JPL PUBLICATION 86-2

Archive of Observations of Periodic Comet Crommelin

Made During Its 1983-84 Apparition

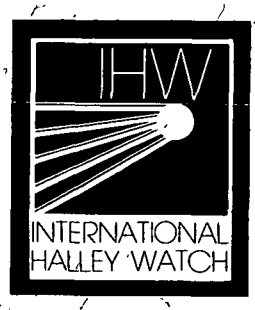
Z. Sekanina
Editor

M. Aronsson
Software Specialist

December 15, 1985

NASA
National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California



JPL PUBLICATION 86-2

Archive of Observations of Periodic Comet Crommelin

Made During Its 1983-84 Apparition

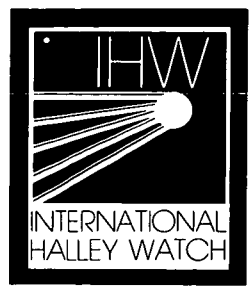
Z. Sekanina
Editor

M. Aronsson
Software Specialist

December 15, 1985

NASA
National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California



This publication was prepared by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

ABSTRACT

This is an archive of 680 reduced observations of Periodic Comet Crommelin made during its 1984 apparition. The archive integrates reports by members of the eight networks of the International Halley Watch (IHW) and presents the results of a trial run designed to test the preparedness of the IHW organization for the current apparition of Periodic Comet Halley.

PREFACE

From the initiation of the International Halley Watch (IHW) a comprehensive test of the organization by means of a "trial run" was planned. It was always intended to make the trial run also valuable scientifically by publishing a short archive of the results. No ideal comets were available in early 1984 when the trial run had to take place. Discussion of possible targets was narrowed to P/Encke and P/Crommelin, and the latter was finally selected at the March 1983 general meeting of the IHW.

At one time we discussed attempting complete coverage of the apparition. It soon became apparent that we lacked the resources for such an approach. Also, it would have been difficult to obtain the cooperation of observatory directors and scheduling committees in adding a relatively large observing effort to the already extremely demanding Halley program. Two possibilities remained. One was to simply take what observations were made throughout the apparition in the "normal" course of cometary research, perhaps with some extra encouragement. The other was to make an intensive observing effort for one week. This would more closely mimic actual Halley operations during Halley Watch Days and have the scientific benefit of providing simultaneous measurements in the various nets. The latter was adopted with minor modifications.

The P/Crommelin Trial Run took place March 25-31, 1984, a time when the comet was at declination -15° and 65° east of the Sun. These conditions are very similar to those for P/Halley at the time of the spacecraft encounters in March 1986 (except Halley will be in the morning sky). The Moon was below the horizon during work on Crommelin, a necessity since the comet was relatively faint. (The Moon will be a crescent near Halley during the VEGA spacecraft flyby but still below the horizon when Giotto arrives.) Reports by visual observers throughout the week indicated that the total magnitude of the head was mag. 8.5-9.0, somewhat brighter than the previous more pessimistic predictions. The coma was quite extended, approaching 10 arcminutes in diameter. No one appears to have had difficulty in finding P/Crommelin, but guiding accurately on such a diffuse object was not always easy.

A few modifications to the one week observing period were made because P/Crommelin was faint. Some photometric measurements were obtained with small telescopes a month earlier, when the comet was brighter but also nearer to the Sun. The radio net observed throughout the active phase of P/Crommelin. Radio astronomers can observe the comet close to the Sun, and they benefited considerably from the increased activity of the comet.

Crommelin was recovered in August 1983 independently by L. Kohoutek and by Discipline Specialists S. Wyckoff and P. Wehinger. Astrometric activity began immediately and increased considerably during the succeeding months; in the end, the numbers of reported positions were larger than those for any short period comet other than Halley. As a result, position predictions were excellent. We have archived ALL Crommelin results submitted to us before

PRECEDING PAGE BLANK NOT FILMED

November 1, 1985, whether or not they were taken during the official Trial Run Week. All nets obtained at least some data on Crommelin, although not all the kinds of data which we expect from Halley. Some observations were received by the Discipline Specialists after November 1, 1985, too late to be included. We wanted the printed archive to appear in early 1986 to allow time for study and criticism before heavy processing of Halley data begins.

The present archive is being presented only as a book, and its form is not quite identical to the one that will be used for Halley. For Halley a more detailed index, as well as more comprehensive explanatory appendices will be prepared, for example.

It is intended that the primary Halley Archive be a set of digital video disks, while the secondary Archive will be in hardcopy form and serve in part as an index to the primary one. Only with the new optical technology can the full photometric value of modern imaging data be retained over a long period of time while maintaining convenient transportability and access. It was not practical to present the Crommelin Archive in the form of disks because this technology is still not yet completely standardized and widely available.

We are very much indebted to all the observers who cooperated in the trial run. As a result of their efforts, the Halley and Giacobini-Zinner Watches and their corresponding Archives will be improved considerably.

We strongly encourage criticism of this document. Only with your help can the future archives be improved still further. Comments can be sent to the undersigned or to this archive's editor, Z. Sekanina.

Ray L. Newburn, Jr.
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91109
USA

Jürgen Rahe
Dr. Remeis Sternwarte
Sternwartstrasse 7
D-8600 Bamberg
FEDERAL REPUBLIC OF GERMANY

Leaders, IHW
December 16, 1985

Table of Contents

INTRODUCTION

In the following the reduced observations of P/Crommelin, obtained from the Discipline Specialists, are integrated chronologically. For each date we first list the comet's self-explanatory geocentric ephemeris (equinox 1950.0) for midnight Universal Time, followed by the data from the individual networks: Astrometry; Infrared Studies; Large Scale Phenomena; Near Nucleus Studies; Photometry and Polarimetry; Radio Studies; Spectroscopy and Spectrophotometry; and Amateur Observations. Within the Photometry and Polarimetry Network and the Radio Studies Network the observations are further organized by the sub-networks. These sub-networks are: Photometry with IHW Filters, Photometry with Other Filters, and Polarimetry, within the Photometry and Polarimetry Network; and OH, Spectral Line, and Continuum, within the Radio Studies Network. The P/Crommelin Trial Run did not involve the Meteor Streams Studies Network.

The archived data span a period from 1983 August 9 through 1984 May 27. The total numbers of observations, by discipline, are: 375, Astrometry; 10 (including a few limits from negative observations), Infrared Studies; 19, Large Scale Phenomena; 5, Near Nucleus Studies; 22, Photometry and Polarimetry; 43 (mostly upper limits), Radio Studies; 9, Spectroscopy and Spectrophotometry; and 197, Amateur Observations. Not included in the Archive are the data that, for various reasons, have been judged to provide no useful information and data not reported to the Discipline Specialists.

For each date and each network (or sub-network) the data are arranged by the time of the day. Each observation is assigned, by the Discipline Specialists, a unique identification number, which is listed immediately following the time and is also used to identify additional information on the observation in a follow-on table or figure.

The comet's images, reproduced by the Large Scale Phenomena and the Near Nucleus Studies Networks, are enlarged prints of the original exposures. The linear scale and orientation are given immediately below each print.

The quantities listed for each observation and the relevant physical units employed are summarized in Appendix I. Also included are the orbital elements that were employed for the geocentric ephemeris determination; general descriptions of the data organization used in the document; and information, supplied by the individual networks, pertaining to observation methods and to the data calibration and standardization.

Each observatory is identified by an 8-digit system code listed in Appendix II. When available, the code includes the 3-digit identification number assigned by the International Astronomical Union's Central Bureau for Astronomical Telegrams and Minor Planet Center. For the other observatories the 3-digit number is 500. Orbital information is presented for the International Ultra-

violet Explorer, the only participating spaceborne observatory. An alphabetically arranged list of the amateur observers and their observing locations completes Appendix II. The Archive closes with two indices: one by date; the other by discipline.

Zdenek Sekanina
Editor
Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, California 91109
USA

IWH DISCIPLINE SPECIALIST TEAMS

NETWORK: ASTROMETRY

Donald K. Yeomans — Discipline Specialist
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

Richard M. West — Discipline Specialist
European Southern Observatory
Garching, Federal Republic of Germany

Robert S. Harrington — Discipline Specialist
U.S. Naval Observatory
Washington, DC, U.S.A.

Brian G. Marsden — Discipline Specialist
Smithsonian Astrophysical Observatory
Cambridge, MA, U.S.A.

Ravenel N. Wimberly — Team Member
Informatics General Corporation
Canoga Park, CA, U.S.A.

Paul W. Chodas — Team Member
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

Michael S. Keesey — Team Member
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

John E. Ekelund — Team Member
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

NETWORK: INFRARED STUDIES

Roger F. Knacke — Discipline Specialist
SUNY
Stony Brook, NY, U.S.A.

Therese Encrenaz — Discipline Specialist
Observatoire de Paris
Meudon, France

Timothy Y. Brooke — Software Specialist
SUNY
Stony Brook, NY, U.S.A.

NETWORK: LARGE SCALE PHENOMENA

John C. Brandt Goddard Space Flight Center Greenbelt, MD, U.S.A.	Discipline Specialist
Malcolm B. Niedner Goddard Space Flight Center Greenbelt, MD, U.S.A.	Deputy Discipline Specialist
Jürgen Rahe Dr. Remeis Sternwarte Bamberg, Federal Republic of Germany	Deputy Discipline Specialist
Daniel A. Klinglesmith III Goddard Space Flight Center Greenbelt, MD, U.S.A.	Team Member
Archibald Warnock III SASC Technologies Lanham, MD, U.S.A.	Team Member
Nancy E. Podger SASC Technologies Lanham, MD, U.S.A.	Team Member
Edwin J. Grayzeck, Jr. Goddard Space Flight Center Greenbelt, MD, U.S.A., and University of Nevada Las Vegas, NV, U.S.A.	Team Member
Robert Hobbs Computer Technology Associates Landover, MD, U.S.A.	Team Member
William Liller CTIO La Serena, Chile	Team Member
Peter D. Usher Pennsylvania State University University Park, PA, U.S.A.	Team Member
Robert D. Chapman Johnson Space Center Houston, TX, U.S.A.	Team Member
Chris Russell UCLA Los Angeles, CA, U.S.A.	Team Member

Murray Dryer NOAA Boulder, CO, U.S.A.	Team Member
E. P. Moore New Mexico Tech Socorro, NM, U.S.A., and JOCR Socorro, NM, U.S.A.	Team Member

NETWORK: NEAR NUCLEUS STUDIES

Stephen M. Larson University of Arizona Tucson, AZ, U.S.A.	Discipline Specialist
Zdenek Sekanina Jet Propulsion Laboratory Pasadena, CA, U.S.A.	Discipline Specialist
Jürgen Rahe Dr. Remeis Sternwarte Bamberg, Federal Republic of Germany	Discipline Specialist
Joseph S. Gotobed University of Arizona Tucson, AZ, U.S.A.	Software Specialist

NETWORK: PHOTOMETRY AND POLARIMETRY

Michael F. A'Hearn University of Maryland College Park, MD, U.S.A.	Discipline Specialist
Vladimir Vanysek Charles University Prague, Czechoslovakia	Discipline Specialist
Michael Feierberg University of Maryland College Park, MD, U.S.A.	Assistant Discipline Specialist

NETWORK: RADIO STUDIES

F. Peter Schloerb University of Massachusetts Amherst, MA, U.S.A.	Discipline Specialist
William M. Irvine University of Massachusetts Amherst, MA, U.S.A.	Discipline Specialist

Eric Gerard Observatoire de Paris Meudon, France	Discipline Specialist
Ronald D. Brown Monash University Clayton, Victoria, Australia	Discipline Specialist
Peter D. Godfrey Monash University Clayton, Victoria, Australia	Discipline Specialist
Wayne M. Kinzel University of Massachusetts Amherst, MA, U.S.A.	Assistant
A. Robert Molloy University of Massachusetts Amherst, MA, U.S.A.	Assistant

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Peter A. Wehinger Arizona State University Tempe, AZ, U.S.A.	Discipline Specialist
Susan Wyckoff Arizona State University Tempe, AZ, U.S.A.	Discipline Specialist
Michel C. Festou Institut d'Astrophysique de Paris Paris, France	Discipline Specialist
R. Mark Wagner Arizona State University Tempe, AZ, U.S.A.	Research Associate
David G. Schleicher Arizona State University Tempe, AZ, U.S.A.	Research Associate
Barbara Boothman Arizona State University Tempe, AZ, U.S.A.	System Manager

NETWORK: AMATEUR OBSERVATIONS

Stephen J. Edberg — Coordinator
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

Michael J. Weiner — Assistant
Jet Propulsion Laboratory
Pasadena, CA, U.S.A.

ARCHIVE DATA

DATE: 9 AUG 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 41.517
Declination (eq. 1950.0; deg,arcmin)	+23 32.33
Geocentric distance (AU)	2.1143
Heliocentric distance (AU)	2.9602
Radial geocentric velocity (km/s)	-19.64
Radial heliocentric velocity (km/s)	-18.95
Angle Sun-Earth-comet (deg)	139.6
Angle Sun-comet-Earth (deg)	12.8
Position angle of prolonged radius vector (deg)	168.9
Position angle of negative orbital velocity vector (deg)	224.7
Angle comet-Earth-Moon (deg)	135.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
9.00764	100375	20 41 30.32	+23 32 20.0		20.0
9.03608	100374	20 41 28.22	+23 32 23.0		

AN #	System	Notes	Observer(s)
100375	14930000	A	Kohoutek,L
100374	14930000	A	Kohoutek,L

NOTE A Stellar image near plate limit

PRECEDING PAGE BLANK NOT FILMED

PAGE 2 INTENTIONALLY BLANK

DATE: 10 AUG 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 40.253
Declination (eq. 1950.0; deg,arcmin)	+23 33.56
Geocentric distance (AU)	2.1031
Heliocentric distance (AU)	2.9492
Radial geocentric velocity (km/s)	-19.22
Radial heliocentric velocity (km/s)	-18.98
Angle Sun-Earth-comet (deg)	139.6
Angle Sun-comet-Earth (deg)	12.9
Position angle of prolonged radius vector (deg)	167.0
Position angle of negative orbital velocity vector (deg)	224.3
Angle comet-Earth-Moon (deg)	133.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
10.00347	100373	20 40 14.92	+23 33 35.0		

AN #	System	Notes	Observer(s)
100373	14930000	A	Kohoutek,L

NOTE A Stellar image near plate limit

DATE: 13 AUG 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 36.413
Declination (eq. 1950.0; deg,arcmin)	+23 35.35
Geocentric distance (AU)	2.0709
Heliocentric distance (AU)	2.9162
Radial geocentric velocity (km/s)	-17.96
Radial heliocentric velocity (km/s)	-19.07
Angle Sun-Earth-comet (deg)	139.5
Angle Sun-comet-Earth (deg)	13.1
Position angle of prolonged radius vector (deg)	161.2
Position angle of negative orbital velocity vector (deg)	222.9
Angle comet-Earth-Moon (deg)	110.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
13.48938	100372	20 35 46.59	+23 35 22.9		19.7

AN #	System	Notes	Observer(s)
100372	16950000		Wyckoff,S/Wehinger,P.A

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 29.912
Declination (eq. 1950.0; deg,arcmin)	+23 31.91
Geocentric distance (AU)	2.0220
Heliocentric distance (AU)	2.8609
Radial geocentric velocity (km/s)	-15.90
Radial heliocentric velocity (km/s)	-19.23
Angle Sun-Earth-comet (deg)	138.6
Angle Sun-comet-Earth (deg)	13.5
Position angle of prolonged radius vector (deg)	151.6
Position angle of negative orbital velocity vector (deg)	220.5
Angle comet-Earth-Moon (deg)	64.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
18.03981	100371	20 29 51.40	+23 31 52.6		
18.06412	100370	20 29 49.56	+23 31 49.6		

AN #	System	Notes	Observer(s)
100371	14930000		Kohoutek,L
100370	14930000	A	Kohoutek,L

NOTE A Guiding error

DATE: 30 AUG 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 14.519
Declination (eq. 1950.0; deg,arcmin)	+22 50.70
Geocentric distance (AU)	1.9284
Heliocentric distance (AU)	2.7263
Radial geocentric velocity (km/s)	-11.18
Radial heliocentric velocity (km/s)	-19.62
Angle Sun-Earth-comet (deg)	133.8
Angle Sun-comet-Earth (deg)	15.5
Position angle of prolonged radius vector (deg)	130.6
Position angle of negative orbital velocity vector (deg)	214.5
Angle comet-Earth-Moon (deg)	95.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
30.22642	100369	20 14 14.37	+22 49 30.9		

AN #	System	Notes	Observer(s)
100369	16750000		Gibson,J

DATE: 31 AUG 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 13.292
Declination (eq. 1950.0; deg,arcmin)	+22 45.22
Geocentric distance (AU)	1.9221
Heliocentric distance (AU)	2.7150
Radial geocentric velocity (km/s)	-10.81
Radial heliocentric velocity (km/s)	-19.65
Angle Sun-Earth-comet (deg)	133.2
Angle Sun-comet-Earth (deg)	15.7
Position angle of prolonged radius vector (deg)	129.0
Position angle of negative orbital velocity vector (deg)	214.0
Angle comet-Earth-Moon (deg)	104.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
31.25350	100368	20 12 58.89	+22 43 48.3		

AN #	System	Notes	Observer(s)
100368	16750000		Gibson,J

DATE: 4 SEP 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	20 8.532
Declination (eq. 1950.0; deg,arcmin)	+22 20.39
Geocentric distance (AU)	1.8988
Heliocentric distance (AU)	2.6694
Radial geocentric velocity (km/s)	-9.38
Radial heliocentric velocity (km/s)	-19.79
Angle Sun-Earth-comet (deg)	130.8
Angle Sun-comet-Earth (deg)	16.6
Position angle of prolonged radius vector (deg)	123.0
Position angle of negative orbital velocity vector (deg)	212.0
Angle comet-Earth-Moon (deg)	133.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #		R.A.(1950.0)	Dec.	m_1	m_2
4.94350	100367	20	7 26.94	+22 13 55.5		
4.96399	100366	20	7 25.46	+22 13 46.8		
4.97875	100365	20	7 24.54	+22 13 40.3		

AN #	System	Notes	Observer(s)
100367	15000000	A	Koutchmy,S et al.
100366	15000000	A	Koutchmy,S et al.
100365	15000000	A	Koutchmy,S et al.

NOTE A Geocentric position; observation made at Pic du Midi

DATE: 27 SEP 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	19 48.420
Declination (eq. 1950.0; deg,arcmin)	+18 47.00
Geocentric distance (AU)	1.8187
Heliocentric distance (AU)	2.4012
Radial geocentric velocity (km/s)	-3.37
Radial heliocentric velocity (km/s)	-20.60
Angle Sun-Earth-comet (deg)	113.5
Angle Sun-comet-Earth (deg)	22.5
Position angle of prolonged radius vector (deg)	97.2
Position angle of negative orbital velocity vector (deg)	201.9
Angle comet-Earth-Moon (deg)	109.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.86081	100364	19 47 58.07	+18 37 27.3		

AN #	System	Notes	Observer(s)
100364	14930000		Kohoutek,L

 DATE: 27 OCT 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	19 47.854
Declination (eq. 1950.0; deg,arcmin)	+13 8.93
Geocentric distance (AU)	1.7825
Heliocentric distance (AU)	2.0346
Radial geocentric velocity (km/s)	-2.01
Radial heliocentric velocity (km/s)	-21.73
Angle Sun-Earth-comet (deg)	89.6
Angle Sun-comet-Earth (deg)	29.2
Position angle of prolonged radius vector (deg)	77.2
Position angle of negative orbital velocity vector (deg)	199.0
Angle comet-Earth-Moon (deg)	136.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.12326	100363	19 47 54.75	+13 7 36.7		

AN #	System	Notes	Observer(s)
100363	17070000		Everhart,E

EPHEMERIS FOR 0h UT

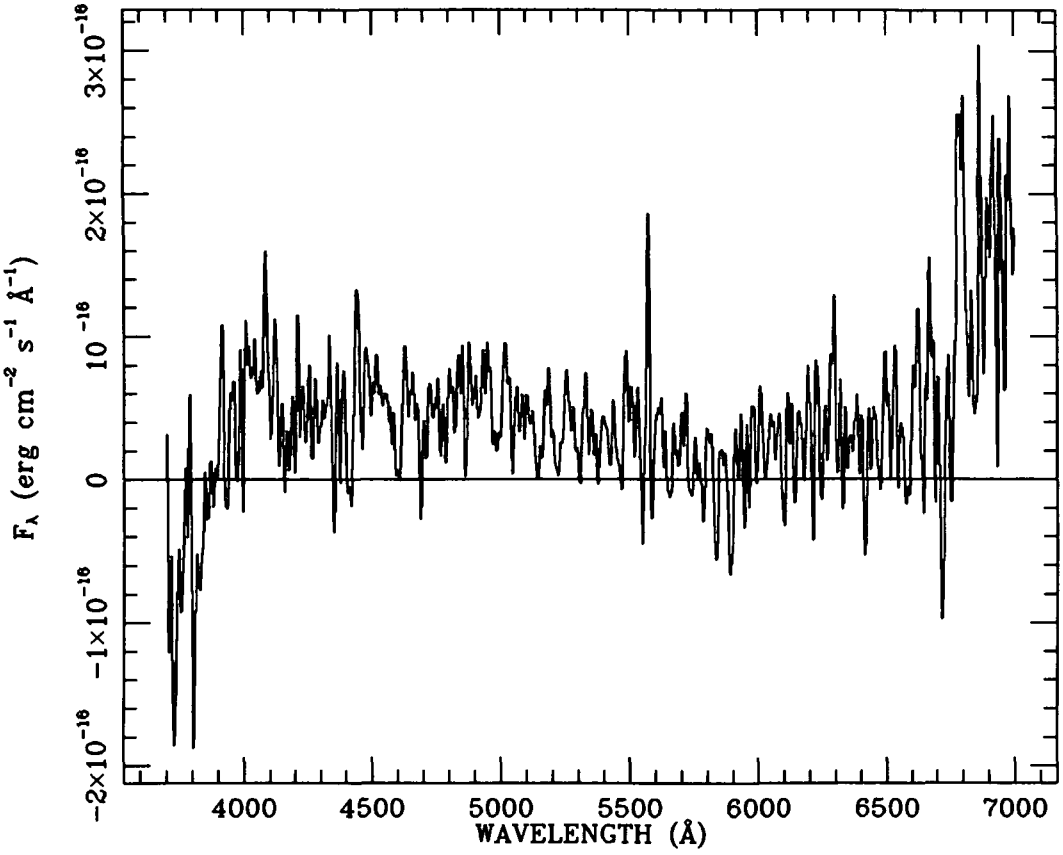
Right ascension (eq. 1950.0; h,m)	20 .147
Declination (eq. 1950.0; deg,arcmin)	+10 34.12
Geocentric distance (AU)	1.7565
Heliocentric distance (AU)	1.8310
Radial geocentric velocity (km/s)	-3.87
Radial heliocentric velocity (km/s)	-22.32
Angle Sun-Earth-comet (deg)	78.2
Angle Sun-comet-Earth (deg)	31.9
Position angle of prolonged radius vector (deg)	69.6
Position angle of negative orbital velocity vector (deg)	208.8
Angle comet-Earth-Moon (deg)	35.3

- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
12.11300	700001	13	3700-7000	5		20.0	1	B&C Spect/blue Reticon/300gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700001	Reduced digital	.0	.0		3.0 circ	76910101	Wehinger,P


F_λ (erg cm^{-2} s^{-1} Å^{-1})
3×10^{-16}
2×10^{-16}
10^{-16}
0
-1×10^{-16}
-2×10^{-16}
4000
4500
5000
5500
6000
6500
7000
WAVELENGTH (Å)

 DATE: 29 DEC 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 25.673
Declination (eq. 1950.0; deg,arcmin)	+ 6 20.39
Geocentric distance (AU)	1.5203
Heliocentric distance (AU)	1.2111
Radial geocentric velocity (km/s)	-14.10
Radial heliocentric velocity (km/s)	-22.69
Angle Sun-Earth-comet (deg)	52.7
Angle Sun-comet-Earth (deg)	40.2
Position angle of prolonged radius vector (deg)	54.2
Position angle of negative orbital velocity vector (deg)	275.4
Angle comet-Earth-Moon (deg)	108.9

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
29.7600	800200	S	12.3	AAVSO	2.5	I						

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800200	.26	Newtonian	6	63				Merlin,J.C.

