (continued)

Date	Year	JD					
20.07	1981	806.372	-2.792	-2.942		-2.903	-2.199
		806.376	-2.798	-2.973		-2.924	-2.154
		806.390	-2.826	-2.974		-2.932	-2.213
		806.399	-2.811	-2.955		-2.910	-2.135
		806.413	-2.808	-2.959		-2.914	-2.168
22.07	1981	808.312	-2.737	-2.880		-2.904	-2.177
		808.322	-2.748	-2.900		-2.877	-2.146
		808.337	-2.735	-2.873		-2.869	-2.166
		808.346	-2.700	-2.824		-2.808	-2.136
		808.354	-2.708	-2.865		-2.866	-2.159
		808.361	-2.721	-2.864	-2.853	-2.864	-2.148
		808.369	-2.718	-2.863	-2.832	-2.864	-2.112
27.07	1981	813.292	-2.810	-2.937	-2.869	-2.906	-2.223
		813.302	-2.821	-2.955	-2.924	-2.926	-2.192
		813.314	-2.819	-2.954	-2.820	-2.914	-2.198
10.08	1981	827.275	-2.820	-2.918	-2.826	-2.924	-2.237
		827.323	-2.845	-2.852	-2.809	-2.945	-2.214
		827.328	-2.852	-2.947	-2.776	-2.952	-2.227
19.08	1981	836.361	-2.716	-2.863	-2.797	-2.888	-2.219
		836.369	-2.677	-2.834	-2.778	-2.863	-2.215
20.08	1981	837.326	-2.779	-2.907	-2.804	-2.904	-2.161
		837.340	-2.632	-2.832	-2.761	-2.862	-2.248
22.08	1981	839.368	-2.672	-2.812	-2.775	-2.833	-2.192
31.08	1981	848.271	-2.660	-2.821	-2.743	-2.849	-2.242
		848.285	-2.667	-2.808	-2.740	-2.840	-2.151
1.09	1981	849.243	-2.666	-2.817	-2.777	-2.849	-2.190
		849.253	-2.610	-2.757	-2.787	-2.798	-2.130
		849.260	-2.594	-2.743	-2.756	-2.790	-2.131
5.09	1981	853.285	-2.646	-2.770	-2.816	-2.797	-2.108
		853.299	-2.733	-2.827	-2.808	-2.855	-2.145
7.09	1981	855.243	-2.753	-2.844	-2.826	-2.877	-2.146
		855.257	-2.725	-2.820	-2.807	-2.852	-2.141
19.09	1981	867.283	-2.755	-2.845	-2.826	-2.869	-2.148
		867.288	-2.782	-2.871	-2.844	-2.898	-2.151
		867.299	-2.775	-2.863	-2.838	-2.882	-2.151
		867.302	-2.763	-2.854	-2.831	-2.875	-2.134
22.09	1981	870.285	-2.839	-2.983	-2.816	-2.793	
		870.292	-2.867	-2.948	-2.774	-2.765	
		870.314	-2.809	-2.919	-2.758	-2.748	
23.09	1981	871.236	-2.800	-2.909	-2.770	-2.731	
		871.254	-2.799	-2.897	-2.716	-2.708	
		871.261	-2.806	-2.907	-2.723	-2.846	
		871.268	-2.786	-2.862	-2.703	-2.691	
		871.275	-2.770	-2.909	-2.716	-2.712	
		871.288	-2.796	-2.910	-2.717	-2.696	
		871.292	-2.819	-2.932	-2.788	-2.717	
		871.300	-2.892	-2.974	-2.765	-2.731	

Table 2 (continued)