DATE: 30 DEC 1983

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 28.373
Declination (eq. 1950.0; deg,arcmin)	+ 6 17.85
Geocentric distance (AU)	1.5121
Heliocentric distance (AU)	1.1980
Radial geocentric velocity (km/s)	-14.33
Radial heliocentric velocity (km/s)	-22.63
Angle Sun-Earth-comet (deg)	52.3
Angle Sun-comet-Earth (deg)	40.5
Position angle of prolonged radius vector (deg)	54.1
Position angle of negative orbital velocity vector (deg)	276.3
Angle comet-Earth-Moon (deg)	97.6

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
30.9900	800201	S	>12.3	AC								

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800201	.50	Newtonian	5.0	157	Y	1	A	Bortle,J

NOTE A Comet not seen

DATE: 1 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 33.903
Declination (eq. 1950.0; deg,arcmin)	+ 6 12.95
Geocentric distance (AU)	1.4953
Heliocentric distance (AU)	1.1720
Radial geocentric velocity (km/s)	-14.78
Radial heliocentric velocity (km/s)	-22.49
Angle Sun-Earth-comet (deg)	51.5
Angle Sun-comet-Earth (deg)	41.1
Position angle of prolonged radius vector (deg)	53.8
Position angle of negative orbital velocity vector (deg)	278.0
Angle comet-Earth-Moon (deg)	75.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
1.98703	100362	21 36 41.59	+ 6 10 34.6		18.0

AN #	System	Notes	Observer(s)
100362	18010000	A	McCrosky,R.E

NOTE A Difficult image

DATE: 3 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 39.610
Declination (eq. 1950.0; deg,arcmin)	+ 6 8.26
Geocentric distance (AU)	1.4779
Heliocentric distance (AU)	1.1461
Radial geocentric velocity (km/s)	-15.23
Radial heliocentric velocity (km/s)	-22.33
Angle Sun-Earth-comet (deg)	50.8
Angle Sun-comet-Earth (deg)	41.7
Position angle of prolonged radius vector (deg)	53.5
Position angle of negative orbital velocity vector (deg)	279.6
Angle comet-Earth-Moon (deg)	53.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
3.08750	100361	21 39 51.49	+ 6 7 59.1		

AN #	System	Notes	Observer(s)
100361	17070000	A	Everhart,E

NOTE A Difficult image

DATE: 4 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 42.531
Declination (eq. 1950.0; deg,arcmin)	+ 6 5.97
Geocentric distance (AU)	1.4691
Heliocentric distance (AU)	1.1332
Radial geocentric velocity (km/s)	-15.45
Radial heliocentric velocity (km/s)	-22.23
Angle Sun-Earth-comet (deg)	50.4
Angle Sun-comet-Earth (deg)	42.0
Position angle of prolonged radius vector (deg)	53.5
Position angle of negative orbital velocity vector (deg)	280.4
Angle comet-Earth-Moon (deg)	44.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
4.41562	100360	21 43 44.72	+ 6 5 4.0	17.5	

AN #	System	Notes	Observer(s)
100360	13720000		Seki,T

DATE: 6 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	21 48.510
Declination (eq. 1950.0; deg,arcmin)	+ 6 1.47
Geocentric distance (AU)	1.4510
Heliocentric distance (AU)	1.1077
Radial geocentric velocity (km/s)	-15.89
Radial heliocentric velocity (km/s)	-22.02
Angle Sun-Earth-comet (deg)	49.7
Angle Sun-comet-Earth (deg)	42.6
Position angle of prolonged radius vector (deg)	53.3
Position angle of negative orbital velocity vector (deg)	281.9
Angle comet-Earth-Moon (deg)	27.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
6.59030	100359	21 50 19.24	+ 6 0 8.6		

AN #	System	Notes	Observer(s)
100359	11900000		Gerasimenko,S

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 35.902
Declination (eq. 1950.0; deg,arcmin)	+ 5 25.58
Geocentric distance (AU)	1.3113
Heliocentric distance (AU)	.9388
Radial geocentric velocity (km/s)	-18.49
Radial heliocentric velocity (km/s)	-19.32
Angle Sun-Earth-comet (deg)	45.6
Angle Sun-comet-Earth (deg)	48.5
Position angle of prolonged radius vector (deg)	54.3
Position angle of negative orbital velocity vector (deg)	291.6
Angle comet-Earth-Moon (deg)	150.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
20.74063	100358	22 38 41.61	+ 5 22 59.0		

AN #	System	Notes	Observer(s)
100358	10170000		Hoffmann,M

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
20.747	800202	S	>10.5	BAAVS								

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800202	.33	Newtonian	4.5	45	6	Y	1		Shanklin,J.D.

 DATE: 21 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 39.684
Declination (eq. 1950.0; deg,arcmin)	+ 5 22.11
Geocentric distance (AU)	1.3006
Heliocentric distance (AU)	.9278
Radial geocentric velocity (km/s)	-18.64
Radial heliocentric velocity (km/s)	-19.02
Angle Sun-Earth-comet (deg)	45.3
Angle Sun-comet-Earth (deg)	49.0
Position angle of prolonged radius vector (deg)	54.5
Position angle of negative orbital velocity vector (deg)	292.3
Angle comet-Earth-Moon (deg)	159.6

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
21.1600	800203	S	11.4	R Peg	3.1	2						
21.9800	800204	S	11.4	AC	2	0						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800203	.20	Newtonian	6	61	6.0	Y			Morris,C.S.
800204	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.

DATE: 22 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 43.523
Declination (eq. 1950.0; deg,arcmin)	+ 5 18.42
Geocentric distance (AU)	1.2898
Heliocentric distance (AU)	.9169
Radial geocentric velocity (km/s)	-18.77
Radial heliocentric velocity (km/s)	-18.71
Angle Sun-Earth-comet (deg)	45.1
Angle Sun-comet-Earth (deg)	49.5
Position angle of prolonged radius vector (deg)	54.7
Position angle of negative orbital velocity vector (deg)	293.0
Angle comet-Earth-Moon (deg)	162.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
22.58644	100357	22 45 48.24	+ 5 15 43.6		
22.58800	100356	22 45 48.36	+ 5 15 43.0		
22.76882	100355	22 46 30.54	+ 5 15 18.4	13.0	
22.78757	100354	22 46 34.96	+ 5 15 14.3	13.0	

AN #	System	Notes	Observer(s)
100357	11860000		Rakhmatov,E
100356	11860000		Rakhmatov,E
100355	14940000		Manning,B
100354	14940000		Manning,B

 DATE: 23 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 47.419
Declination (eq. 1950.0; deg,arcmin)	+ 5 14.50
Geocentric distance (AU)	1.2789
Heliocentric distance (AU)	.9062
Radial geocentric velocity (km/s)	-18.90
Radial heliocentric velocity (km/s)	-18.37
Angle Sun-Earth-comet (deg)	44.9
Angle Sun-comet-Earth (deg)	50.1
Position angle of prolonged radius vector (deg)	55.0
Position angle of negative orbital velocity vector (deg)	293.7
Angle comet-Earth-Moon (deg)	155.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
23.09271	100353	22 47 46.85	+ 5 14 4.6		
23.61212	100352	22 49 49.70	+ 5 11 34.2		
23.61242	100351	22 50 6.48	+ 5 11 34.0		

AN #	System	Notes	Observer(s)
100353	17070000	A	Everhart,E
100352	11860000		Rakhmatov,E
100351	11860000		Rakhmatov,E

NOTE A Reference stars nearly colinear - may be a noisy data point

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
23.764	800205	S	>10.5									

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800205	.33	Newtonian	4.5	45	5.2	Y	1		Shanklin,J.D.

DATE: 24 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 51.371
Declination (eq. 1950.0; deg,arcmin)	+ 5 10.33
Geocentric distance (AU)	1.2680
Heliocentric distance (AU)	.8957
Radial geocentric velocity (km/s)	-19.03
Radial heliocentric velocity (km/s)	-18.01
Angle Sun-Earth-comet (deg)	44.7
Angle Sun-comet-Earth (deg)	50.6
Position angle of prolonged radius vector (deg)	55.3
Position angle of negative orbital velocity vector (deg)	294.4
Angle comet-Earth-Moon (deg)	145.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
24.41080	100350	22 53 .65	+ 5 8 28.4		

AN #	System	Notes	Observer(s)
100350	13810000		Kosai,H/Hurukawa,K

DATE: 25 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 55.382
Declination (eq. 1950.0; deg,arcmin)	+ 5 5.88
Geocentric distance (AU)	1.2569
Heliocentric distance (AU)	.8854
Radial geocentric velocity (km/s)	-19.14
Radial heliocentric velocity (km/s)	-17.63
Angle Sun-Earth-comet (deg)	44.5
Angle Sun-comet-Earth (deg)	51.2
Position angle of prolonged radius vector (deg)	55.6
Position angle of negative orbital velocity vector (deg)	295.0
Angle comet-Earth-Moon (deg)	133.8

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
25.0350	800206	S	12.0	AA		1						
25.1500	800207	M	10.5	R Peg	2.5	3	0.03	280				
25.767	800208	S	10.5	R Peg	3	0						
25.771	800209	S	10.8	R Peg	2.5	1						
25.7900	800210	S	10.9	AAVSO	3	1						
25.9800	800211	S	10.4	AC	1.8	1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800206	.15	Newtonian	8	30	5.2	Y	1		McBride,P.V.
800207	.20	Newtonian	6	61	7.0	Y	4		Morris,C.S.
800208	.25	Jones-Bird	6	59	5	Y	2		Bus,E.P.
800209	.25	Jones-Bird	6	59	5	Y	2		Bouma,R.J.
800210	.26	Newtonian	6	63				A	Merlin,J.C.
800211	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.

NOTE A Coma diameter uncertain

 DATE: 26 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	22 59.451
Declination (eq. 1950.0; deg,arcmin)	+ 5 1.13
Geocentric distance (AU)	1.2458
Heliocentric distance (AU)	.8753
Radial geocentric velocity (km/s)	-19.25
Radial heliocentric velocity (km/s)	-17.24
Angle Sun-Earth-comet (deg)	44.3
Angle Sun-comet-Earth (deg)	51.8
Position angle of prolonged radius vector (deg)	56.0
Position angle of negative orbital velocity vector (deg)	295.7
Angle comet-Earth-Moon (deg)	122.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
26.60486	100349	23 1 54.60	+ 4 58	.7	

AN #	System	Notes	Observer(s)
100349	11860000		Rakhmatov,E

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 3.578
Declination (eq. 1950.0; deg,arcmin)	+ 4 56.06
Geocentric distance (AU)	1.2347
Heliocentric distance (AU)	.8654
Radial geocentric velocity (km/s)	-19.34
Radial heliocentric velocity (km/s)	-16.82
Angle Sun-Earth-comet (deg)	44.1
Angle Sun-comet-Earth (deg)	52.4
Position angle of prolonged radius vector (deg)	56.3
Position angle of negative orbital velocity vector (deg)	296.4
Angle comet-Earth-Moon (deg)	110.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)			Dec.			m_1	m_2
27.44167	100348	23	5	25.01	+ 4	53	39.0	13.0	
27.61999	100347	23	6	8.87	+ 4	52	39.8		
27.62083	100346	23	6	10.96	+ 4	52	38.0		
27.62264	100345	23	6	8.51	+ 4	52	40.0		
27.63263	100344	23	6	13.16	+ 4	52	33.0		

AN #	System	Notes	Observer(s)
100348	13720000		Seki,T
100347	11860000		Rakhmatov,E
100346	11650000		Timofeev,S
100345	11860000		Rakhmatov,E
100344	11650000		Timofeev,S

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

27.00 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
N W=- FILE=600001 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.50 BW= 8.0 (1.00, 0) OFF=(0.00, 0) PE= -
INS = UNK/AC F= 1665.402 B= 1.250 R= 6.5 TS= - TR= -
UPPER LIMIT = 0.010 JY/BEAM
OBS = L. Snyder, C. Henkel, and P. Jewell

27.00 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
N W=- FILE=600002 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.50 BW= 8.0 (1.00, 0) OFF=(0.00, 0) PE= -
INS = UNK/AC F= 1667.359 B= 0.800 R= 1.5 TS= - TR= -
LINE DATA PEAK= 0.004 (0.002) JY/BEAM AREA= 7.2 (2.6) JY/BEAM*M/S
OBS = L. Snyder, C. Henkel, and P. Jewell

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
27.9800	800212	S	9.8	AC	2.7	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800212	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.

DATE: 28 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 7.764
Declination (eq. 1950.0; deg,arcmin)	+ 4 50.64
Geocentric distance (AU)	1.2235
Heliocentric distance (AU)	.8559
Radial geocentric velocity (km/s)	-19.43
Radial heliocentric velocity (km/s)	-16.38
Angle Sun-Earth-comet (deg)	44.0
Angle Sun-comet-Earth (deg)	53.0
Position angle of prolonged radius vector (deg)	56.7
Position angle of negative orbital velocity vector (deg)	297.1
Angle comet-Earth-Moon (deg)	99.1

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
28.0240	800213	S	11.2	R Peg	2	1						
28.9900	800214	S	10.0	AC	2.2	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800213	.15	Refractor	5	62	5.2	Y	2		Morrison,W.C.
800214	.32	Newtonian	5.6	68	6.5	Y	1		Bortle,J.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 12.009
Declination (eq. 1950.0; deg,arcmin)	+ 4 44.86
Geocentric distance (AU)	1.2123
Heliocentric distance (AU)	.8465
Radial geocentric velocity (km/s)	-19.51
Radial heliocentric velocity (km/s)	-15.91
Angle Sun-Earth-comet (deg)	43.8
Angle Sun-comet-Earth (deg)	53.7
Position angle of prolonged radius vector (deg)	57.2
Position angle of negative orbital velocity vector (deg)	297.9
Angle comet-Earth-Moon (deg)	87.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
29.60659	100343	23 14 36.33	+ 4 41 2.6		
29.62118	100342	23 14 40.31	+ 4 40 56.9		

AN #	System	Notes	Observer(s)
100343	11650000		Timofeev,S
100342	11650000		Timofeev,S

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
29.1500	800215	M	9.9	R Peg	2.8	5		280				
29.1528	800216	S	10.6	SAO	1.5	2						
29.767	800217	S	10.9		1.2	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800215	.20	Newtonian	6	61	7.0	Y	4	A	Morris,C.S.
800216	.25	Newtonian	4	32			1		Machholz,D.
800217	.33	Newtonian	4.5	45	5	Y	1		Shanklin,J.D.

NOTE A Sunward fan suspected

DATE: 30 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 16.314
Declination (eq. 1950.0; deg,arcmin)	+ 4 38.67
Geocentric distance (AU)	1.2010
Heliocentric distance (AU)	.8375
Radial geocentric velocity (km/s)	-19.58
Radial heliocentric velocity (km/s)	-15.43
Angle Sun-Earth-comet (deg)	43.7
Angle Sun-comet-Earth (deg)	54.3
Position angle of prolonged radius vector (deg)	57.6
Position angle of negative orbital velocity vector (deg)	298.6
Angle comet-Earth-Moon (deg)	76.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
30.60521	100341	23 18 56.89	+ 4 34 40.3		
30.61094	100340	23 18 57.70	+ 4 34 41.8		
30.61805	100339	23 19 .34	+ 4 34 35.6		
30.71586	100338	23 19 25.75	+ 4 33 50.9		

AN #	System	Notes	Observer(s)
100341	11650000		Timofeev,S
100340	11650000		Timofeev,S
100339	11650000		Timofeev,S
100338	10560000		Rychtarcik,P

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
30.1500	800218	M	9.7	R Peg		4		280				

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800218	.20	Newtonian	6	61	6.0	Y	3		Morris,C.S

 DATE: 31 JAN 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 20.677
Declination (eq. 1950.0; deg,arcmin)	+ 4 32.07
Geocentric distance (AU)	1.1896
Heliocentric distance (AU)	.8287
Radial geocentric velocity (km/s)	-19.63
Radial heliocentric velocity (km/s)	-14.91
Angle Sun-Earth-comet (deg)	43.5
Angle Sun-comet-Earth (deg)	55.0
Position angle of prolonged radius vector (deg)	58.1
Position angle of negative orbital velocity vector (deg)	299.3
Angle comet-Earth-Moon (deg)	65.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
31.98984	100337	23 25 2.88	+ 4 25 2.1		

AN #	System	Notes	Observer(s)
100337	18010000		McCrosky,R.E

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

31.00 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
N W=- FILE=600003 ARECIBO ARECIBO PR SYSCODE= 65001617
TEL = 305M E=0.60 BW= 3.2 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1665.402 B= 0.625 R= 2.5 TS= 60 TR= -
UPPER LIMIT = 0.006 JY/BEAM
OBS = W. Deich, J. Cordes, and Y. Terzian

31.00 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
N W=- FILE=600044 ARECIBO ARECIBO PR SYSCODE= 65001617
TEL = 305M E=0.60 BW= 3.2 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1667.359 B= 0.625 R= 2.5 TS= 60 TR= -
UPPER LIMIT = 0.006 JY/BEAM
OBS = W. Deich, J. Cordes, and Y. Terzian

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
31.757	800219	S	9.7	R Peg	3							
31.760	800220	S	9.7	R Peg		3						
31.764	800221	S	9.6	R Peg	4	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800219	.16	Newtonian	4.9	36	5.5	Y	2		Bouma,R.J.
800220	.25	Jones-Bird	6	59	5.5	Y	2		Bouma,R.J.
800221	.25	Jones-Bird	6	59	5.5	Y	2		Bus,E.P.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 25.100
Declination (eq. 1950.0; deg,arcmin)	+ 4 25.03
Geocentric distance (AU)	1.1783
Heliocentric distance (AU)	.8203
Radial geocentric velocity (km/s)	-19.68
Radial heliocentric velocity (km/s)	-14.38
Angle Sun-Earth-comet (deg)	43.4
Angle Sun-comet-Earth (deg)	55.7
Position angle of prolonged radius vector (deg)	58.6
Position angle of negative orbital velocity vector (deg)	300.0
Angle comet-Earth-Moon (deg)	54.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
1.72265	100336	23 28 19.26	+ 4 19 33.5		
1.79306	100335	23 28 38.76	+ 4 19 2.0		
1.80278	100334	23 28 41.35	+ 4 18 58.2		
1.96810	100333	23 29 25.94	+ 4 17 39.7		

AN #	System	Notes	Observer(s)
100336	10950000		Ponomarev,D.N
100335	14930000		Kohoutek,L
100334	14930000		Kohoutek,L
100333	18010000		McCrosky,R.E

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
1.60900	500003		4845	65	7.9	2.7	134	10

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500003	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
1.0630	800222	S	10.5	AA		1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800222	.15	Newtonian	8	30	5.2	Y	1		McBride,P.V.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 29.582
Declination (eq. 1950.0; deg,arcmin)	+ 4 17.51
Geocentric distance (AU)	1.1669
Heliocentric distance (AU)	.8121
Radial geocentric velocity (km/s)	-19.71
Radial heliocentric velocity (km/s)	-13.82
Angle Sun-Earth-comet (deg)	43.3
Angle Sun-comet-Earth (deg)	56.4
Position angle of prolonged radius vector (deg)	59.2
Position angle of negative orbital velocity vector (deg)	300.7
Angle comet-Earth-Moon (deg)	44.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
2.66264	100332	23 32 34.71	+ 4 12 11.0		
2.67969	100331	23 32 38.44	+ 4 12 6.9		
2.69066	100330	23 32 42.39	+ 4 12 .6		
2.69387	100329	23 32 43.26	+ 4 11 56.0		
2.69578	100328	23 32 43.83	+ 4 11 54.2		
2.69768	100327	23 32 44.39	+ 4 11 52.3		
2.69877	100326	23 32 34.87	+ 4 12 13.0		
2.71834	100325	23 32 49.95	+ 4 11 43.4		
2.71864	100324	23 32 50.07	+ 4 11 43.2		
2.71895	100323	23 32 50.20	+ 4 11 43.0		
2.72604	100322	23 32 51.64	+ 4 11 42.4		

AN #	System	Notes	Observer(s)
100332	11150000		Tselishchev,I.E
100331	11150000		Tselishchev,I.E
100330	10950000		Ponomarev,D.N
100329	10950000		Chernykh,N.S
100328	10950000		Chernykh,N.S
100327	10950000		Chernykh,N.S
100326	11150000		Rizvanov
100325	10950000		Chernykh,N.S
100324	10950000		Chernykh,N.S
100323	10950000		Chernykh,N.S
100322	10950000		Ponomarev,D.N

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
2.0000	800223	S	9.6	AC	2.0	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800223	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 34.122
Declination (eq. 1950.0; deg,arcmin)	+ 4 9.49
Geocentric distance (AU)	1.1555
Heliocentric distance (AU)	.8043
Radial geocentric velocity (km/s)	-19.74
Radial heliocentric velocity (km/s)	-13.24
Angle Sun-Earth-comet (deg)	43.2
Angle Sun-comet-Earth (deg)	57.1
Position angle of prolonged radius vector (deg)	59.7
Position angle of negative orbital velocity vector (deg)	301.5
Angle comet-Earth-Moon (deg)	33.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
3.60382	100321	23 36 52.93	+ 4 4 15.7		
3.60799	100320	23 36 54.30	+ 4 4 15.1		
3.61042	100319	23 36 55.11	+ 4 4 15.2		
3.62743	100318	23 36 59.43	+ 4 4 6.4		
3.65943	100317	23 37 8.59	+ 4 3 51.8		
3.68206	100316	23 37 13.15	+ 4 3 41.3		
3.69824	100315	23 37 19.14	+ 4 3 30.9		
3.70874	100314	23 37 22.01	+ 4 3 24.2		
3.71221	100313	23 37 22.76	+ 4 3 23.8		

AN #	System	Notes	Observer(s)
100321	11650000		Timofeev,S
100320	11650000		Timofeev,S
100319	11650000		Timofeev,S
100318	11650000		Timofeev,S
100317	11150000		Tselishchev,I.E
100316	11150000		Tselishchev,I.E
100315	10950000		Ponomarev,D.N
100314	10950000		Chernykh,N.S
100313	10950000		Chernykh,N.S

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
3.774	800224	S	10.6		2.8	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800224	.33	Newtonian	4.5	45	4.7	Y	1		Shanklin,J.D.

DATE: 4 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 38.722
Declination (eq. 1950.0; deg,arcmin)	+ 4 .95
Geocentric distance (AU)	1.1441
Heliocentric distance (AU)	.7968
Radial geocentric velocity (km/s)	-19.74
Radial heliocentric velocity (km/s)	-12.63
Angle Sun-Earth-comet (deg)	43.1
Angle Sun-comet-Earth (deg)	57.8
Position angle of prolonged radius vector (deg)	60.3
Position angle of negative orbital velocity vector (deg)	302.2
Angle comet-Earth-Moon (deg)	23.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
4.61700	100312	23 41 34.82	+ 3 55 22.0		
4.65460	100311	23 41 45.63	+ 3 54 57.2		

AN #	System	Notes	Observer(s)
100312	11860000		Rakhmatov,E
100311	11150000		Tselishchev,I.E

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
4.11500	500001	3115	OH	-9.982	
4.11500	500001	3650	Cont	-13.603	
4.11500	500001	3871	CN	-9.877	
4.11500	500001	4845	Cont	-13.245	
4.11500	500001	5140	C_2	-10.115	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500001	74.6			56880000	A'Hearn,M
500001	74.6			56880000	A'Hearn,M
500001	74.6			56880000	A'Hearn,M
500001	74.6			56880000	A'Hearn,M
500001	74.6			56880000	A'Hearn,M

COMMENT Old OH filter
TELESCOPE 1.1 m

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
4.61670	500007		4845	65	6.5	±1.6	167	±7

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500007	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

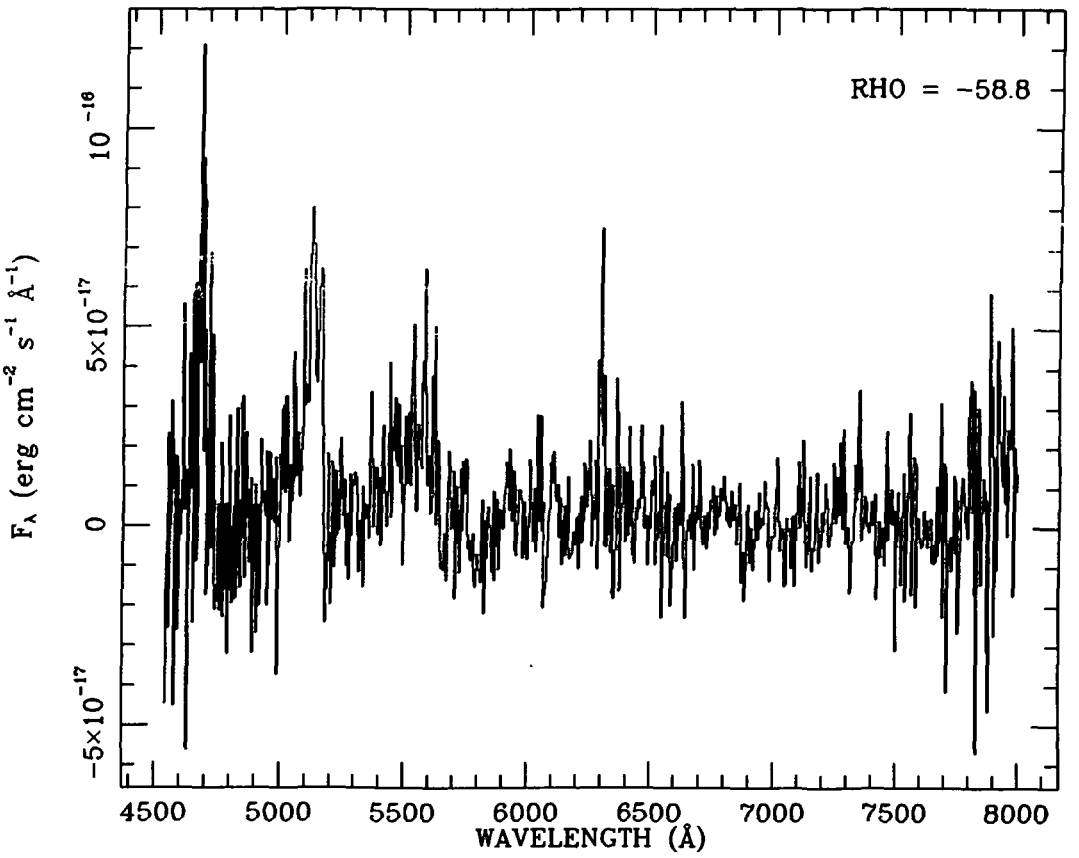
- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

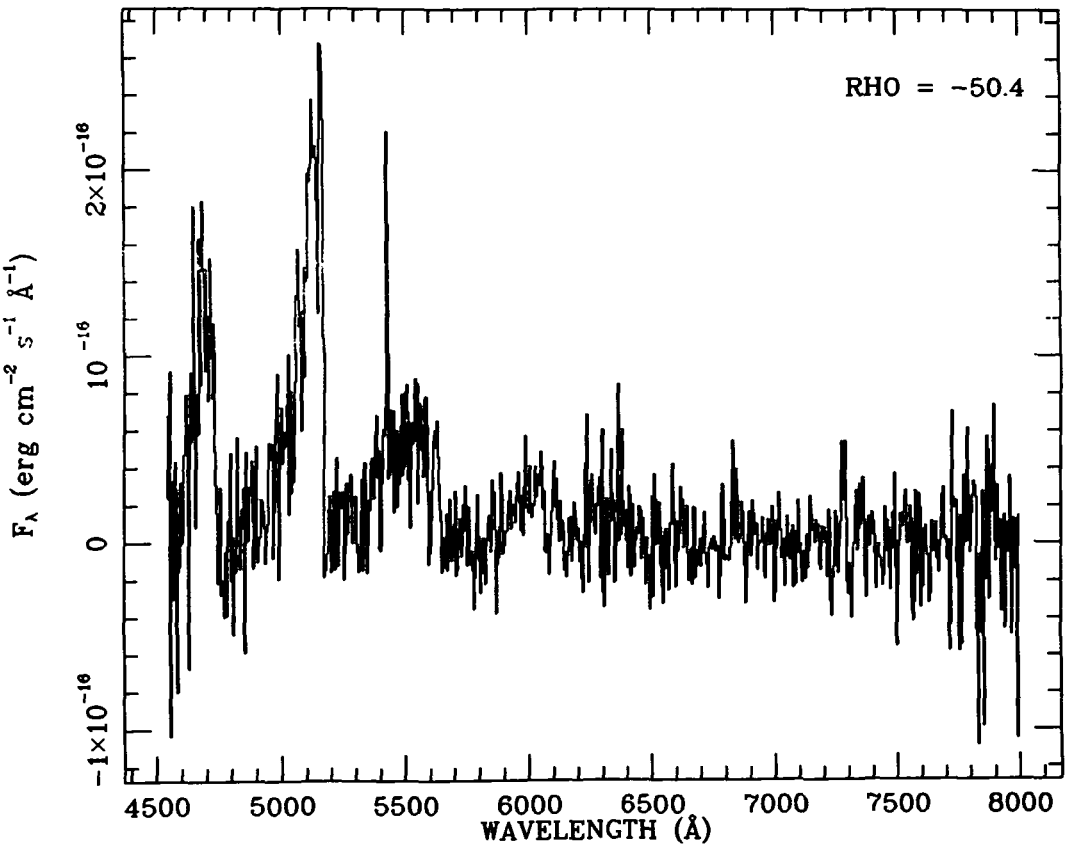
Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
4.10970	700002	17	4545-8000	1	1	11.7	2	RC Spect/Cryocam/TICCD/300gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700002	Reduced digital			61	3.2x6.0	76950101	Spinrad,H/Wehinger,P

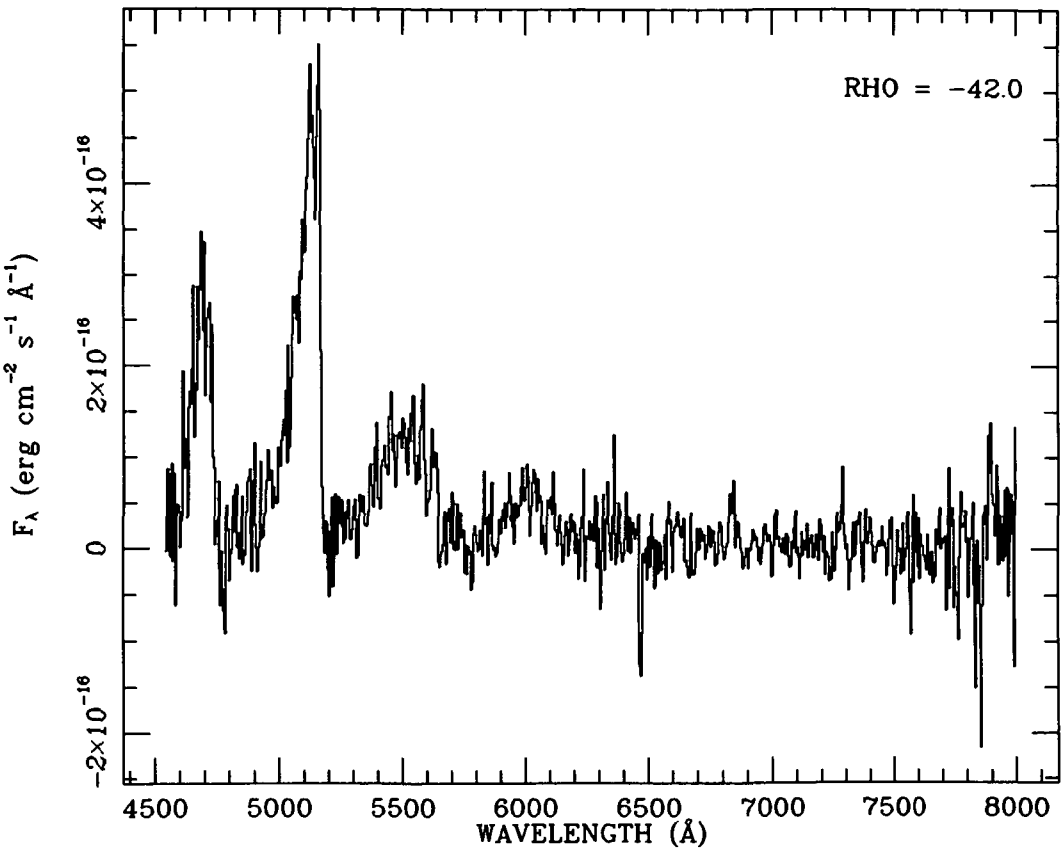
SSN # 700002



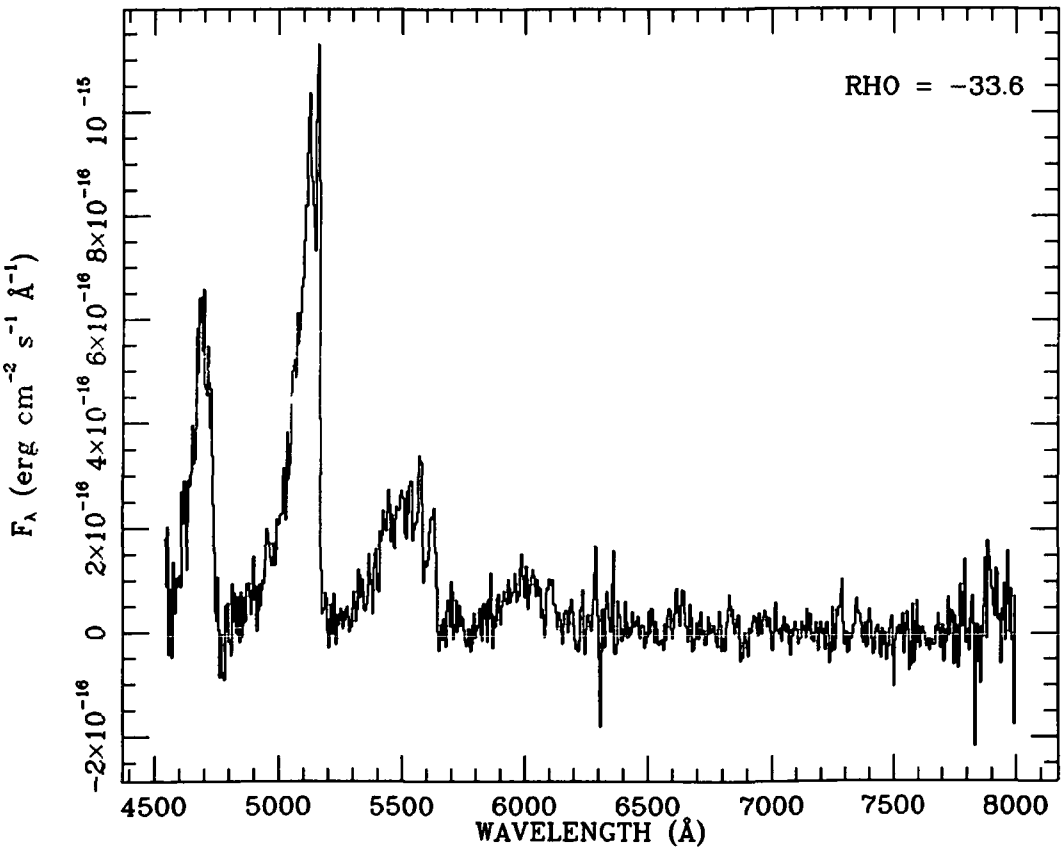
SSN # 700002 (cont.)



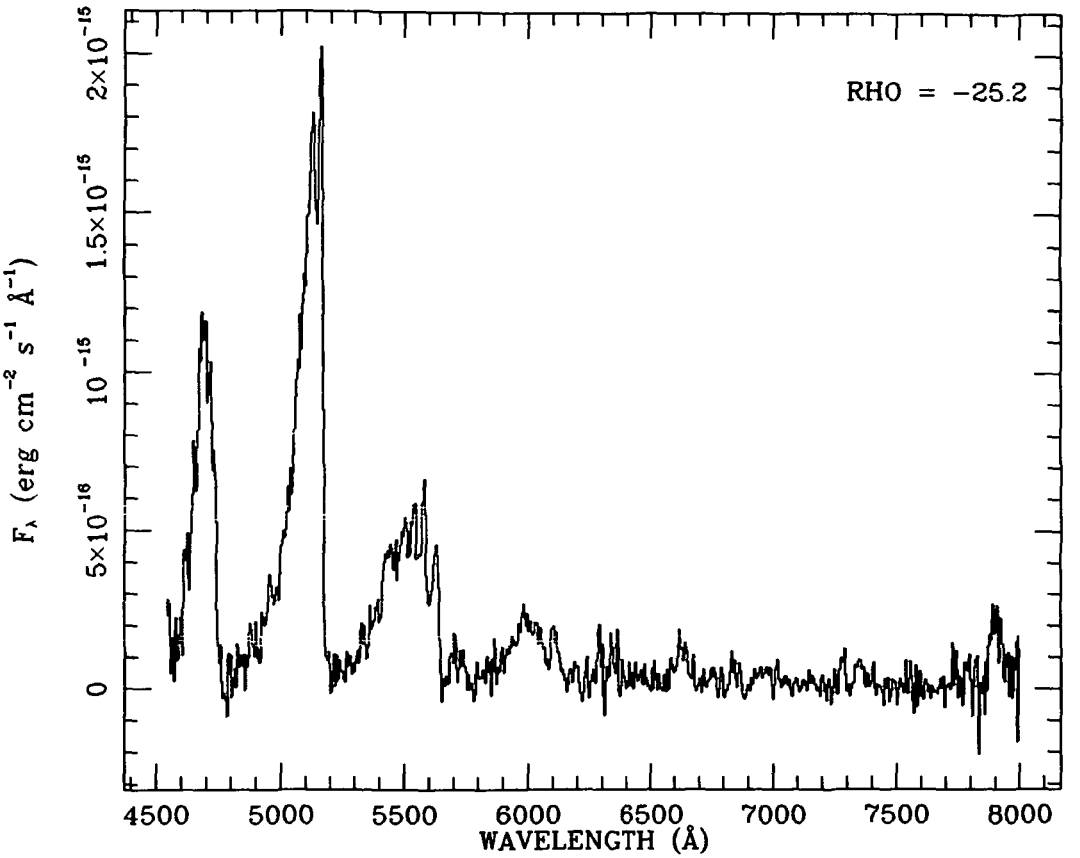
SSN # 700002 (cont.)



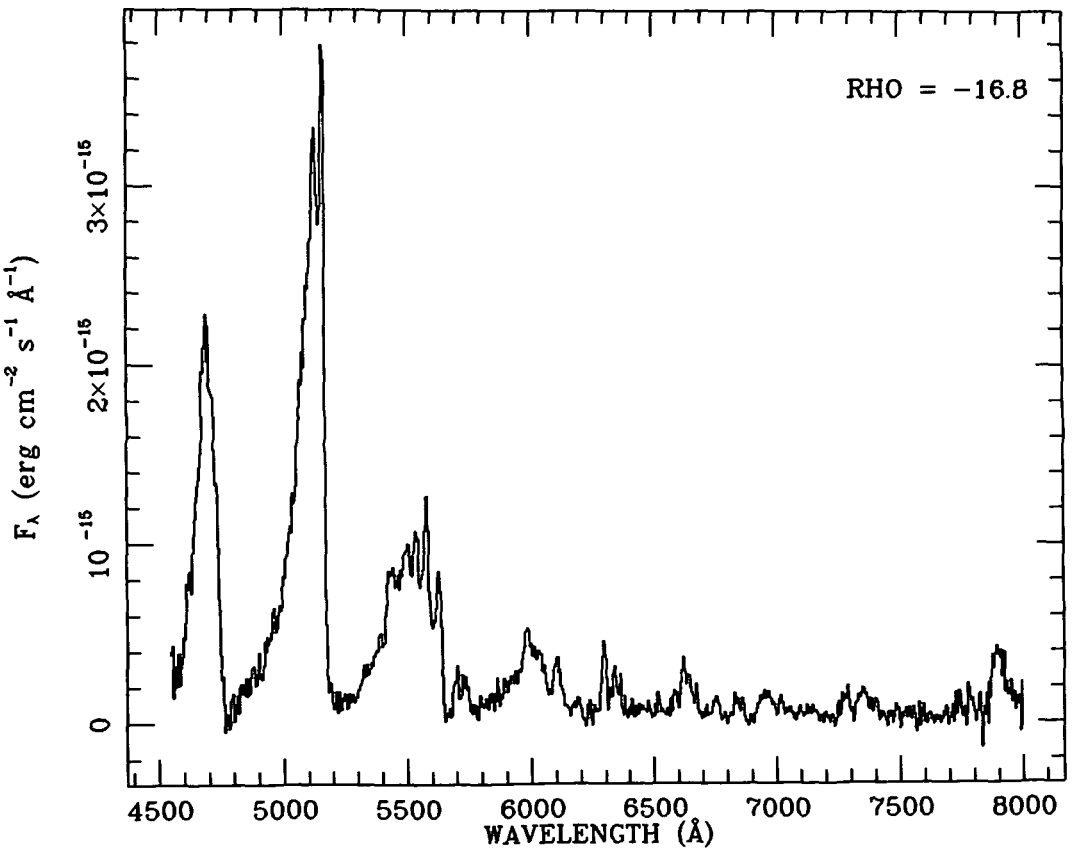
SSN # 700002 (cont.)



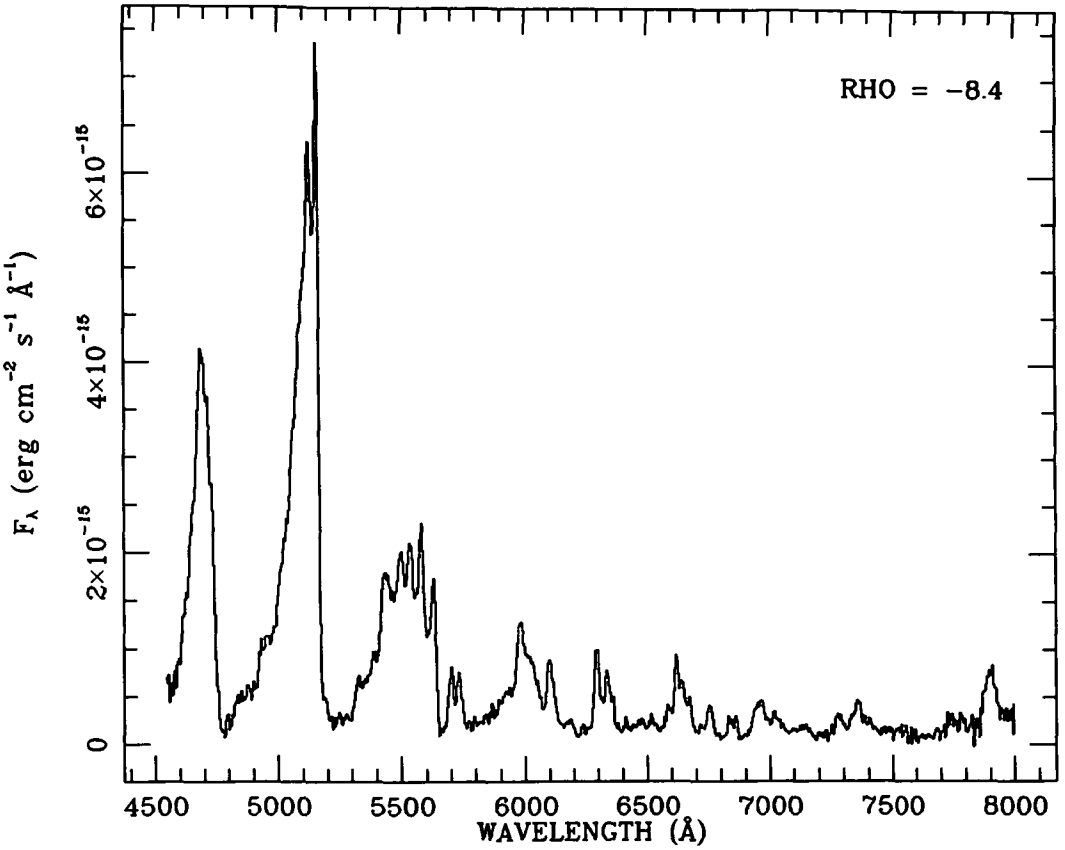
SSN # 700002 (cont.)



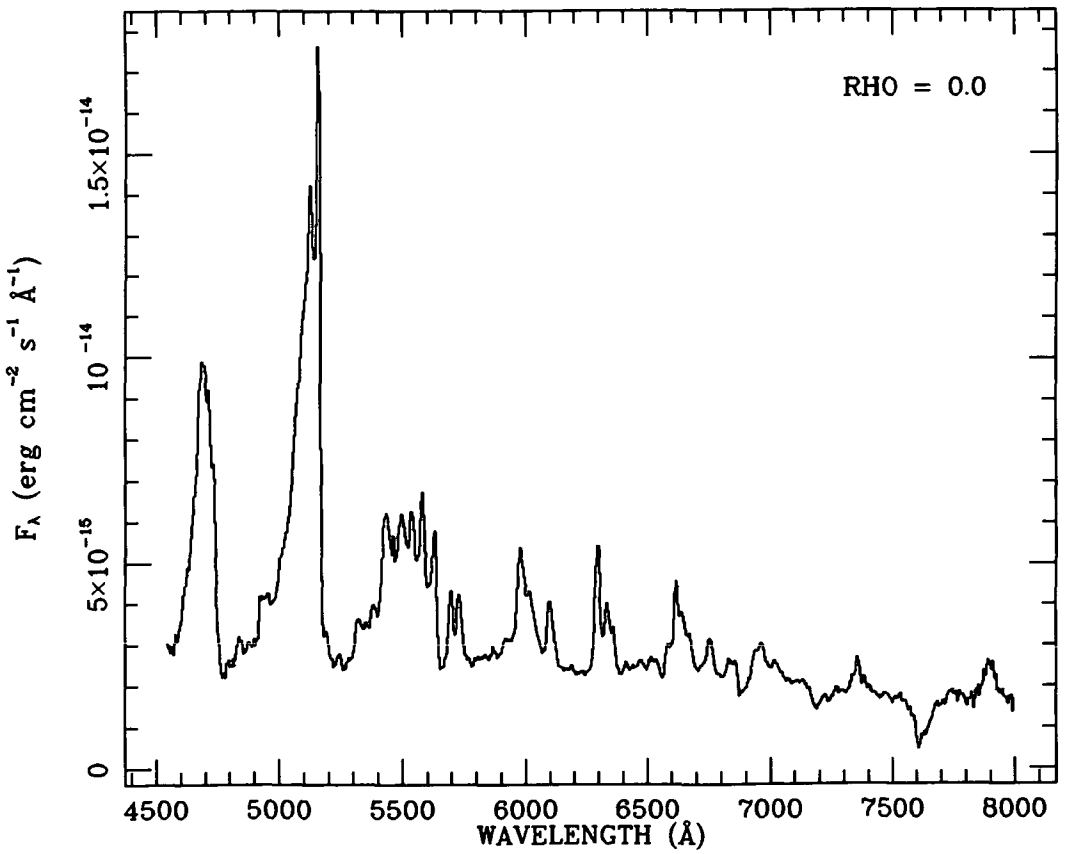
SSN # 700002 (cont.)



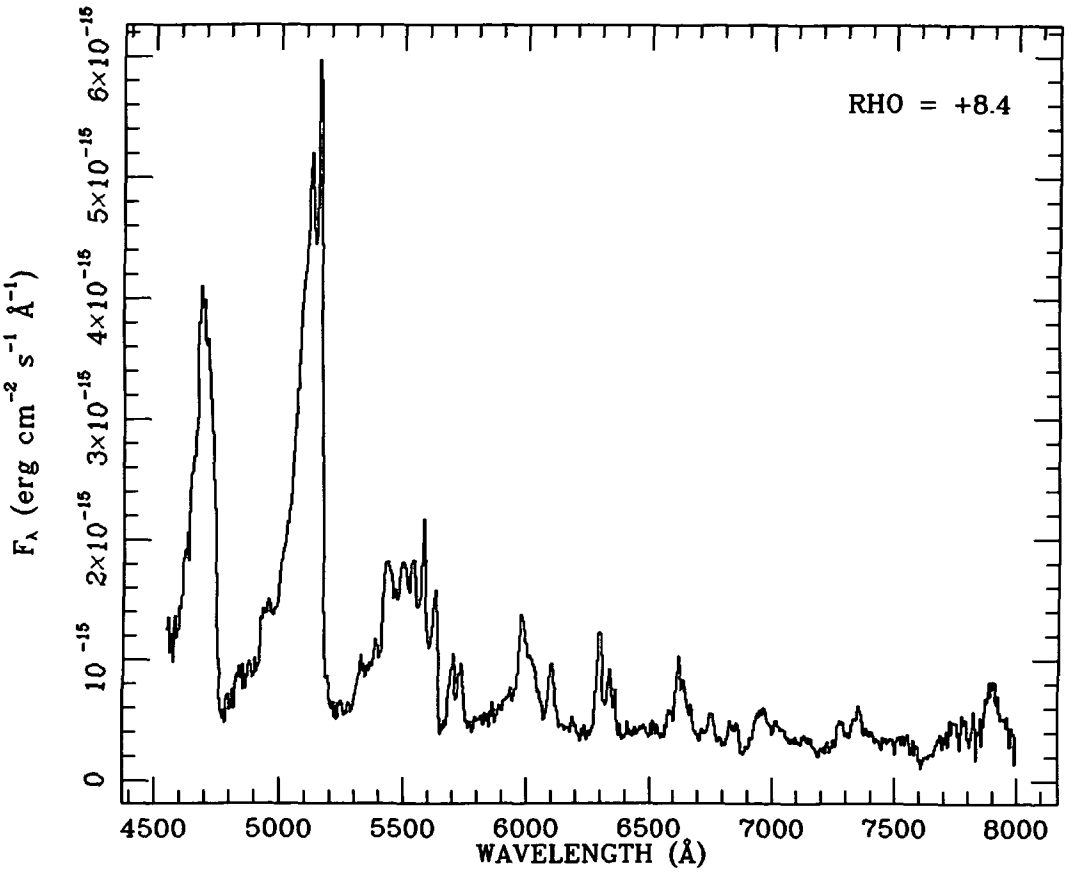
SSN # 700002 (cont.)



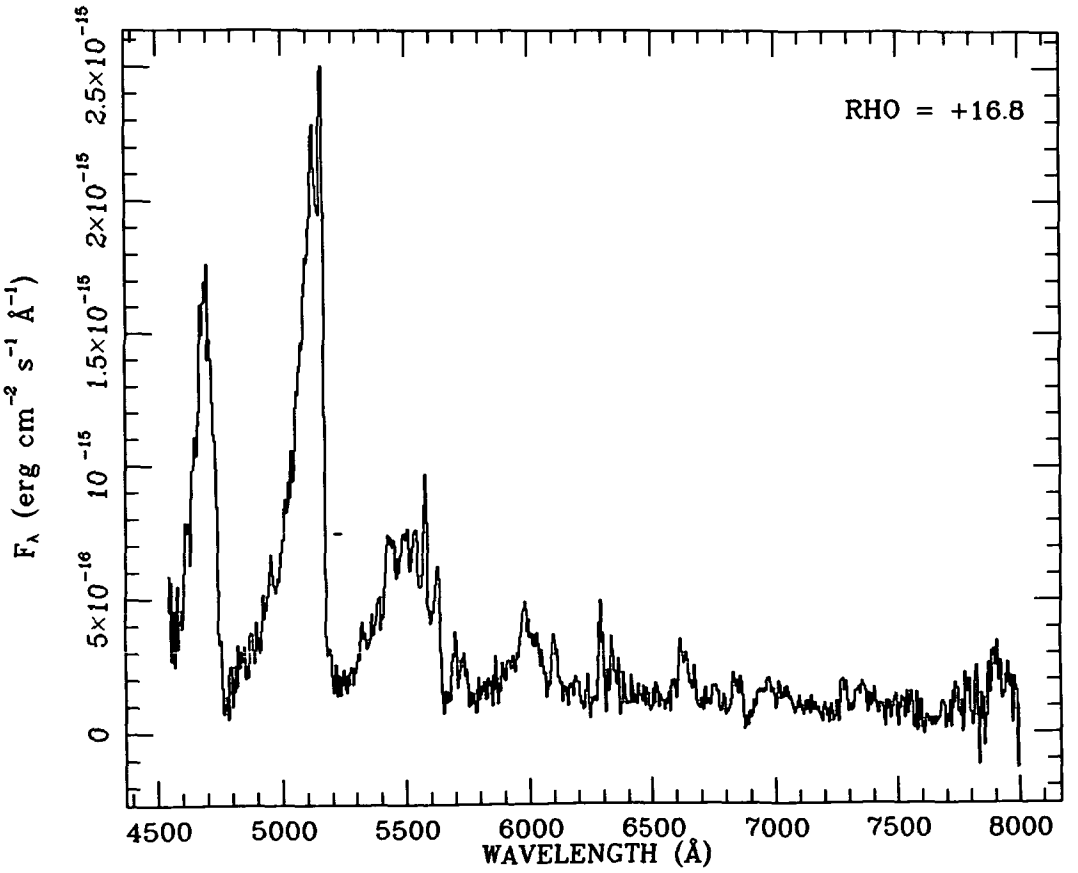
SSN # 700002 (cont.)