Date	Year	JD									
29.09	1981	871.303						-2.815	-2.866	-2.753	-2.114
6.10	1981	871.309						-2.824	-2.880	-2.755	-2.129
7.10	1981	877.271	-2.874	-2.757	-2.967	-2.849	-2.766	-2.822	-2.914	-2.766	-2.309
		884.312	-2.830	-2.768	-2.989	-2.855	-2.790	-2.879			
		884.319	-2.926	-2.774	-2.998	-2.966	-2.801	-2.837			
21.10	1981	885.326	-2.814	-2.761	-2.860	-2.808	-2.735	-2.848	-2.891	-2.754	-2.163
		885.334	-2.825	-2.642	-2.876	-2.762	-2.736	-2.855			
		899.274		-2.665		-2.778		-2.768	-2.832	-2.752	-2.198
		899.283		-2.525		-2.839		-2.786	-2.845		-2.199
		899.288						-2.777	-2.916		
		899.292						-2.793			-2.211
25.11	1981	934.231	-2.797	-2.621	-2.804	-2.770	-2.721	-2.709	-2.844	-2.767	-2.264
4.06	1982	1125.338	-2.695	-2.542	-2.786	-2.740	-2.715	-2.778	-2.806	-2.760	-2.207
		1125.347		-2.537		-2.702		-2.789	-2.694		
5.06	1982	1126.351	-2.694	-2.606	-2.716	-2.748	-2.663	-2.766	-2.832	-2.714	-2.227
		1126.361		-2.668		-2.781		-2.754			
6.06	1982	1127.310	-2.707	-2.647	-2.750	-2.790	-2.696	-2.770	-2.845	-2.755	-2.254
		1127.322						-2.726	-2.853		
13.06	1982	1134.306	-2.758	-2.695	-2.810	-2.807	-2.713	-2.756	-2.870	-2.796	-2.203
		1134.314		-2.671		-2.785		-2.773	-2.846	-2.777	
13.07	1982	1164.408	-2.871	-2.607	-2.846	-2.722	-2.756	-2.763	-2.802	-2.729	-2.182
		1164.426	-2.871	-2.640		-2.745	-2.754	-2.793	-2.807		-2.147
		1164.436		-2.762		-2.881		-2.769	-2.959		
27.07	1982	1178.352	-2.846	-2.725	-2.819	-2.847	-2.725	-2.806	-2.924	-2.748	-2.178
10.08	1982	1192.278	-2.829	-2.650	-2.810	-2.796	-2.704	-2.810	-2.872	-2.807	-2.320
		1192.294		-2.656		-2.804		-2.806	-2.872	-2.808	-2.285
14.08	1982	1196.267	-2.871	-2.577	-2.851	-2.741	-2.784	-2.783	-2.828	-2.726	-2.278
		1196.272	-2.871	-2.573	-2.860	-2.746	-2.782	-2.792	-2.823	-2.705	-2.257
17.08	1982	1199.381	-2.846	-2.658	-2.795	-2.803	-2.676	-2.747	-2.841	-2.696	-2.202
		1199.406		-2.666	-2.780	-2.817	-2.678	-2.760	-2.883		-2.169
22.08	1982	1204.319	-2.829	-2.687	-2.802	-2.824	-2.692	-2.754	-2.851	-2.712	-2.137
16.09	1982	1229.267						-2.897			-2.209
		1229.271						-2.872			-2.156
		1229.277						-2.836			
		1229.281						-2.848			
19.09	1982	1232.268						-2.814			
		1232.274						-2.823			
15.10	1982	1258.274						-2.767			
		1258.282						-2.758			
		1258.287						-2.756			
		1258.292						-2.735			
10.11	1982	1284.296						-2.740			
		1284.299						-2.796			
25.11	1982	1299.321						-2.818			
		1299.325						-2.800			
		1299.330						-2.770			
15.06	1983	1501.309						-2.709			

24

Table 2 (continued)

Date	Year	λ									
25.06	1983	1501.319	-2.696	-2.606	-2.710	-2.702	-2.583	-2.717	-2.768	-2.632	-2.032
28.06	1983	1511.354	-2.892	-2.619	-2.822	-2.719	-2.668	-2.638	-2.776	-2.722	-2.075
		1511.362	-2.971	-2.743	-2.889	-2.753	-2.713	-2.708	-2.814	-2.755	-2.125
4.08	1983	1514.312	-2.946	-2.758	-2.931	-2.802	-2.748	-2.733	-2.850	-2.744	-2.170
		1551.271	-2.951	-2.782	-2.929	-2.860	-2.736	-2.780	-2.880	-2.748	-2.176
17.08	1983	1551.285	-2.940	-2.750	-2.938	-2.828	-2.735	-2.749	-2.866	-2.765	-2.203
		1564.330	-3.051	-2.836	-3.059	-2.908	-2.816	-2.787	-2.935	-2.808	-2.197
		1564.411	-3.012	-2.861	-3.015	-2.930	-2.793	-2.814	-2.940	-2.812	-2.193
22.08	1983	1564.415	-2.975	-2.776	-2.985	-2.848	-2.764	-2.803	-2.873	-2.780	-2.207
		1569.317	-2.987	-2.801	-2.986	-2.875	-2.761	-2.832	-2.895	-2.779	-2.188
		1569.324	-2.961	-2.779	-2.978	-2.858	-2.766	-2.808	-2.877	-2.783	-2.196
23.08	1983	1569.336	-2.978	-2.818	-2.978	-2.869	-2.760	-2.799	-2.897	-2.772	-2.205
		1570.268	-3.043	-2.781	-3.021	-2.855	-2.791	-2.884	-2.876	-2.788	-2.205
		1570.274	-2.938	-2.724	-2.970	-2.820	-2.747	-2.856	-2.842	-2.774	-2.204
		1570.280	-2.937	-2.742	-2.976	-2.830	-2.740	-2.875	-2.858	-2.767	-2.180
31.08	1983	1570.285	-2.957	-2.745	-3.016	-2.815	-2.763	-2.889	-2.864	-2.771	-2.257
		1578.261	-2.965	-2.746	-3.019	-2.828	-2.765	-2.825	-2.865	-2.770	-2.243
		1578.266	-2.973	-2.736	-3.030	-2.804	-2.771	-2.822	-2.851	-2.782	-2.233
2.09	1983	1578.273	-2.881	-2.533	-2.914	-2.732	-2.715	-2.821	-2.789	-2.772	-2.168
		1580.264	-2.942	-2.543	-2.986	-2.744	-2.754	-2.821	-2.792	-2.817	-2.152
		1580.266	-2.915	-2.824	-2.928	-2.870	-2.738	-2.828	-2.924	-2.802	-2.292
		1580.276	-2.776	-2.835	-2.821	-2.876	-2.702	-2.844	-2.936	-2.715	-2.313
4.09	1983	1580.281	-3.037		-3.035		-2.824	-2.824		-2.879	
		1582.278	-2.970		-2.970		-2.771	-2.866		-2.837	
		1582.287						-2.839			
10.09	1983	1588.256						-2.816			
		1588.263						-2.835			
		1588.273						-2.828			
		1588.281						-2.793			
		1588.290						-2.809			
12.09	1983	1590.230						-2.831			
		1590.233						-2.839			
		1590.237						-2.848			
15.10	1983	1623.247						-2.782			
		1623.252						-2.836			
		1623.259						-2.812			
		1623.264						-2.819			
16.10	1983	1624.182						-2.764			
		1624.188						-2.800			
23.10	1983	1631.183						-2.735			
		1631.191						-2.745			
		1631.199						-2.757			
24.10	1983	1632.223						-2.890			
		1632.228						-2.839			
		1632.235						-2.869			
		1632.241						-2.876			