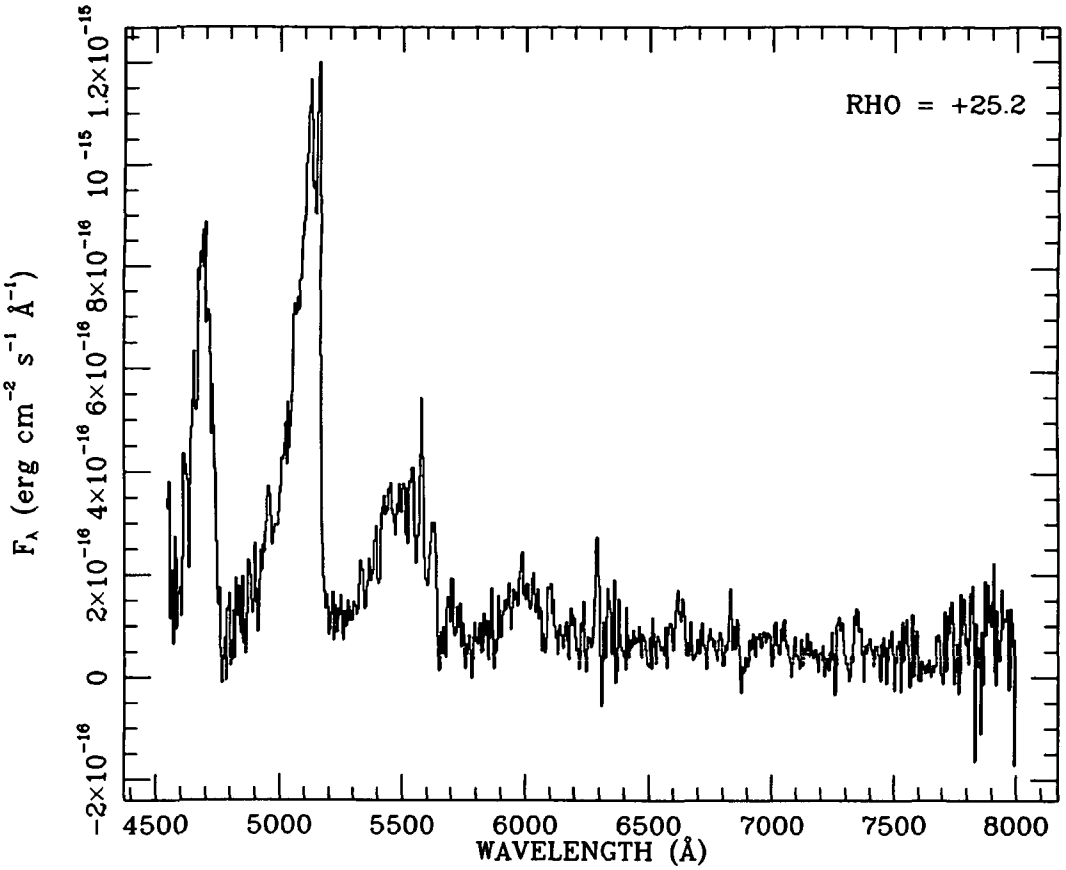
SSN # 700002 (cont.)



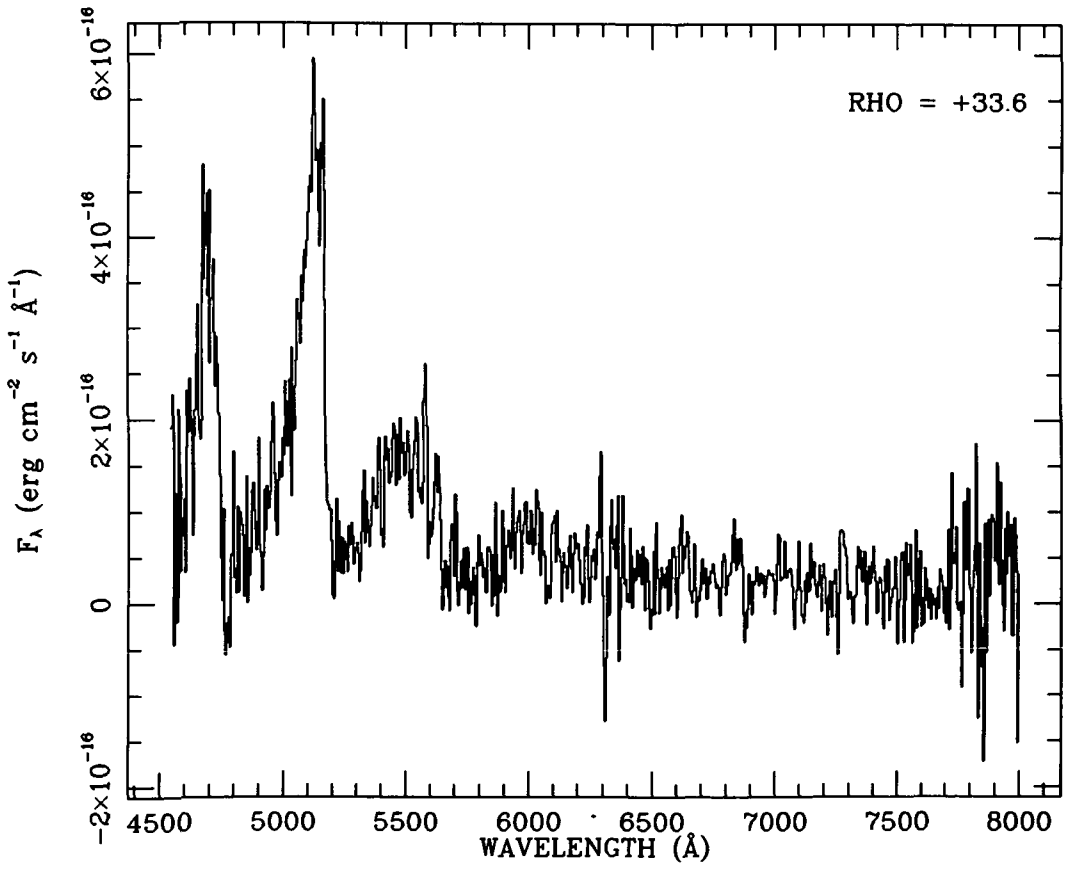
SSN # 700002 (cont.)



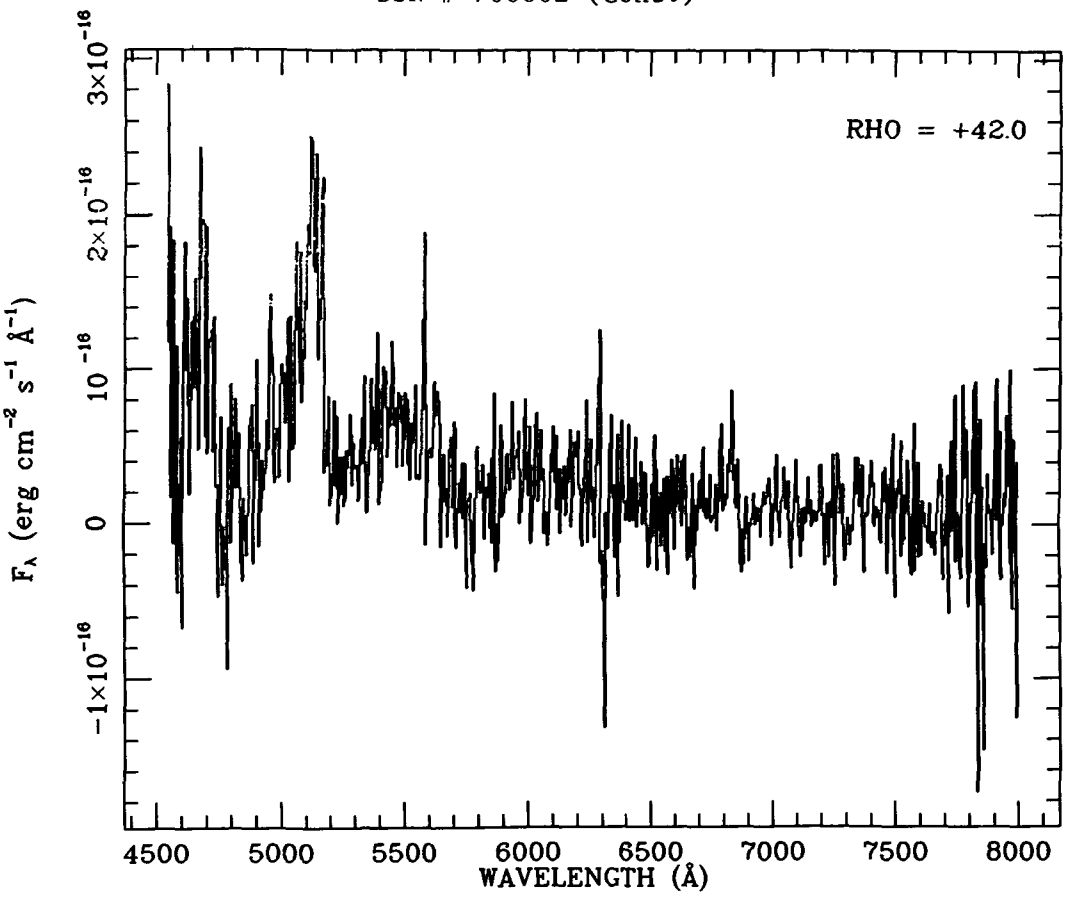
SSN # 700002 (cont.)



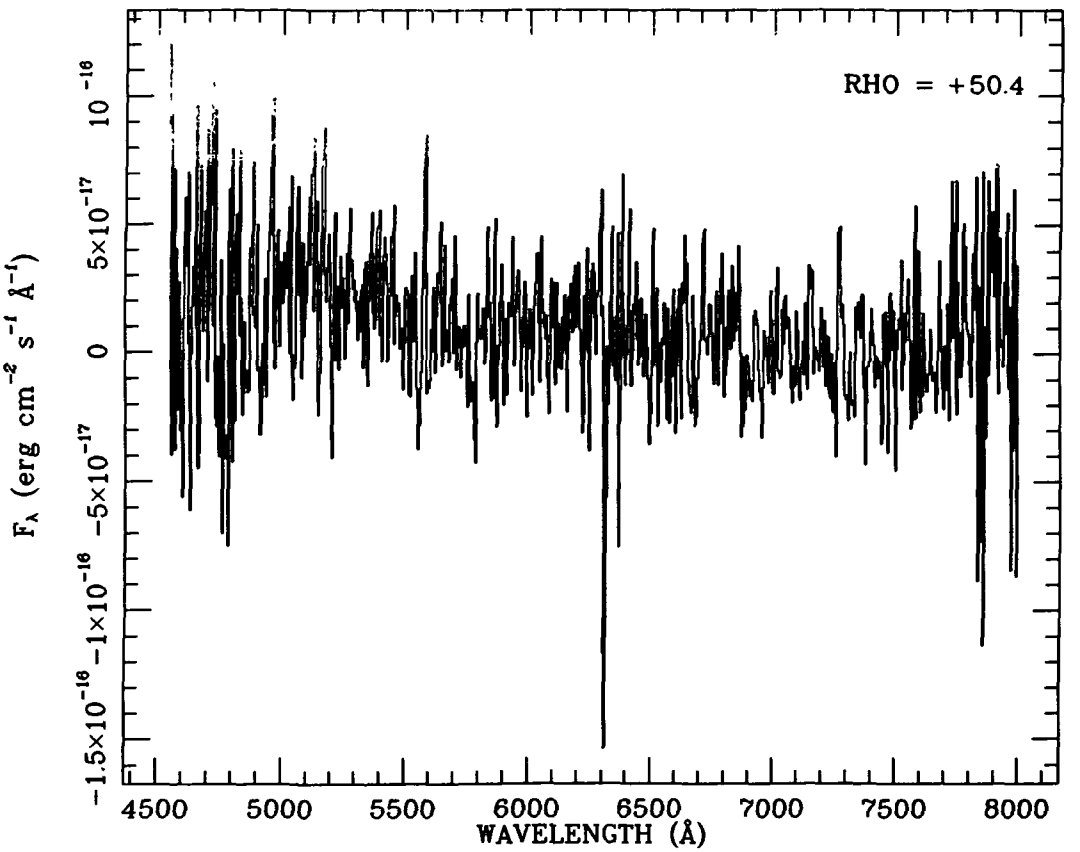
SSN # 700002 (cont.)

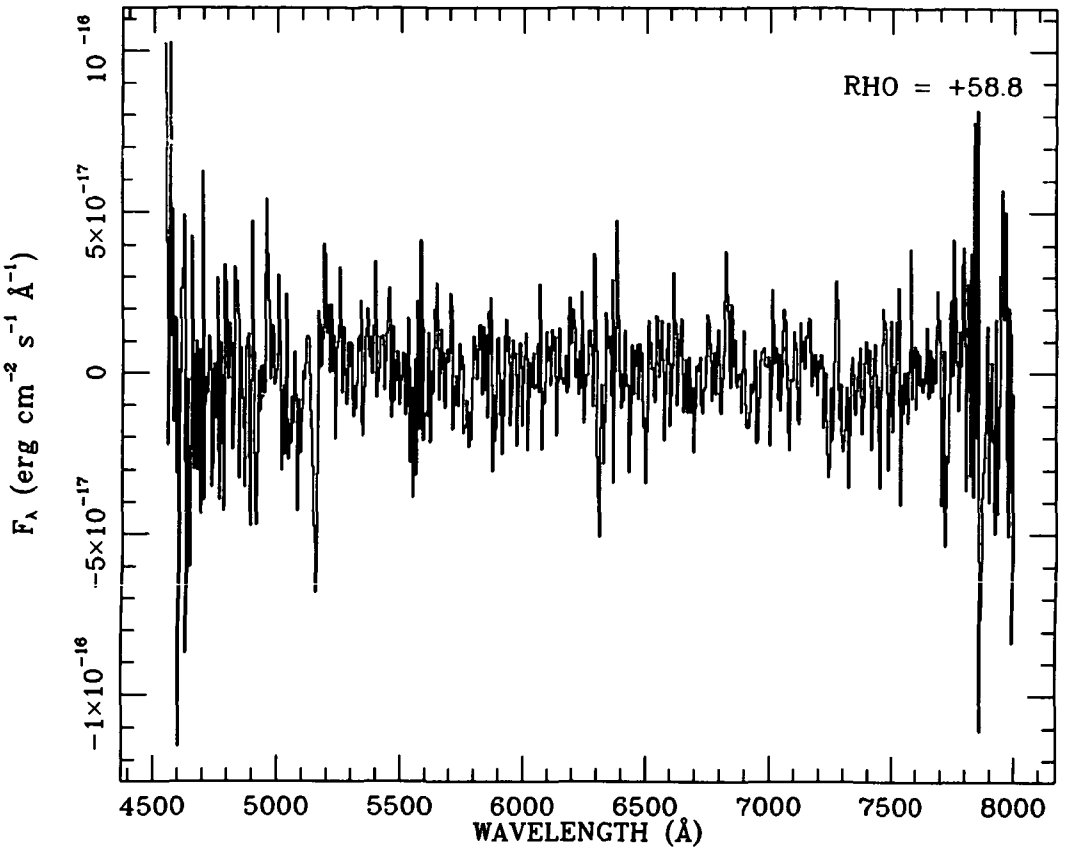


SSN # 700002 (cont.)



SSN # 700002 (cont.)





NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
4.1400	800225	S	9.1	R Peg	3.0	4						

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800225	.20	Schmidt-Cass.	10 0	81 12.5	Y	3	A	Spratt,C.

NOTE A Low alt. (F. star prob. telescopic, not vis. Ed.)

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 43.379
Declination (eq. 1950.0; deg,arcmin)	+ 3 51.86
Geocentric distance (AU)	1.1327
Heliocentric distance (AU)	.7897
Radial geocentric velocity (km/s)	-19.74
Radial heliocentric velocity (km/s)	-11.99
Angle Sun-Earth-comet (deg)	43.1
Angle Sun-comet-Earth (deg)	58.5
Position angle of prolonged radius vector (deg)	60.9
Position angle of negative orbital velocity vector (deg)	303.0
Angle comet-Earth-Moon (deg)	14.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
5.69878	100310	23 46 39.73	+ 3 45 4.4		
5.78750	100309	23 47 5.05	+ 3 44 13.0		

AN #	System	Notes	Observer(s)
100310	11150000		Tselishchev,I.E
100309	14930000		Kohoutek,L

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
5.13100	500013	3115	OH	-9.838	
5.13100	500013	3650	Cont	-13.616	
5.13100	500013	3871	CN	-9.735	
5.13100	500013	4845	Cont	-13.056	
5.13100	500013	5140	C_2	-10.007	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500013	74.6			56880000	A'Hearn,M
500013	74.6			56880000	A'Hearn,M
500013	74.6			56880000	A'Hearn,M
500013	74.6			56880000	A'Hearn,M
500013	74.6			56880000	A'Hearn,M

COMMENT Old OH filter
TELESCOPE 1.1 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
5.0000	800226	S	9.2	AC	2.4	4						
5.1400	800227	M	9.3	R Peg	3.0	5		280				
5.7500	800228	S	10.5:	TX Psc	2.5	2						
5.7900	800229	S	9.3	AAVSO	4	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800226	.32	Newtonian	5.6	68	6.3	Y	1		Bortle,J.
800227	.20	Newtonian	6	61	6.0	Y	3	A	Morris,C.S.
800228	.25	Jones-Bird	6	76	4 MC	Y	1		Poitevin,P.
800229	.26	Newtonian	6	39				B	Merlin,J.C.

NOTE A Sunward fan suspected
NOTE B Coma diameter uncertain

DATE: 6 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 48.094
Declination (eq. 1950.0; deg,arcmin)	+ 3 42.20
Geocentric distance (AU)	1.1213
Heliocentric distance (AU)	.7830
Radial geocentric velocity (km/s)	-19.71
Radial heliocentric velocity (km/s)	-11.34
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	59.2
Position angle of prolonged radius vector (deg)	61.6
Position angle of negative orbital velocity vector (deg)	303.7
Angle comet-Earth-Moon (deg)	9.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
6.60590	100308	23 50 58.41	+ 3 35 58.9		
6.61074	100307	23 50 59.73	+ 3 35 49.7		
6.63166	100306	23 51 5.61	+ 3 35 37.1		
6.68484	100305	23 51 21.13	+ 3 35 8.5		
6.68860	100304	23 51 22.17	+ 3 35 8.0		
6.75139	100303	23 51 40.48	+ 3 34 27.5		
6.76042	100302	23 51 43.15	+ 3 34 23.4		

AN #	System	Notes	Observer(s)
100308	11650000		Timofeev,S
100307	11650000		Timofeev,S
100306	11650000		Timofeev,S
100305	10950000		Chernykh,N.S
100304	10950000		Chernykh,N.S
100303	10220000		Massone,G/Zappala,V
100302	10220000		Massone,G/Zappala,V

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 52.867
Declination (eq. 1950.0; deg,arcmin)	+ 3 31.94
Geocentric distance (AU)	1.1099
Heliocentric distance (AU)	.7766
Radial geocentric velocity (km/s)	-19.68
Radial heliocentric velocity (km/s)	-10.66
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	60.0
Position angle of prolonged radius vector (deg)	62.3
Position angle of negative orbital velocity vector (deg)	304.4
Angle comet-Earth-Moon (deg)	14.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
7.45389	100301	23 55 3.57	+ 3 27 .6		
7.46777	100300	23 55 6.74	+ 3 26 55.9		
7.48548	100299	23 55 11.89	+ 3 26 40.2		
7.60324	100298	23 55 46.28	+ 3 25 19.0		
7.60671	100297	23 55 47.29	+ 3 25 22.1		
7.63038	100296	23 55 53.80	+ 3 25 9.3		

AN #	System	Notes	Observer(s)
100301	13300000		Wei,S.L
100300	13300000		Yang,J.X
100299	13300000		Yang,J.X
100298	11650000		Timofeev,S
100297	11650000		Timofeev,S
100296	11860000		Rakhmatov,E

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
7.61720	500019	3650	Cont	-11.677	
7.61720	500019	3871	CN	-7.965	
7.61720	500019	4060	C_3	-8.969	
7.61720	500019	4845	Cont	-11.328	
7.61720	500019	5140	C_2	-8.230	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500019	44.6			52000000	Kiselev,N/Chernova,G
500019	44.6			52000000	Kiselev,N/Chernova,G
500019	44.6			52000000	Kiselev,N/Chernova,G
500019	44.6			52000000	Kiselev,N/Chernova,G
500019	44.6			52000000	Kiselev,N/Chernova,G

TELESCOPE 1.02 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

```
 7.50 UT  LINE= OH            2P3/2 J=3/2 F=2-2      RESTF=  1667.359 MHz
   N  W=- FILE=600045   DRAO        PENTICTON  BC         SYSCODE= 65002102
   TEL = 26M        E=0.60  BW=  30.0 (1.00,  0)  OFF=(   0.00,  0) PE=  6
   INS = FET/FB       F=   1667.359  B=   1.000  R=  10.0    TS=  85  TR=  50
   UPPER LIMIT =   0.255  JY/BEAM
   OBS =  J. Galt
```

 DATE: 8 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	23 57.696
Declination (eq. 1950.0; deg,arcmin)	+ 3 21.06
Geocentric distance (AU)	1.0986
Heliocentric distance (AU)	.7707
Radial geocentric velocity (km/s)	-19.62
Radial heliocentric velocity (km/s)	-9.95
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	60.7
Position angle of prolonged radius vector (deg)	63.0
Position angle of negative orbital velocity vector (deg)	305.2
Angle comet-Earth-Moon (deg)	23.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
8.46986	100295	23 59 57.98	+ 3 15 38.7		
8.60318	100294	0 0 37.88	+ 3 14 1.6		
8.60666	100293	0 0 39.00	+ 3 13 58.9		
8.61013	100292	0 0 39.96	+ 3 13 57.9		
8.73565	100291	0 1 16.77	+ 3 12 32.1		
8.80399	100290	0 1 36.85	+ 3 11 45.3		
8.98694	100289	0 2 30.78	+ 3 9 35.3		

AN #	System	Notes	Observer(s)
100295	13300000		Ge,Y.L
100294	11650000		Timofeev,S
100293	11650000		Timofeev,S
100292	11650000		Timofeev,S
100291	10560000		Rychtarcik,P
100290	14930000		Kohoutek,L
100289	18010000		McCrosky,R.E

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: SPECTRAL LINE

8.00 UT LINE= HCN 3-2 RESTF=265886.500 MHz
N W=- FILE=600006 MWO MOUNT LOCKE TX SYSCODE= 65001610
TEL = 5M E=0.40 BW= 1.1 (1.00, 0) OFF=(0.00, 0) PE= 6
INS = MIXER/FB F= 265886.500 B= 64.000 R= 250.0 TS=1861 TR=1100
UPPER LIMIT = 42.000 JY/BEAM
OBS = A. Wootten

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
8.0000	800230	S	8.8	AC	2	4						
8.7800	800231	S	9.1	SAO	6.0	2	0.1	58				
8.9900	800232	S	8.9	AC	2.0	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800230	.32	Newtonian	5.6	68	5.5	Y	1		Bortle,J.
800231	.15	Newtonian	5	25					Merlin,J.C.
800232	.32	Newtonian	5.6	68	5.0	Y	1		Bortle,J.

 DATE: 9 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 2.581
Declination (eq. 1950.0; deg,arcmin)	+ 3 9.53
Geocentric distance (AU)	1.0873
Heliocentric distance (AU)	.7651
Radial geocentric velocity (km/s)	-19.55
Radial heliocentric velocity (km/s)	-9.23
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	61.5
Position angle of prolonged radius vector (deg)	63.7
Position angle of negative orbital velocity vector (deg)	305.9
Angle comet-Earth-Moon (deg)	34.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
9.78744	100288	0 6 27.50	+ 2 59 57.7		
9.79160	100287	0 6 28.48	+ 2 59 50.7		

AN #	System	Notes	Observer(s)
100288	10220000		Massone,G/Zappala,V
100287	10220000		Massone,G/Zappala,V

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

9.00 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
N W=- FILE=600007 CSIRO PARKES NSW SYSCODE= 65002601
TEL = 64M E=0.70 BW= 11.7 (1.00, 0) OFF=(0.00, 0) PE= -
INS = UNK/UNK F= 1667.359 B= 2.000 R= 2.0 TS= 50 TR= -
UPPER LIMIT = 0.054 JY/BEAM
OBS = R. Norris

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
9.7700	800233	S	9.1	SAO	6.6	2		28				

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800233	.26	Newtonian	6	39				Merlin,J.C.

DATE: 10 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 7.521
Declination (eq. 1950.0; deg,arcmin)	+ 2 57.34
Geocentric distance (AU)	1.0760
Heliocentric distance (AU)	.7600
Radial geocentric velocity (km/s)	-19.46
Radial heliocentric velocity (km/s)	-8.48
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	62.2
Position angle of prolonged radius vector (deg)	64.4
Position angle of negative orbital velocity vector (deg)	306.7
Angle comet-Earth-Moon (deg)	45.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
10.60810	100286	0 10 32.86	+ 2 49 28.2		
10.61534	100285	0 10 34.73	+ 2 49 26.2		
10.75347	100284	0 11 16.55	+ 2 47 36.4		
10.75903	100283	0 11 18.06	+ 2 47 34.0		

AN #	System	Notes	Observer(s)
100286	11650000		Timofeev,S
100285	11650000		Timofeev,S
100284	10220000		Massone,G/Zappala,V
100283	10220000		Massone,G/Zappala,V

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

10.00 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
N W=- FILE=600010 ARECIBO ARECIBO PR SYSCODE= 65001617
TEL = 305M E=0.60 BW= 3.2 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1665.402 B= 0.625 R= 2.5 TS= 60 TR= -
UPPER LIMIT = 0.009 JY/BEAM
OBS = W. Deich, J. Cordes, and Y. Terzian

10.00 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
N W=- FILE=600011 ARECIBO ARECIBO PR SYSCODE= 65001617
TEL = 305M E=0.60 BW= 3.2 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1667.359 B= 0.625 R= 2.5 TS= 60 TR= -
UPPER LIMIT = 0.009 JY/BEAM
OBS = W. Deich, J. Cordes, and Y. Terzian

SUB-NETWORK: SPECTRAL LINE

10.00 UT LINE= NH2 3(1,3)-2(2,0) RESTF=241591.400 MHz
N W=- FILE=600008 MWO MOUNT LOCKE TX SYSCODE= 65001610
TEL = 5M E=0.50 BW= 1.2 (1.00, 0) OFF=(0.00, 0) PE= 6
INS = MIXER/FB F= 241591.400 B= 64.000 R= 250.0 TS=1714 TR=1100
UPPER LIMIT = 57.000 JY/BEAM
OBS = A. Wootten

10.00 UT LINE= CS 5-4 RESTF=244935.600 MHz
N W=- FILE=600009 MWO MOUNT LOCKE TX SYSCODE= 65001610
TEL = 5M E=0.50 BW= 1.2 (1.00, 0) OFF=(0.00, 0) PE= 6
INS = MIXER/FB F= 244935.600 B= 64.000 R= 250.0 TS=1197 TR=1100
UPPER LIMIT = 33.000 JY/BEAM
OBS = A. Wootten

10.81 UT LINE= HCN 1-0 F=2-1 RESTF= 88631.840 MHz
N W=- FILE=600012 FCRAO NEW SALEM MA SYSCODE= 65001615
TEL = 14M E=0.60 BW= 1.0 (1.00, 0) OFF=(0.00, 0) PE= 7
INS = MIXER/SEFB F= 88631.840 B= 12.500 R= 50.0 TS= 350 TR= 200
UPPER LIMIT = 2.000 JY/BEAM
OBS = P. Schloerb, W. Irvine, D. Swade, C. Clemens, and R. Molloy

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
10.7700	800234	S	9.0	SAO	6.0	2						

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800234	.26	Newtonian	6	39			A	Merlin,J.C.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 12.515
Declination (eq. 1950.0; deg,arcmin)	+ 2 44.46
Geocentric distance (AU)	1.0648
Heliocentric distance (AU)	.7553
Radial geocentric velocity (km/s)	-19.36
Radial heliocentric velocity (km/s)	-7.71
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	63.0
Position angle of prolonged radius vector (deg)	65.2
Position angle of negative orbital velocity vector (deg)	307.4
Angle comet-Earth-Moon (deg)	56.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
11.68131	100282	0 15 56.51	+ 2 35 12.5		
11.69433	100281	0 16 .59	+ 2 34 59.2		
11.69462	100280	0 16 .90	+ 2 34 58.0		
11.70711	100279	0 16 4.46	+ 2 34 48.4		
11.71406	100278	0 16 6.66	+ 2 34 42.3		
11.79062	100277	0 16 29.79	+ 2 33 41.4		

AN #	System	Notes	Observer(s)
100282	11150000		Tselishchev,I.E
100281	11150000		Tselishchev,I.E
100280	10690000		Alksnis,A
100279	10690000		Pundure
100278	10690000		Pundure
100277	14930000		Kohoutek,L

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 17.563
Declination (eq. 1950.0; deg,arcmin)	+ 2 30.87
Geocentric distance (AU)	1.0536
Heliocentric distance (AU)	.7511
Radial geocentric velocity (km/s)	-19.23
Radial heliocentric velocity (km/s)	-6.92
Angle Sun-Earth-comet (deg)	43.0
Angle Sun-comet-Earth (deg)	63.7
Position angle of prolonged radius vector (deg)	66.0
Position angle of negative orbital velocity vector (deg)	308.1
Angle comet-Earth-Moon (deg)	68.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
12.75961	100276	0 21 25.34	+ 2 19 59.3		
12.79201	100275	0 21 35.64	+ 2 19 30.9		

AN #	System	Notes	Observer(s)
100276	10240000		
100275	14930000		Kohoutek,L

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
12.7700	800235	S	8.7	SAO	6.0	3		28				
12.795	800236	S	10.4		2.8	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.		DA	OS	Notes	Observer(s)
800235	.26	Newtonian	6	39					A	Merlin,J.C.
800236	.33	Newtonian	4.5	45	3	M	Y	1		Shanklin,J.D.

NOTE A Coma diameter uncertain

DATE: 13 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 22.663
Declination (eq. 1950.0; deg,arcmin)	+ 2 16.57
Geocentric distance (AU)	1.0426
Heliocentric distance (AU)	.7474
Radial geocentric velocity (km/s)	-19.09
Radial heliocentric velocity (km/s)	-6.12
Angle Sun-Earth-comet (deg)	43.1
Angle Sun-comet-Earth (deg)	64.5
Position angle of prolonged radius vector (deg)	66.9
Position angle of negative orbital velocity vector (deg)	308.8
Angle comet-Earth-Moon (deg)	81.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
13.60388	100274	0 25 46.43	+ 2 7 29.7		
13.61638	100273	0 25 49.78	+ 2 7 19.2		
13.76094	100272	0 26 34.44	+ 2 5 6.2		

AN #	System	Notes	Observer(s)
100274	11650000		Timofeev,S
100273	11650000		Timofeev,S
100272	10260000		Wild,P

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

13.13 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
S W=- FILE=600013 NANCAY NANCAY FRANCE SYSCODE= 65000401
TEL = 200MX40M E=0.48 BW= 8.2 (5.42, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1667.359 B= 0.800 R= 3.1 TS= 50 TR= -
LINE DATA PEAK= -.018 (0.006) JY/BEAM AREA= -50.0 (10.0) JY/BEAM*M/S
OBS = D. Bockelee-Morvan, J. Crovisier, and E. Gerard

13.13 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
S W=- FILE=600014 NANCAY NANCAY FRANCE SYSCODE= 65000401
TEL = 200MX40M E=0.48 BW= 8.2 (5.42, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1665.402 B= 0.800 R= 3.1 TS= 50 TR= -
UPPER LIMIT = 0.020 JY/BEAM
OBS = D. Bockelee-Morvan, J. Crovisier, and E. Gerard

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
13.7700	800237	S	8.6	SAO	8.0	3		28				
13.771	800238	S	9.7		2.3	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800237	.26	Newtonian	6	39				A	Merlin,J.C.
800238	.33	Newtonian	4.5	45	3.5	Y	1		Shanklin,J.D.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 27.815
Declination (eq. 1950.0; deg,arcmin)	+ 2 1.54
Geocentric distance (AU)	1.0316
Heliocentric distance (AU)	.7441
Radial geocentric velocity (km/s)	-18.92
Radial heliocentric velocity (km/s)	-5.30
Angle Sun-Earth-comet (deg)	43.2
Angle Sun-comet-Earth (deg)	65.2
Position angle of prolonged radius vector (deg)	67.7
Position angle of negative orbital velocity vector (deg)	309.6
Angle comet-Earth-Moon (deg)	94.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
14.70924	100271	0 31 29.70	+ 1 50 18.6		
14.71370	100270	0 31 31.19	+ 1 50 13.2		
14.71909	100269	0 31 33.03	+ 1 50 10.6		

AN #	System	Notes	Observer(s)
100271	10690000		Dundans
100270	10690000		Dundans
100269	10690000		Dundans

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
14.7700	800239	S	8.5	SAO	7.0	3						

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800239	.26	Newtonian	6	39			A	Merlin,J.C.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 33.018
Declination (eq. 1950.0; deg,arcmin)	+ 1 45.77
Geocentric distance (AU)	1.0207
Heliocentric distance (AU)	.7412
Radial geocentric velocity (km/s)	-18.74
Radial heliocentric velocity (km/s)	-4.46
Angle Sun-Earth-comet (deg)	43.3
Angle Sun-comet-Earth (deg)	66.0
Position angle of prolonged radius vector (deg)	68.6
Position angle of negative orbital velocity vector (deg)	310.3
Angle comet-Earth-Moon (deg)	108.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
15.70816	100268	0 36 43.71	+ 1 33 57.7		
15.71319	100267	0 36 44.82	+ 1 33 56.9		

AN #	System	Notes	Observer(s)
100268	10690000		Eglitis,I
100267	10690000		Eglitis,I

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

15.35 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
S W=2 FILE=600046 NRAO-GB GREEN BANK WV SYSCODE= 65001613
TEL = 43M E=0.70 BW= 18.1 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1667.359 B= 0.313 R= 1.2 TS= 25 TR= -
LINE DATA PEAK= -.030 (0.010) JY/BEAM AREA= -33.0 (6.0) JY/BEAM*M/S
OBS = P. Schloerb, C. Clemens, and R. Molloy

15.35 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
S W=2 FILE=600047 NRAO-GB GREEN BANK WV SYSCODE= 65001613
TEL = 43M E=0.70 BW= 18.1 (1.00, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1665.402 B= 0.313 R= 1.2 TS= 25 TR= -
LINE DATA PEAK= -.020 (0.010) JY/BEAM AREA= -20.0 (6.0) JY/BEAM*M/S
OBS = P. Schloerb, C. Clemens, and R. Molloy

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
15.1500	800240	S	8.5:	SAO								

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800240	.20	Schmidt-Cass.	10	78	4.5	Y	1		Morris,C.S.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 38.270
Declination (eq. 1950.0; deg,arcmin)	+ 1 29.24
Geocentric distance (AU)	1.0100
Heliocentric distance (AU)	.7389
Radial geocentric velocity (km/s)	-18.53
Radial heliocentric velocity (km/s)	-3.62
Angle Sun-Earth-comet (deg)	43.4
Angle Sun-comet-Earth (deg)	66.7
Position angle of prolonged radius vector (deg)	69.4
Position angle of negative orbital velocity vector (deg)	310.9
Angle comet-Earth-Moon (deg)	122.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
16.71615	100266	0 42 3.50	+ 1 16 48.5		

AN #	System	Notes	Observer(s)
100266	10690000		Platajs,I.K

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: SPECTRAL LINE

16.58 UT LINE= H2O 6(1,6)-5(2,3) RESTF= 22235.080 MHz
N W=- FILE=600017 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.37 BW= 0.7 (1.00, 0) OFF=(0.00, 0) PE= 1
INS = MASER/AC F= 22235.080 B= 10.000 R= 52.0 TS= 63 TR= 40
UPPER LIMIT = 0.033 JY/BEAM
OBS = M. Bird, M. Walmsley, W. Huchtmeier, and W. Batrla

16.58 UT LINE= NH3 1(1)-1(1) RESTF= 23694.500 MHz
N W=- FILE=600018 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.37 BW= 0.7 (1.00, 0) OFF=(0.00, 0) PE= 1
INS = MASER/AC F= 23694.500 B= 10.000 R= 52.0 TS= 63 TR= 40
UPPER LIMIT = 0.036 JY/BEAM
OBS = M. Bird, M. Walmsley, W. Huchtmeier, and W. Batrla

16.58 UT LINE= NH3 2(2)-2(2) RESTF= 23722.630 MHz
N W=- FILE=600019 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.37 BW= 0.7 (1.00, 0) OFF=(0.00, 0) PE= 1
INS = MASER/AC F= 23722.630 B= 10.000 R= 52.0 TS= 63 TR= 40
UPPER LIMIT = 0.039 JY/BEAM
OBS = M. Bird, M. Walmsley, W. Huchtmeier, and W. Batrla

16.58 UT LINE= NH3 3(3)-3(3) RESTF= 23870.130 MHz
N W=- FILE=600020 MPI EFFELSBERG FRG SYSCODE= 65002501
TEL = 100M E=0.37 BW= 0.7 (1.00, 0) OFF=(0.00, 0) PE= 1
INS = MASER/AC F= 23870.130 B= 10.000 R= 52.0 TS= 63 TR= 40
UPPER LIMIT = 0.030 JY/BEAM
OBS = M. Bird, M. Walmsley, W. Huchtmeier, and W. Batrla

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 43.571
Declination (eq. 1950.0; deg,arcmin)	+ 1 11.97
Geocentric distance (AU)	.9993
Heliocentric distance (AU)	.7371
Radial geocentric velocity (km/s)	-18.30
Radial heliocentric velocity (km/s)	-2.76
Angle Sun-Earth-comet (deg)	43.5
Angle Sun-comet-Earth (deg)	67.4
Position angle of prolonged radius vector (deg)	70.3
Position angle of negative orbital velocity vector (deg)	311.6
Angle comet-Earth-Moon (deg)	136.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
17.70303	100265	0 47 19.30	+ 0 59 14.0		
17.70809	100264	0 47 21.34	+ 0 59 8.3		
17.71201	100263	0 47 22.27	+ 0 59 3.7		

AN #	System	Notes	Observer(s)
100265	10690000		Eglitis,I
100264	10690000		Eglitis,I
100263	10690000		Eglitis,I

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
17.7700	800241	S	8.3	SAO	5.0	3						
17.7700	800242	?					0.03	352				

AON #	Tel.	Instrument	f/#	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800241	.26	Newtonian	6	39				A	Merlin,J.C.
800242	.26	Newtonian	6	130					Merlin,J.C.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 48.919
Declination (eq. 1950.0; deg,arcmin)	+ 0 53.94
Geocentric distance (AU)	.9888
Heliocentric distance (AU)	.7357
Radial geocentric velocity (km/s)	-18.05
Radial heliocentric velocity (km/s)	-1.89
Angle Sun-Earth-comet (deg)	43.7
Angle Sun-comet-Earth (deg)	68.1
Position angle of prolonged radius vector (deg)	71.3
Position angle of negative orbital velocity vector (deg)	312.3
Angle comet-Earth-Moon (deg)	150.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
18.60523	100262	0 52 10.61	+ 0 42 29.5		
18.72795	100261	0 52 49.42	+ 0 40 12.0		
18.72951	100260	0 52 50.11	+ 0 40 17.2		
18.73125	100259	0 52 50.87	+ 0 40 3.3		
18.73351	100258	0 52 51.74	+ 0 40 4.9		
18.73368	100257	0 52 51.56	+ 0 40 5.7		
18.73906	100256	0 52 53.50	+ 0 39 56.9		
18.74794	100255	0 52 56.57	+ 0 39 51.1	8.5	
18.75244	100254	0 52 58.12	+ 0 39 45.2		
18.76840	100253	0 53 3.00	+ 0 39 29.0		
18.78368	100252	0 53 8.40	+ 0 39 11.0		
18.79653	100251	0 53 12.57	+ 0 38 55.0	10.0	

AN #	System	Notes	Observer(s)
100262	11650000		Timofeev,S
100261	10610000		Ignatovich,S
100260	10610000		Ignatovich,S
100259	10610000		Ignatovich,S
100258	10610000		Ignatovich,S
100257	10610000		Ignatovich,S
100256	10610000		Ignatovich,S
100255	10460000		Mrkos,A
100254	10460000		Mrkos,A
100253	10170000		Geffert,M/Geyer,E.H
100252	10170000		Geffert,M/Geyer,E.H
100251	14940000		Manning,B

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
18.5200	800243	S	8.2	AA	3.2	6						
18.7700	800244	S	8.1	SAO	7.5	3						
18.7700	800245	?					0.08	84				
18.7700	800246	?					0.09	340				
18.788	800247	S	8.0:	Z Cet								
18.792	800248	S	8.0:	Z Cet	4.5	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800243	.15	Newtonian	5	30	4.8	Y			Pearce,A.
800244	.26	Newtonian	6	39					Merlin,J.C.
800245	.26	Newtonian	6	130					Merlin,J.C.
800246	.26	Newtonian	6	63					Merlin,J.C.
800247	.25	Jones-Bird	6	59	4	Y	3		Bouma,R.J.
800248	.25	Jones-Bird	6	59	4	Y	3		Bus,E.P.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 54.315
Declination (eq. 1950.0; deg,arcmin)	+ 0 35.15
Geocentric distance (AU)	.9785
Heliocentric distance (AU)	.7349
Radial geocentric velocity (km/s)	-17.78
Radial heliocentric velocity (km/s)	-1.03
Angle Sun-Earth-comet (deg)	43.9
Angle Sun-comet-Earth (deg)	68.8
Position angle of prolonged radius vector (deg)	72.2
Position angle of negative orbital velocity vector (deg)	312.9
Angle comet-Earth-Moon (deg)	164.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
19.61082	100250	0 57 37.97	+ 0 23 13.3		
19.61282	100249	0 57 38.12	+ 0 23 7.8		
19.76271	100248	0 58 27.06	+ 0 20 14.8		
19.76657	100247	0 58 28.40	+ 0 20 9.0		

AN #	System	Notes	Observer(s)
100250	11650000		Timofeev,S
100249	11650000		Timofeev,S
100248	10170000		Geffert,M/Geyer,E.H
100247	10170000		Geffert,M/Geyer,E.H

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
19.1600	800249	M	8.2	AA	2.7	7						
19.1600	800250	M	8.2	AA								
19.5200	800251	S	8.6		2.3	6						
19.5200	800252	S	8.1	AA	2.5	5						
19.7700	800253	S	8.1	SAO	6.0	4						
19.778	800254	S	8.1	Z Cet	4.5	3						
19.7800	800255	?					0.08	84				
19.788	800256	S	8.3	Z Cet	6	1						
19.792	800257	S	7.9	Z Cet	5	5						
19.9500	800258	B	8.9	SAO	1.4	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800249	.20	Newtonian	6	61	7.0	Y	3		Morris,C.S.
800250	.20	Schmidt-Cass.	10	78	7.0	Y	3		Morris,C.S.
800251	.41	Newtonian	4.2	86	13.5	Y	1	A	Clark,M.L.
800252	.15	Newtonian	5	30	5.1	Y			Pearce,A.
800253	.26	Newtonian	6	39				B	Merlin,J.C.
800254	.16	Newtonian	4.9	36	4.5	Y	2		Bouma,R.J.
800255	.26	Newtonian	6	130					Merlin,J.C.
800256	.08	Binoculars		20	4.5	Y	2		Bouma,R.J.
800257	.16	Newtonian	4.9	36	4.5	Y	2		Bus,E.P.
800258	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A (F. star prob. telescopic, not vis. Ed.)
NOTE B Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	0 59.756
Declination (eq. 1950.0; deg,arcmin)	+ 0 15.62
Geocentric distance (AU)	.9683
Heliocentric distance (AU)	.7345
Radial geocentric velocity (km/s)	-17.49
Radial heliocentric velocity (km/s)	-.15
Angle Sun-Earth-comet (deg)	44.1
Angle Sun-comet-Earth (deg)	69.4
Position angle of prolonged radius vector (deg)	73.1
Position angle of negative orbital velocity vector (deg)	313.5
Angle comet-Earth-Moon (deg)	177.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #		R.A.(1950.0)	Dec.	m_1	m_2
20.10139	100246	1	0 18.43	+ 0 13 29.6		
20.51111	100245	1	2 32.92	+ 0 5 24.8		
20.60541	100244	1	3 4.25	+ 0 3 25.6		

AN #	System	Notes	Observer(s)
100246	17070000		Everhart,E
100245	13230000	A	Candy,M.P et al.
100244	11860000		Rakhmatov,E

NOTE A Additional observers: Candy,V/Jekabsons,P/Johnston,J/Sultana,M

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
20.1500	800259	S	8.0	AA	6	4	0.33	63				
20.1600	800260	M	8.2	AA	1.6	6	0.33	63				
20.5200	800261	S	8.4		2.5	6						
20.5300	800262	S	8.1	AA	3	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800259	.08	Binoculars		20	7.0	Y	3		Morris,C.S.
800260	.20	Schmidt-Cass.	10	78					Morris,C.S.
800261	.41	Newtonian	4.2	86	13.5	Y	1	A	Clark,M.L.
800262	.15	Newtonian	5	30	5.1	Y			Pearce,A.

NOTE A (F. star prob. telescopic, not vis. Ed.)

DATE: 21 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 5.242
Declination (eq. 1950.0; deg,arcmin)	- 0 4.64
Geocentric distance (AU)	.9583
Heliocentric distance (AU)	.7347
Radial geocentric velocity (km/s)	-17.18
Radial heliocentric velocity (km/s)	.72
Angle Sun-Earth-comet (deg)	44.3
Angle Sun-comet-Earth (deg)	70.1
Position angle of prolonged radius vector (deg)	74.1
Position angle of negative orbital velocity vector (deg)	314.1
Angle comet-Earth-Moon (deg)	168.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #		R.A.(1950.0)	Dec.	m_1	m_2
21.10035	100243	1	5 47.41	+ 0 6 52.7		
21.10660	100242	1	5 49.44	+ 0 6 57.5		
21.11528	100241	1	5 52.03	+ 0 7 6.1		
21.61587	100240	1	8 37.13	+ 0 17 42.7		
21.68819	100239	1	9 2.32	+ 0 19 9.9		
21.74567	100238	1	9 21.40	+ 0 20 21.9	8.0	
21.74804	100237	1	9 22.19	+ 0 20 25.0	8.0	

AN #	System	Notes	Observer(s)
100243	16880000		Bowell,E
100242	16880000		Bowell,E
100241	16880000		Bowell,E
100240	11860000		Rakhmatov,E
100239	11020000		Yurevich
100238	10460000		Mrkos,A
100237	10460000		Mrkos,A

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
21.12100	500014	3115	OH	-9.645	
21.12100	500014	3650	Cont	-13.048	
21.12100	500014	3871	CN	-9.523	
21.12100	500014	4060	C_3	-10.458	
21.12100	500014	4845	Cont	-12.803	
21.12100	500014	5140	C_2	-9.658	

PPN #	Diaph.	Offset R.A.	Dec.	System	Observer(s)
500014	74.6			56880000	Millis,R
500014	74.6			56880000	Millis,R
500014	74.6			56880000	Millis,R
500014	74.6			56880000	Millis,R
500014	74.6			56880000	Millis,R
500014	74.6			56880000	Millis,R

COMMENT Old OH filter
TELESCOPE 1.1 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: SPECTRAL LINE

21.86 UT LINE= H2O 6(1,6)-5(2,3) RESTF= 22235.080 MHz
N W=- FILE=600048 NRAO-GB GREEN BANK WV SYSCODE= 65001613
TEL = 43M E=0.20 BW= 1.3 (1.00, 0) OFF=(0.00, 0) PE= -
INS = MASER/AC F= 22235.070 B= 5.000 R= 19.5 TS= 55 TR= -
UPPER LIMIT = 0.297 JY/BEAM
OBS = W. Batrla and J. Hollis

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
21.017	800263	S	8.7	Z Cet	1.9	3						
21.9400	800264	B	8.4	SAO	1.4	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800263	.15	Newtonian	8	51	4 :	Y	1		De Young,J.A.
800264	.07	Binoculars		10					De Assis Neto,V.F.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 10.773
Declination (eq. 1950.0; deg,arcmin)	- 0 25.63
Geocentric distance (AU)	.9484
Heliocentric distance (AU)	.7354
Radial geocentric velocity (km/s)	-16.84
Radial heliocentric velocity (km/s)	1.59
Angle Sun-Earth-comet (deg)	44.5
Angle Sun-comet-Earth (deg)	70.7
Position angle of prolonged radius vector (deg)	75.1
Position angle of negative orbital velocity vector (deg)	314.7
Angle comet-Earth-Moon (deg)	155.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
22.11346	100236	1 11 23.80	+ 0 28 8.6		
22.60666	100235	1 14 8.82	+ 0 38 51.9		
22.61221	100234	1 14 10.81	+ 0 38 58.3		
22.61429	100233	1 14 11.23	+ 0 39 1.2		
22.61806	100232	1 14 13.53	+ 0 38 57.8		
22.63825	100231	1 14 19.32	+ 0 39 31.5		
22.68611	100230	1 14 34.90	+ 0 40 34.3		
22.69611	100229	1 14 35.00	+ 0 40 35.0		
22.76985	100228	1 15 3.06	+ 0 42 8.5		
22.77766	100227	1 15 5.61	+ 0 42 16.9		
22.78171	100226	1 15 6.74	+ 0 42 23.8		

AN #	System	Notes	Observer(s)
100236	16750000		Gibson,J
100235	11650000		Timofeev,S
100234	11650000		Timofeev,S
100233	11650000		Timofeev,S
100232	11900000		Gerasimenko,S
100231	11650000		Timofeev,S
100230	11020000		Yurevich
100229	11020000		Yurevich
100228	10510000		Churms,J
100227	10510000		Churms,J
100226	10510000		Churms,J

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
22.63400	500008		4845	65	9.4	0.9	162	3

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500008	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

```
22.87 UT
   N  W=- FILE=600022   ROI          ATIBAIA  BRAZIL         SYSCODE= 65000201
   TEL = 14M         E=0.38  BW=   4.5 (1.00,  0)  OFF=(   0.00,  0) PE= 12
   INS = MIXER/CONT   F=  22200.000  B= 500.000  R=   -       TS=   -  TR=1000
   UPPER LIMIT =   0.260  JY/BEAM
   OBS =  E. Scalise and Z. Abraham
```

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
22.010	800265	S	8.5	Z Cet	2.3	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.		DA	OS	Notes	Observer(s)
800265	.15	Newtonian	8	51	4	:	Y	1		De Young,J.A.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 16.347
Declination (eq. 1950.0; deg,arcmin)	- 0 47.32
Geocentric distance (AU)	.9388
Heliocentric distance (AU)	.7365
Radial geocentric velocity (km/s)	-16.49
Radial heliocentric velocity (km/s)	2.46
Angle Sun-Earth-comet (deg)	44.8
Angle Sun-comet-Earth (deg)	71.2
Position angle of prolonged radius vector (deg)	76.0
Position angle of negative orbital velocity vector (deg)	315.2
Angle comet-Earth-Moon (deg)	142.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
23.01389	100225	1 16 25.20	+ 0 47 43.0		
23.60049	100224	1 19 42.43	- 1 0 46.5		
23.60658	100223	1 19 43.80	- 1 0 20.0		
23.60687	100222	1 19 43.50	- 1 0 22.0		
23.60732	100221	1 19 44.10	- 1 0 28.0		
23.60759	100220	1 19 43.40	- 1 0 26.0		
23.60862	100219	1 19 43.70	- 1 0 20.0		
23.60932	100218	1 19 43.70	- 1 0 26.0		
23.60992	100217	1 19 42.70	- 1 0 28.0		
23.61952	100216	1 19 47.64	- 1 1 13.9		
23.69055	100215	1 20 12.92	- 1 2 45.8		
23.69306	100214	1 20 14.03	- 1 2 53.7		
23.71518	100213	1 20 21.54	- 1 3 22.7		
23.72410	100212	1 20 24.23	- 1 3 36.6		

AN #	System	Notes	Observer(s)
100225	15001601		Fredrick,L
100224	11900000		Gerasimenko,S
100223	11900000		Masumi
100222	11900000		Masumi
100221	11900000		Masumi
100220	11900000		Masumi
100219	11900000		Masumi
100218	11900000		Masumi
100217	11900000		Masumi
100216	11860000		Rakhmatov,E
100215	11230000		Akhverdyan,L
100214	11020000		Yurevich
100213	10690000		Jurgitis,I.I
100212	10690000		Jurgitis,I.I

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
23.62080	500020	3650	Cont	-11.197	
23.62080	500020	3871	CN	-7.683	
23.62080	500020	4060	C_3	-8.705	
23.62080	500020	4845	Cont	-11.020	
23.62080	500020	5140	C_2	-7.866	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500020	44.6			52000000	Kiselev,N/Chernova,G
500020	44.6			52000000	Kiselev,N/Chernova,G
500020	44.6			52000000	Kiselev,N/Chernova,G
500020	44.6			52000000	Kiselev,N/Chernova,G
500020	44.6			52000000	Kiselev,N/Chernova,G

TELESCOPE 1.02 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

23.77 UT
N W=- FILE=600023 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.200 JY/BEAM
OBS = E. Scalise and Z. Abraham

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
23.006	800266	S	8.5:	Z Cet	2.3	3						
23.0100	800267	S	8.5	AC	3.5	6						
23.0100	800268	B	8.7	AC	3.5	6						
23.0100	800269	S	8.3	AC	4.5							
23.0140	800270	S	8.3	Z Cet	2.5	5						
23.4400	800271	S	7.8	AA	3	2						
23.7900	800272	S	8.2	SAO	7.5	3	0.10	98				
23.7900	800273	?					0.08	233				
23.8000	800274	S	8.1	SAO								

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800266	.15	Newtonian	8	51	3 :	Y	1	A	De Young,J.A.
800267	.08	Binoculars		20	6.5	Y	1		Bortle,J.
800268	.08	Binoculars		20					Bortle,J.
800269	.05	Binoculars		10					Bortle,J.
800270	.15	Refractor	5	31	5.5Z	Y	2	B	Morrison,W.C.
800271	.08	Binoculars		15	5.0	Y	1		Price,R.T.
800272	.26	Newtonian	6	39				C	Merlin,J.C.
800273	.26	Newtonian	6	130					Merlin,J.C.
800274	.09	Newtonian	9	28					Merlin,J.C.