25

photometrically in the summer of 1981 (Skopal, 1989, Fig. 1). A significant dec-
rease in the intensity of the blue continuum was observed photometrically in July
and August 1984 (e.g., Panov et al., 1985). Our observations of Dec. 3, 1984 (Figs
1 and 2) have indicated that the energy distribution in the CH Cygni spectrum was
similar to the radiation of the M6III giant (cf. Tsuji, 1978). The raddiation in
the molecular belt TiO (618.0 nm): $I_\lambda = -2.5 \log[F_\lambda/F_{\lambda_1}+(F_{\lambda_2}-F_{\lambda_1})(\lambda-\lambda_1)/(\lambda_2-\lambda_1)]$,
where λ_1 and λ_2 are the wavelengths of the continuum and F_λ is the flux in the
belt, was roughly equal to 0.64, which, according to Kenyon and Fernandez-Castro
(1987) should correspond to the classification of a red giant M 7.7 (this value

Fig. 3. Radiation flux at selected wavelengths during the interval from July 16,
1980 to October 24, 1983.

26

was obtained by extrapolation). Coversely, in 1983 our observations yielded $I_\lambda = 0.36-0.40$ (M5.1 - M5.5). In the interval of Apr. 9 - 14, 1984, Kenyon and Fernandez-Castro even observed $I_{618} = 0.17$ (M2.0). It is evident that the titanium belt 618.0 nm cannot be used to determine the spectral type of the cool component of CH Cygni reliably during the period of maximum activity. Nevertheless Luud et al. (1982) and Andrillat (1988) pointed out the actual changes of the spectral type of the cool component of CH Cygni during the quiescent phase.

ACKNOWLEDGEMENTS

REFERENCES

Andrillat, Y.: 1988, IAU Circ. No. 4625.
Deutsch, A. J.: 1964, Ann. Rep. Mt. Wilson and Palomar Obs. 11.
Fehrenbach, Ch.: 1977, IAU Circ. No. 3102.
Faraggiana, R., Hack, M.: 1971, Astron. Astrophys. 15, 55. .
Hack, M., Rusconi, L., Sedmak, G., Engin, S., Yilmaz, N.: 1982, Astron. Astrophys. 113, 250.
Ipatov, A. P., Yudin, B. F.: 1983, Pisma v Astron. Zh. 9, 421.
Ipatov, A. P., Taranova, O. G., Yudin, B. F.: 1974, Astron. Astrophys. 135, 325.
Kenyon, S.J., Fernandez-Castro, T.: 1987, Astron. J. 93, 938.
Luud, L., Vennik, J., Pechk, M.: 1982, Publ. Tartu Astrofiz. Obs. 49, 77.
Mikolajewski, M., Tomov, T., Mikolajewska, J.: 1987, Astrophys. Space Sci. 131, 733.
Panov, K. P., Kovachev, B., Ivanova, M., Geyer, E. H.: 1985, Astrophys. Space Sci. 116, 355.
Skopal, A.: 1988, Inf. Bull. Variable Stars, No. 3245.
Skopal, A.: 1989, Contr. Astron. Obs. Skalnaté Pleso 18, 31.
Tomov, T.: 1984, Inf. Bull. Variable Stars, No. 2610.
Tsuji, T.: 1978, Astron. Astrophys. 62, 29.
Wallerstein, G.: 1983, Publ. Astron. Soc. Pacific 95, 135.