NOTE A Thin overcast or haze
NOTE B Zodiacal light present
NOTE C Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 21.964
Declination (eq. 1950.0; deg,arcmin)	- 1 9.69
Geocentric distance (AU)	.9294
Heliocentric distance (AU)	.7382
Radial geocentric velocity (km/s)	-16.12
Radial heliocentric velocity (km/s)	3.32
Angle Sun-Earth-comet (deg)	45.1
Angle Sun-comet-Earth (deg)	71.8
Position angle of prolonged radius vector (deg)	77.0
Position angle of negative orbital velocity vector (deg)	315.8
Angle comet-Earth-Moon (deg)	130.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
24.50208	100211	1 24 47.42	- 1 21 6.6		
24.59879	100210	1 25 20.70	- 1 23 15.0		
24.59909	100209	1 25 21.90	- 1 23 10.0		
24.59927	100208	1 25 21.60	- 1 23 18.0		
24.59951	100207	1 25 21.20	- 1 23 18.0		
24.59969	100206	1 25 21.70	- 1 23 26.0		
24.59987	100205	1 25 21.80	- 1 23 26.0		
24.60005	100204	1 25 21.50	- 1 23 12.0		
24.60028	100203	1 25 21.40	- 1 23 22.0		
24.60052	100202	1 25 21.90	- 1 23 26.0		
24.61579	100201	1 25 25.89	- 1 23 49.1		
24.67130	100200	1 25 45.11	- 1 25 11.2		
24.68229	100199	1 25 48.42	- 1 25 22.3		
24.68973	100198	1 25 51.30	- 1 25 37.2		
24.69517	100197	1 25 52.92	- 1 25 43.1		
24.69618	100196	1 25 53.62	- 1 25 49.1		
24.70037	100195	1 25 54.80	- 1 25 51.2		
24.72327	100194	1 26 2.62	- 1 26 22.2		

AN #	System	Notes	Observer(s)
100211	13230000	A	Candy,M.P et al.
100210	11900000		Masumi
100209	11900000		Masumi
100208	11900000		Masumi
100207	11900000		Masumi
100206	11900000		Masumi
100205	11900000		Masumi
100204	11900000		Masumi
100203	11900000		Masumi
100202	11900000		Masumi
100201	11860000		Rakhmatov,E
100200	11230000		Akhverdyan,L
100199	11020000		Rusin
100198	11150000		Tselishchev,I.E
100197	11230000		Akhverdyan,L
100196	11020000		Rusin
100195	11150000		Tselishchev,I.E
100194	11230000		Akhverdyan,L

NOTE A Additional observers: Candy,V/Jekabsons,P/Johnston,J/Sultana,M

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

24.70 UT
N W=- FILE=600024 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.450 JY/BEAM
OBS = E. Scalise and Z. Abraham

- -

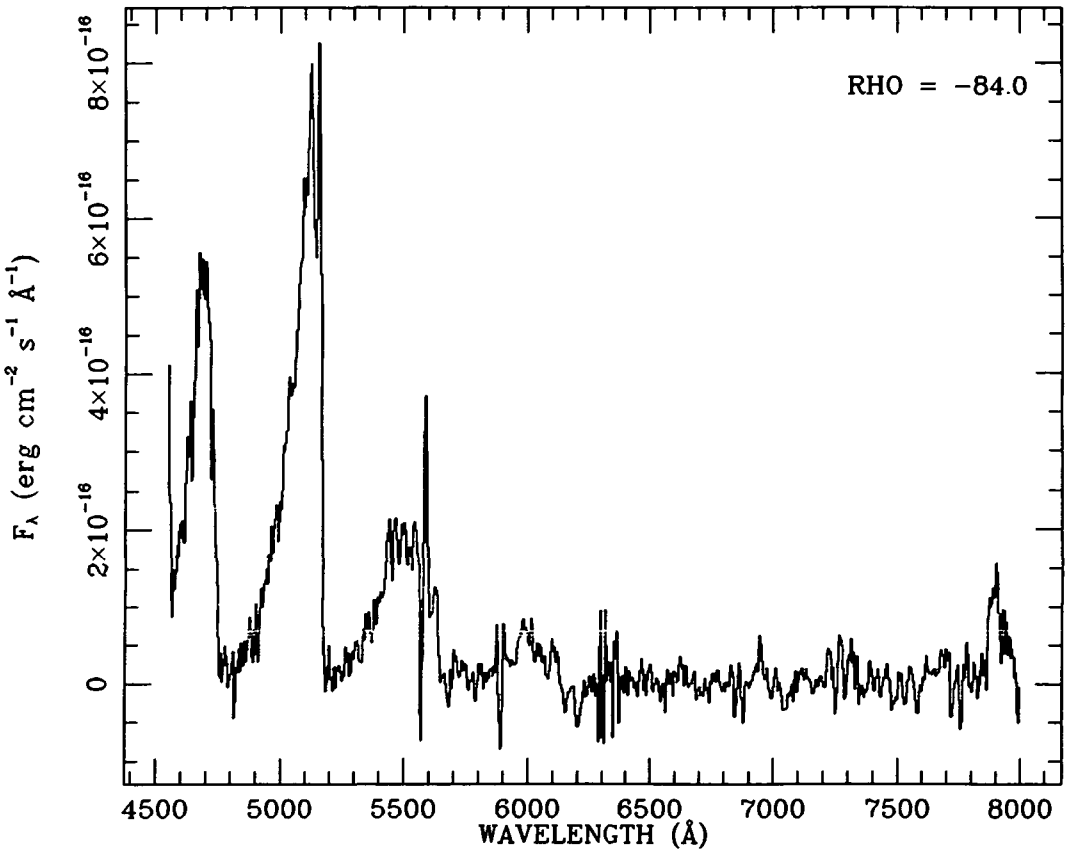
NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
24.12570	700008	17	4550-8000	1	6	10.0	2	RC Spect/Cryocam/TICCD/300gpm

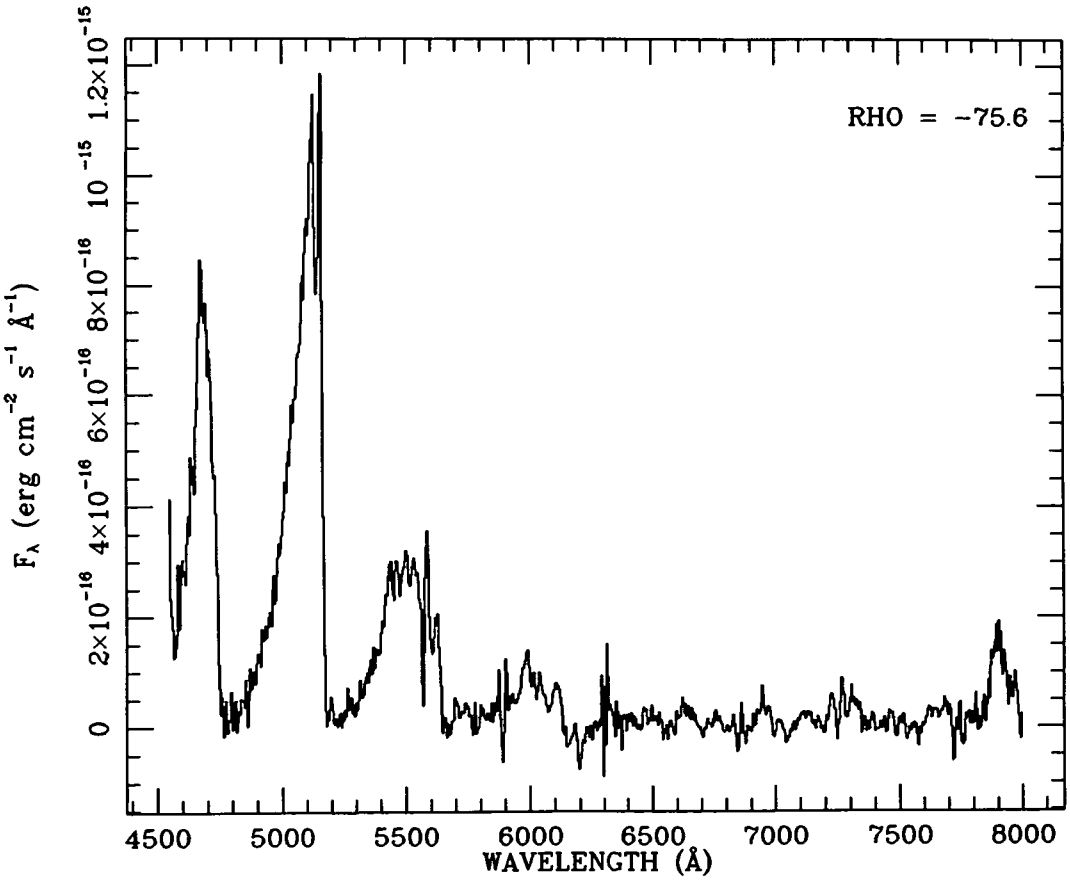
SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700008	Reduced digital			77	3.2x6.0	76950101	Belton,M et al.

C-2

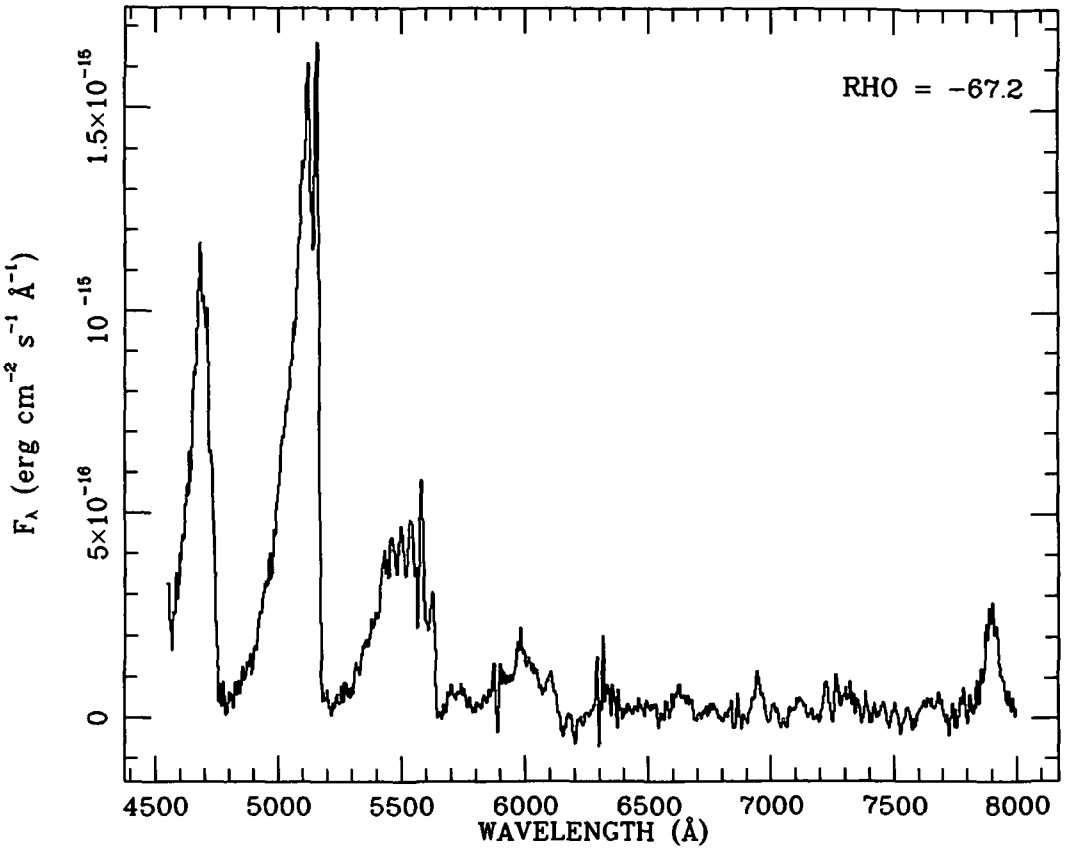
SSN # 700008



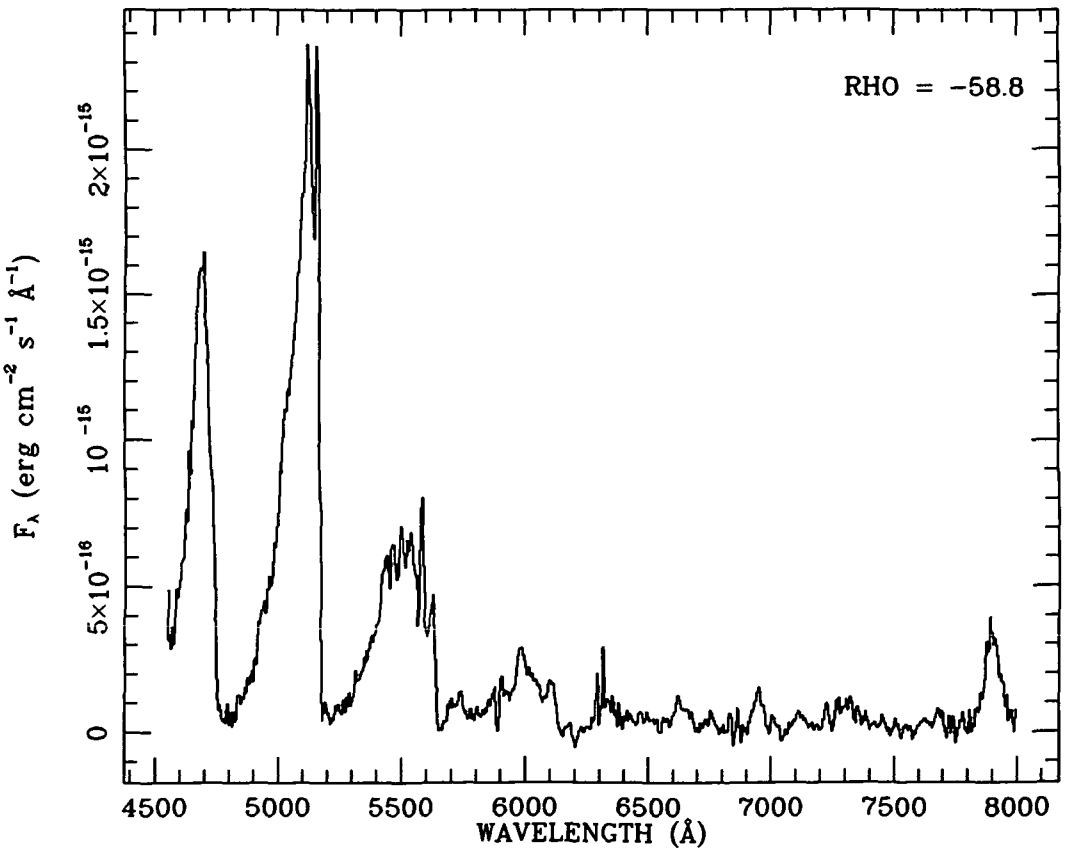
SSN # 700008 (cont.)



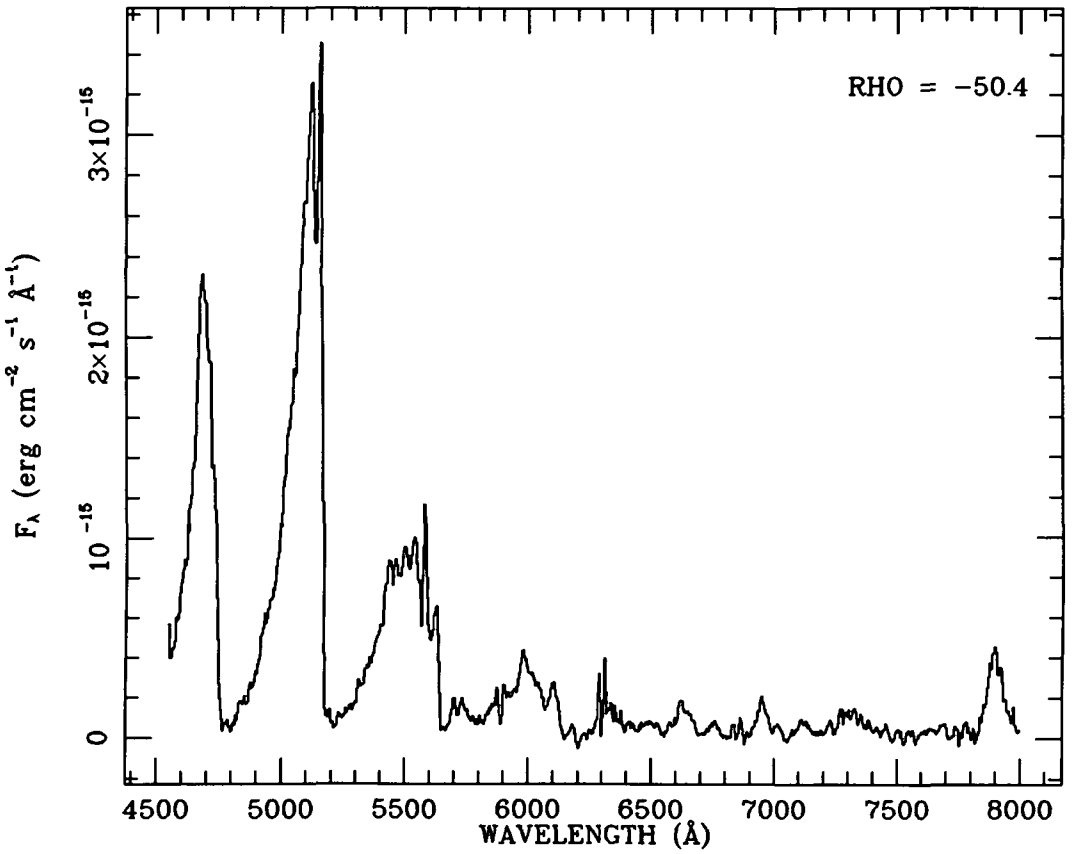
SSN # 700008 (cont.)



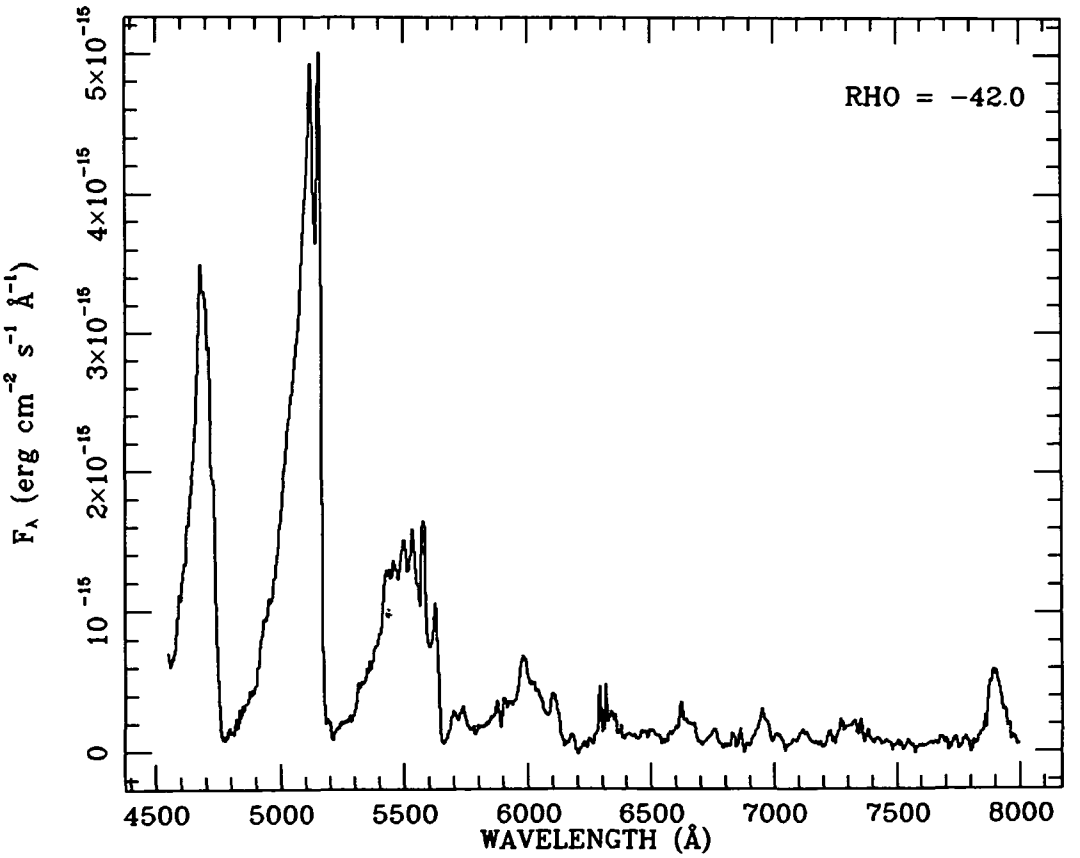
SSN # 700008 (cont.)



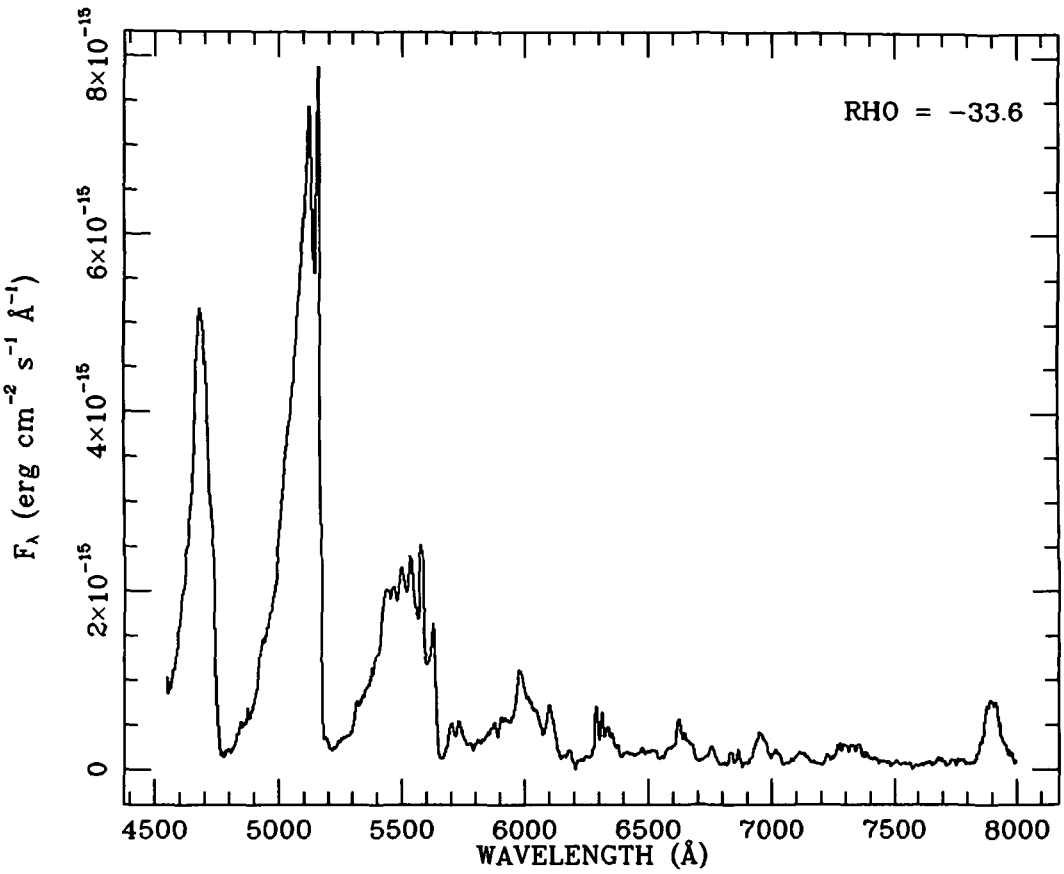
SSN # 700008 (cont.)



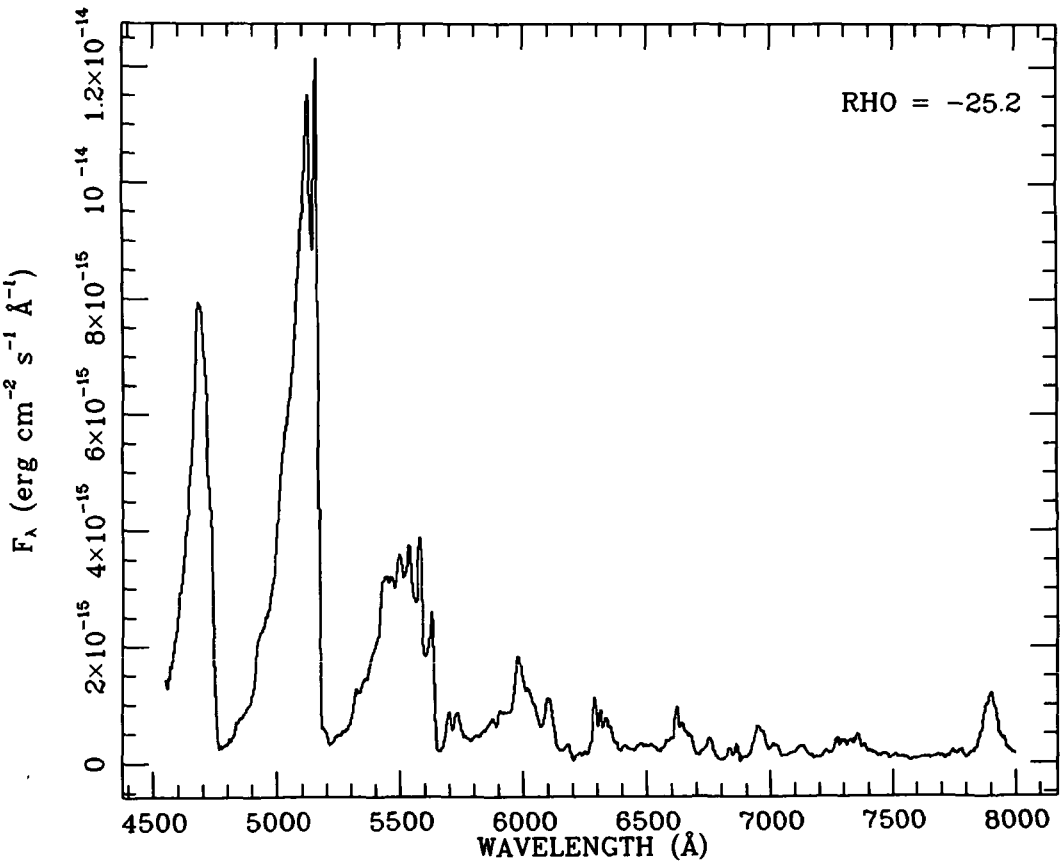
SSN # 700008 (cont.)



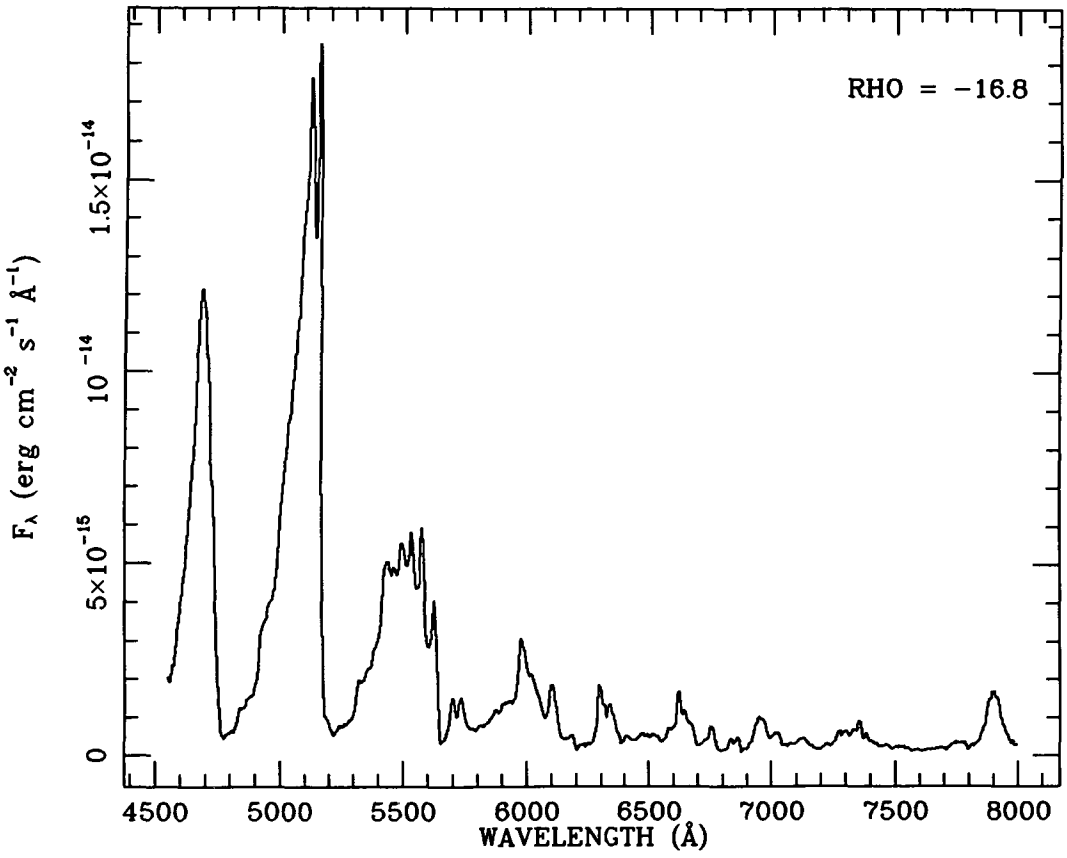
SSN # 700008 (cont.)



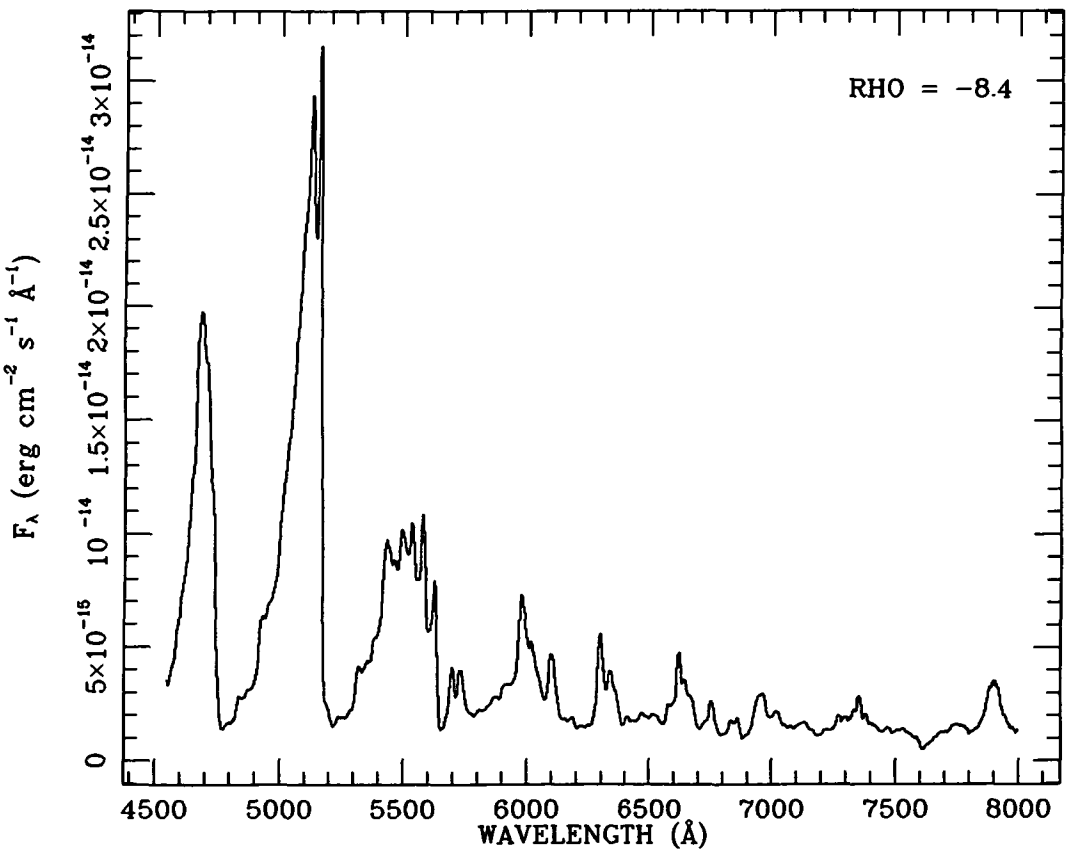
SSN # 700008 (cont.)



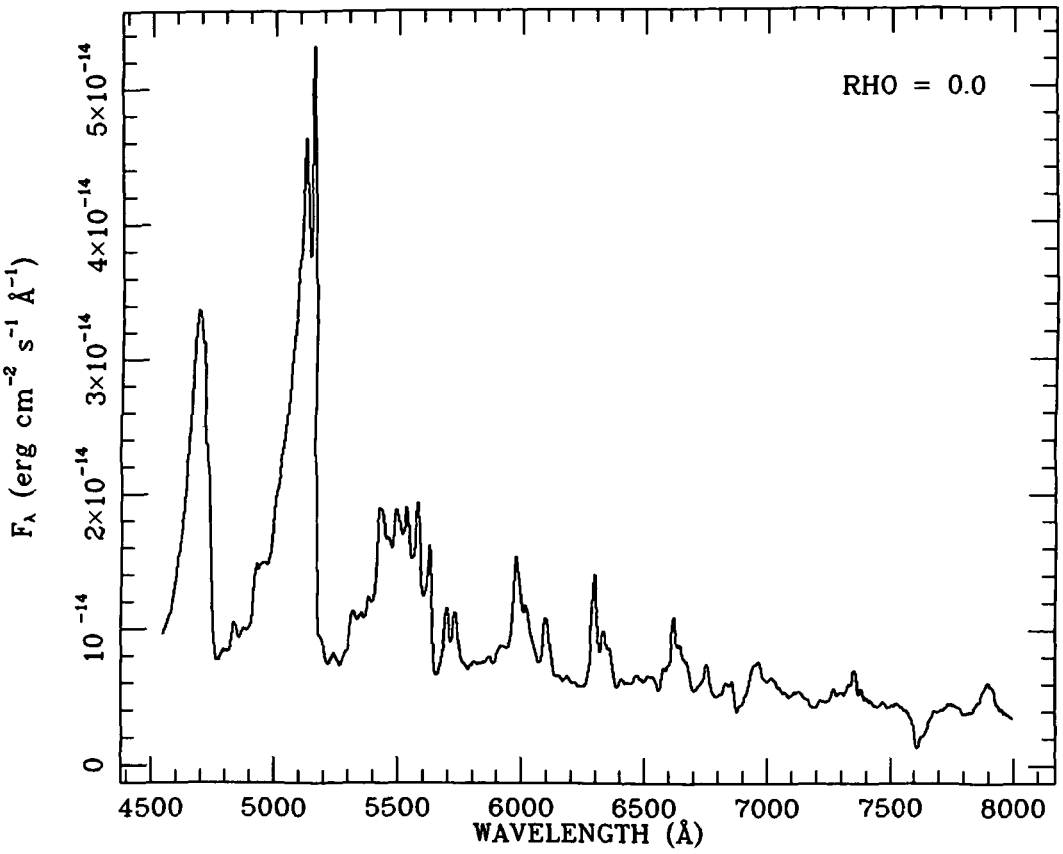
SSN # 700008 (cont.)



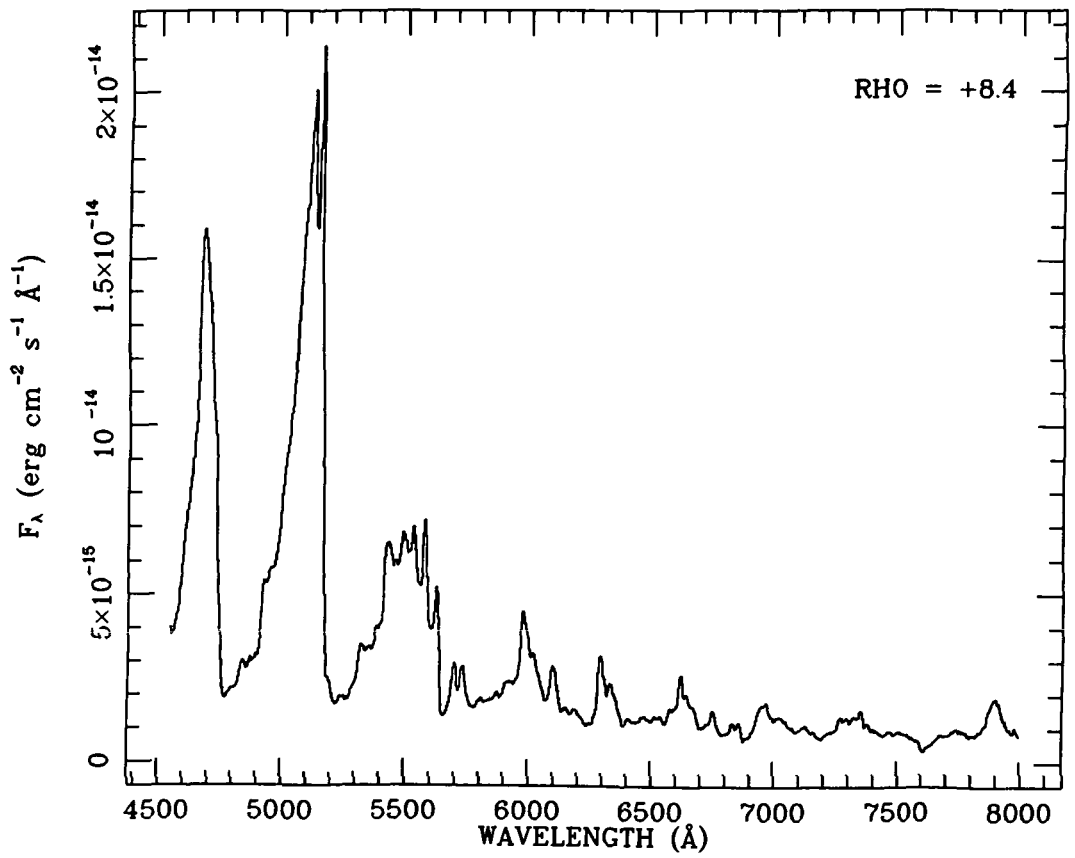
SSN # 700008 (cont.)



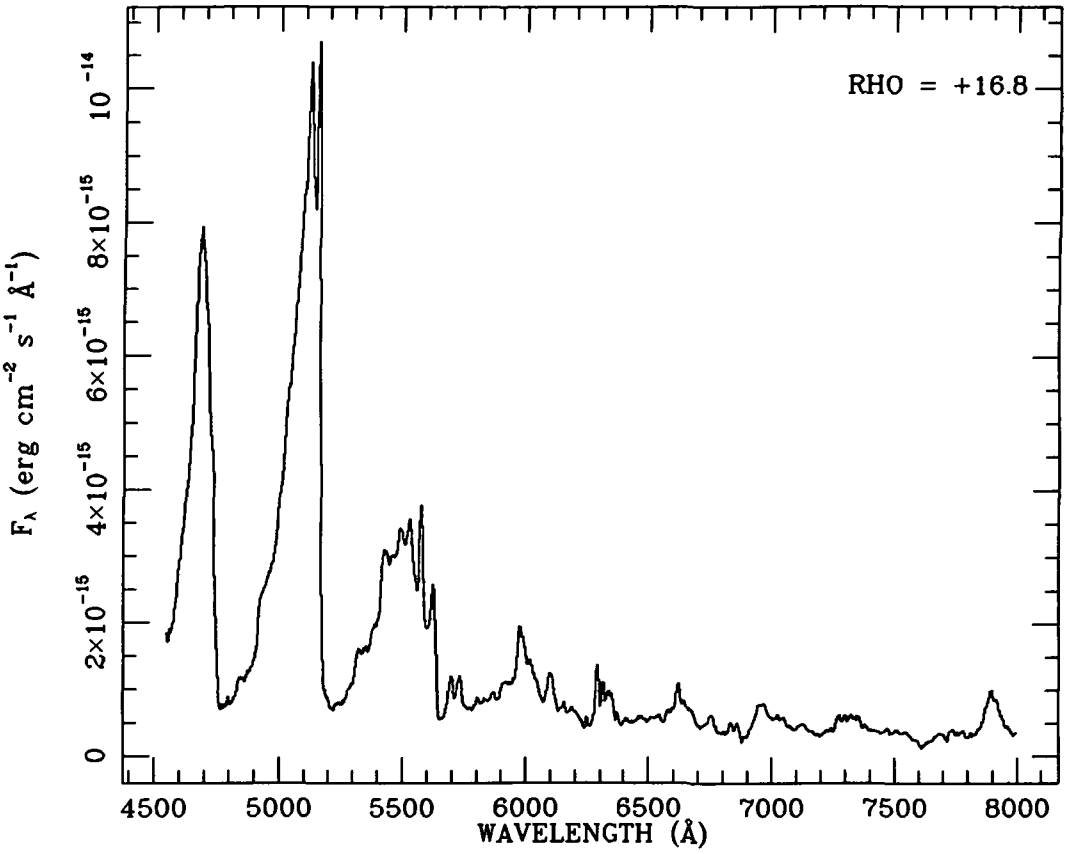
SSN # 700008 (cont.)



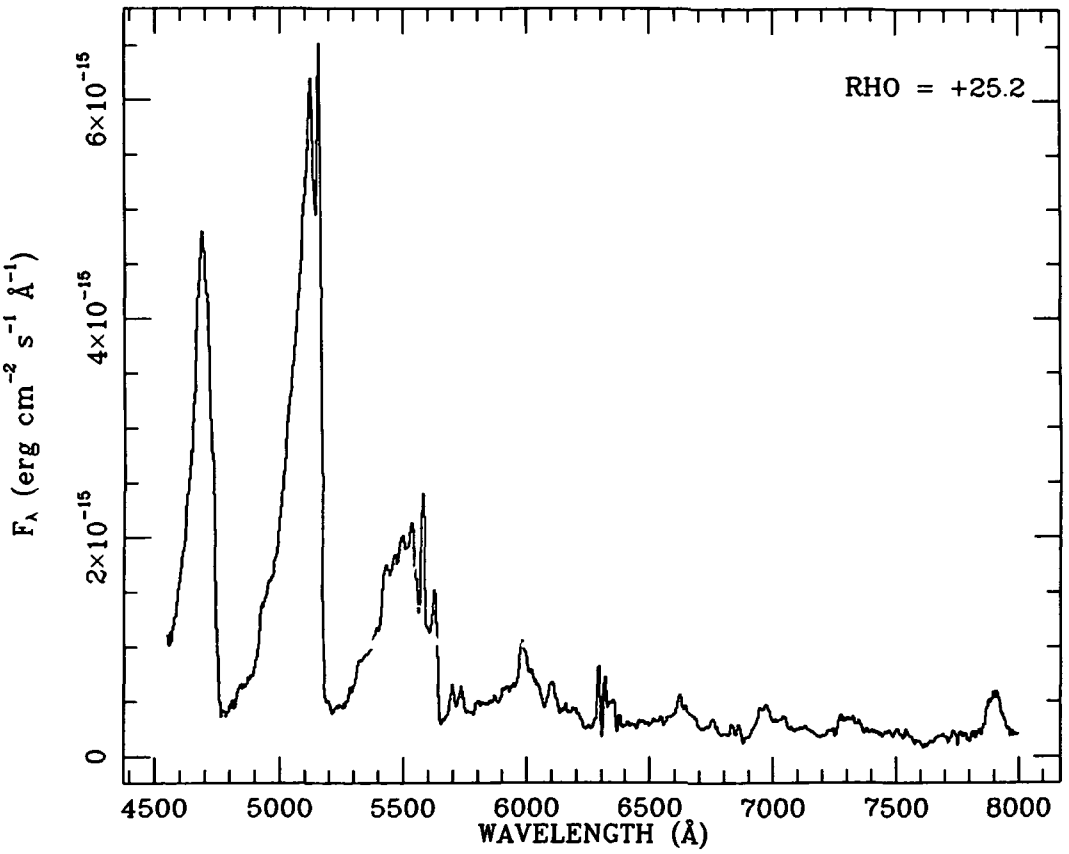
SSN # 700008 (cont.)



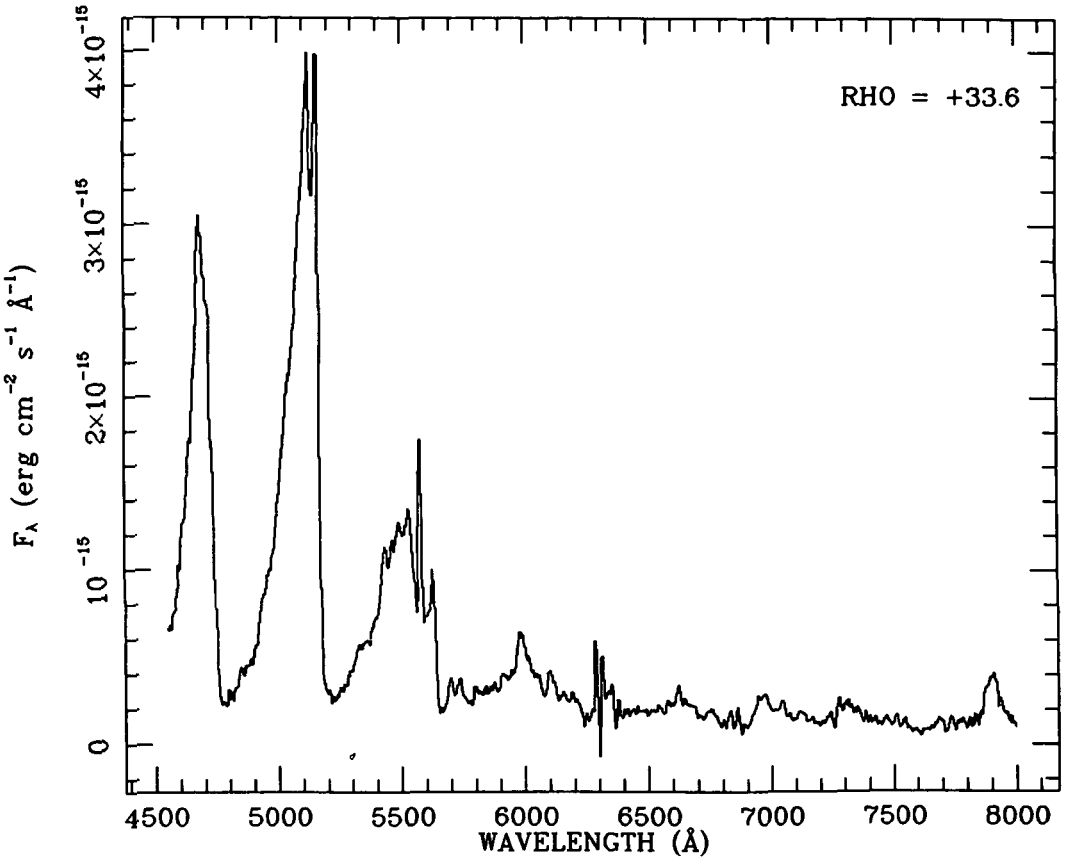
SSN # 700008 (cont.)



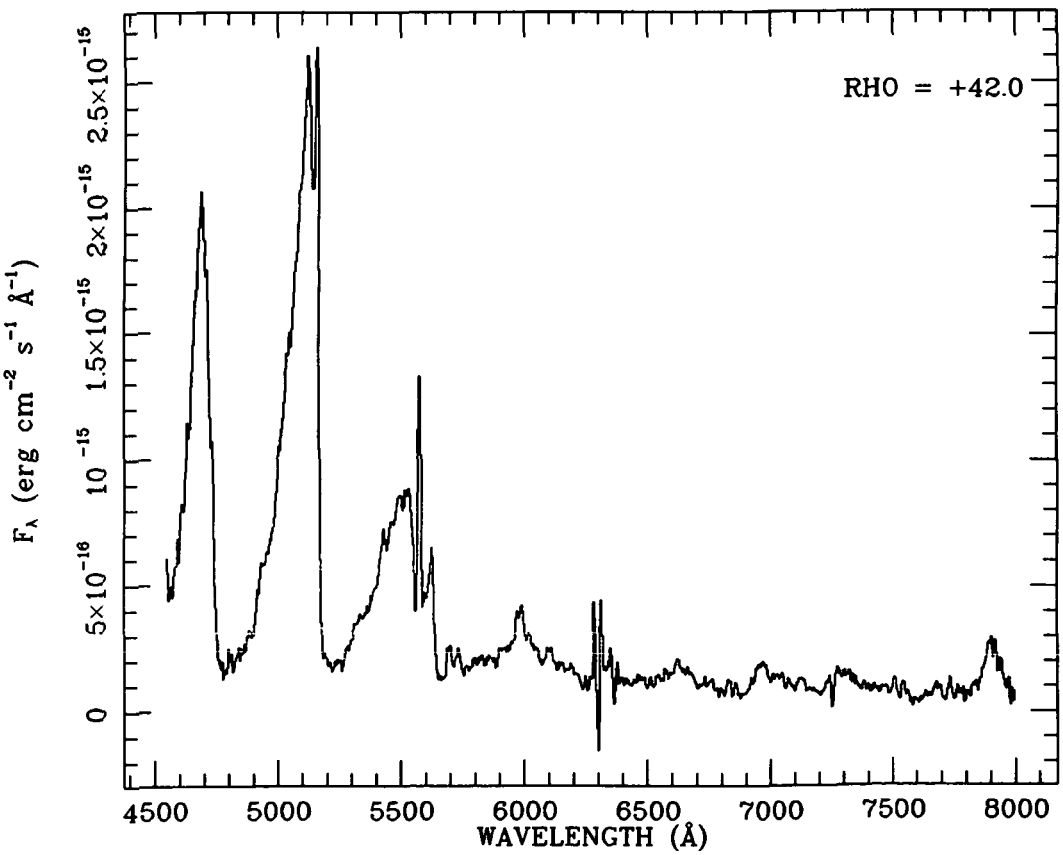
SSN # 700008 (cont.)



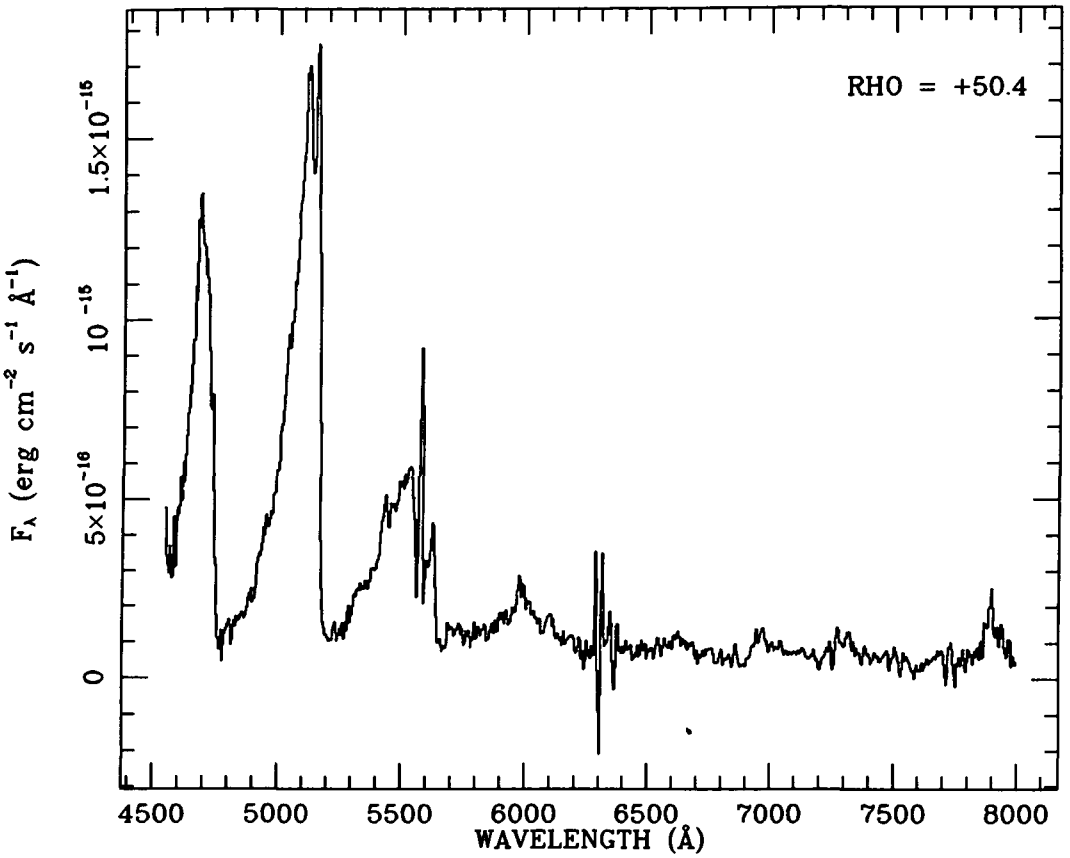
SSN # 700008 (cont.)



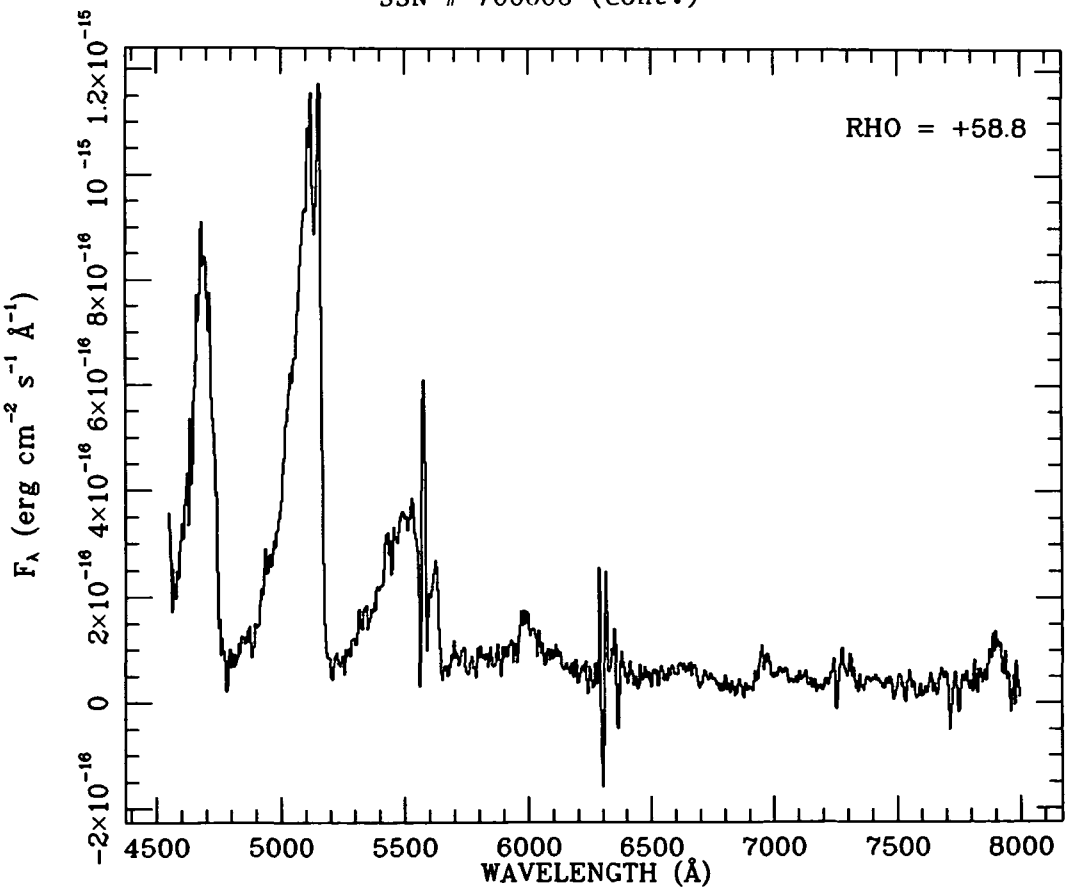
SSN # 700008 (cont.)



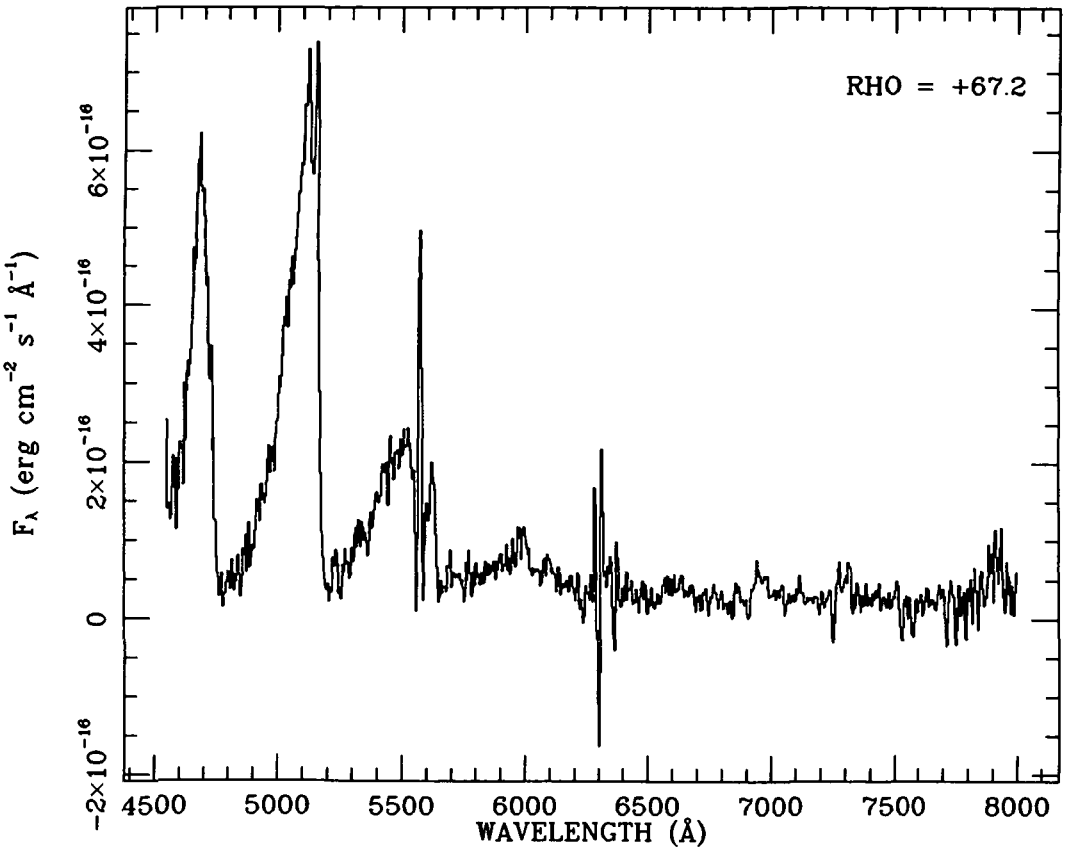
SSN # 700008 (cont.)



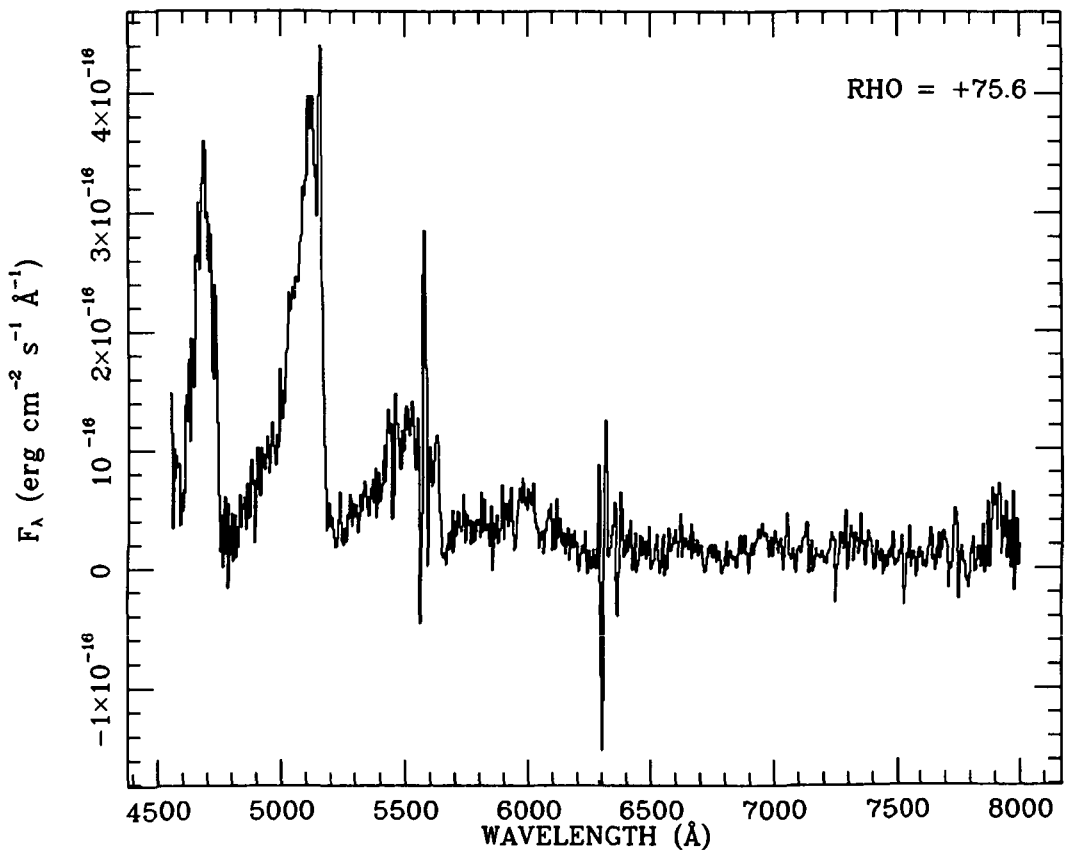
SSN # 700008 (cont.)



SSN # 700008 (cont.)



SSN # 700008 (cont.)



NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
24.1600	800275	M	8.1	AA	7	5						
24.4300	800276	S	7.7		4	2						
24.5000	800277	S	7.3		3	5	0.07	30				
24.5200	800278	S	7.7	AA	3.5	6	0.33	311				
24.5200	800279	M	7.8	AA	3.5							

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800275	.08	Binoculars		20	6.5	Y	3		Morris,C.S.
800276	.08	Binoculars		15	5.0	Y	1		Price,R.T.
800277	.20	Schmidt-Cass.	10	50	6.9	Y			Wood,J.
800278	.15	Newtonian	5	30	5.2	Y			Pearce,A.
800279	.15	Newtonian	5	30	5.2	Y			Pearce,A.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 27.623
Declination (eq. 1950.0; deg,arcmin)	- 1 32.73
Geocentric distance (AU)	.9202
Heliocentric distance (AU)	.7404
Radial geocentric velocity (km/s)	-15.73
Radial heliocentric velocity (km/s)	4.17
Angle Sun-Earth-comet (deg)	45.4
Angle Sun-comet-Earth (deg)	72.3
Position angle of prolonged radius vector (deg)	78.0
Position angle of negative orbital velocity vector (deg)	316.2
Angle comet-Earth-Moon (deg)	118.8

- -

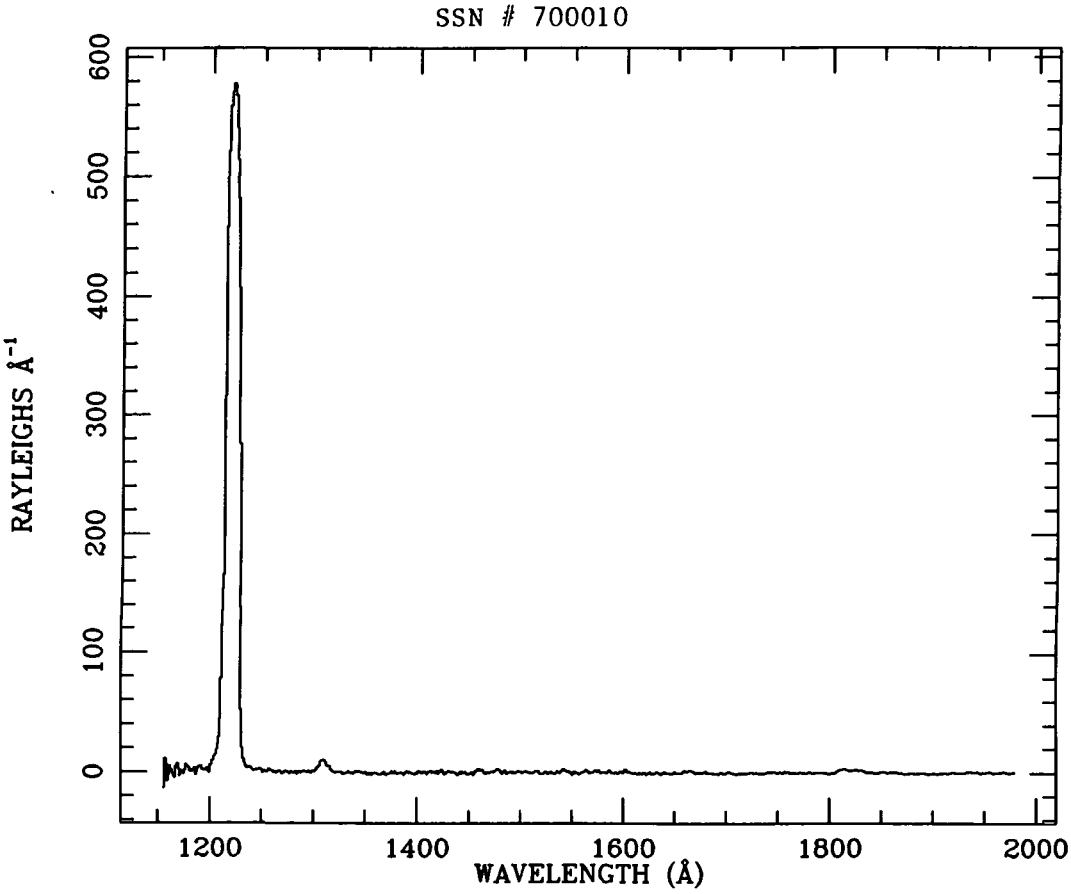
NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
25.12517	100193	1 28 19.73	- 1 35 47.3		
25.61499	100192	1 31 7.06	- 1 47 20.2		
25.62193	100191	1 31 9.50	- 1 47 31.2		
25.62402	100190	1 31 10.32	- 1 47 34.5		
25.67507	100189	1 31 27.65	- 1 48 45.6		
25.68347	100188	1 31 30.47	- 1 48 57.0		
25.69878	100187	1 31 35.77	- 1 49 20.1		
25.70143	100186	1 31 36.75	- 1 49 24.1		
25.71188	100185	1 31 40.17	- 1 49 38.7		
25.71360	100184	1 31 40.67	- 1 49 40.2		

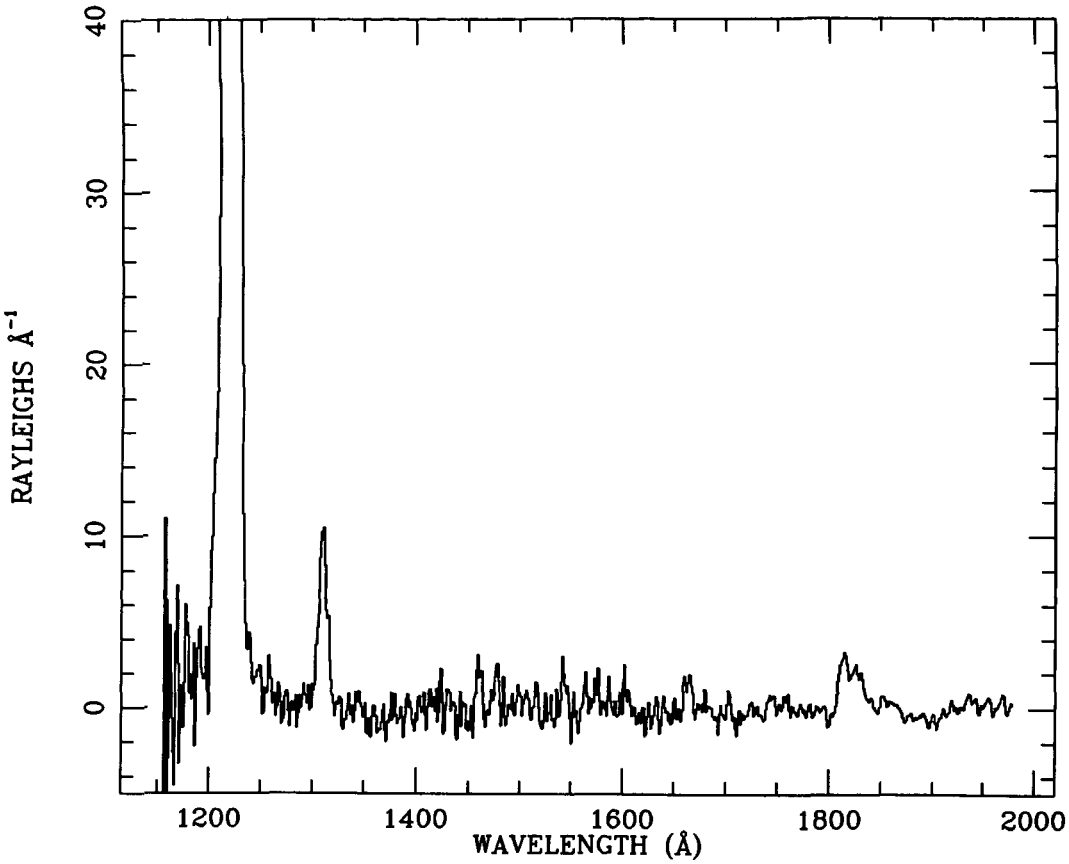
AN #	System	Notes	Observer(s)
100193	16750000		Helin,E/Dunbar,R.S
100192	11650000		Timofeev,S
100191	11650000		Timofeev,S
100190	11650000		Timofeev,S
100189	11230000		Akhverdyan,L
100188	11230000		Akhverdyan,L
100187	11230000		Akhverdyan,L
100186	10950000		Chernykh,N.S
100185	10950000		Chernykh,N.S
100184	11230000		Akhverdyan,L

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
25.39365	700010	10	1156-1979	2		60.0	1	SWP 22354

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700010	Spaceborne	.0			10.3x15.2	75009901	Festou,M



SSN # 700010 (cont.)



NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
25.0200	800280	S	8.2	AC	6	5						
25.1600	800281	M	8.1	AA	7	7						
25.4200	800282	S	7.6		4	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800280	.08	Binoculars		20	6.3	Y	1		Bortle,J.
800281	.08	Binoculars		20	7.0	Y	4		Morris,C.S.
800282	.08	Binoculars		15	5.0	Y	1		Price,R.T.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 33.324
Declination (eq. 1950.0; deg,arcmin)	- 1 56.41
Geocentric distance (AU)	.9112
Heliocentric distance (AU)	.7430
Radial geocentric velocity (km/s)	-15.32
Radial heliocentric velocity (km/s)	5.01
Angle Sun-Earth-comet (deg)	45.8
Angle Sun-comet-Earth (deg)	72.7
Position angle of prolonged radius vector (deg)	78.9
Position angle of negative orbital velocity vector (deg)	316.7
Angle comet-Earth-Moon (deg)	107.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
26.71016	100183	1 37 23.43	- 2 13 42.5		
26.71701	100182	1 37 25.87	- 2 13 52.3		
26.72370	100181	1 37 23.71	- 2 13 43.0		

AN #	System	Notes	Observer(s)
100183	10950000		Chernykh,N.S
100182	10950000		Chernykh,N.S
100181	10890000		Kalikhevich

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
26.1500	800283	M	8.5	SAO	2.5	7	0.17	55				
26.1600	800284	M	8.2	AA	5	6						
26.43	800285	S	8.3	AA	3.8	4						
26.4300	800286	S	7.5		5	2						
26.5200	800287	S	7.7	AA	3.5	6	0.33	312				
26.9400	800288	B	8.4	SAO	2.2	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800283	.26	Newtonian	4.5	45	7.0	Y			Morris,C.S.
800284	.08	Binoculars		20	7.0	Y			Morris,C.S.
800285	.20	Schmidt-Cass.	10	50	5	Y	1		Dixon,I.
800286	.08	Binoculars		15	5.0	Y	1		Price,R.T.
800287	.15	Newtonian	5	30	5.2	Y			Pearce,A.
800288	.07	Binoculars		10					De Assis Neto,V.F.

DATE: 27 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 39.066
Declination (eq. 1950.0; deg,arcmin)	- 2 20.68
Geocentric distance (AU)	.9025
Heliocentric distance (AU)	.7461
Radial geocentric velocity (km/s)	-14.89
Radial heliocentric velocity (km/s)	5.83
Angle Sun-Earth-comet (deg)	46.1
Angle Sun-comet-Earth (deg)	73.1
Position angle of prolonged radius vector (deg)	79.9
Position angle of negative orbital velocity vector (deg)	317.1
Angle comet-Earth-Moon (deg)	96.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.03681	100180	1 39 11.46	- 2 21 19.4		
27.50000	100179	1 41 56.69	- 2 32 57.0		
27.67105	100178	1 42 56.09	- 2 37 23.0		
27.67738	100177	1 42 58.37	- 2 37 33.6		
27.68178	100176	1 42 59.61	- 2 37 40.7		
27.69271	100175	1 43 3.43	- 2 38 2.8		
27.69401	100174	1 43 4.08	- 2 37 57.0		
27.70027	100173	1 43 6.26	- 2 38 6.2		
27.70183	100172	1 43 6.79	- 2 38 9.4		
27.70240	100171	1 43 6.83	- 2 38 11.8		
27.70339	100170	1 43 7.31	- 2 38 12.7		
27.70847	100169	1 43 9.39	- 2 38 17.6		
27.70985	100168	1 43 6.79	- 2 38 9.0		
27.71701	100167	1 43 12.30	- 2 38 36.0		
27.75781	100166	1 43 25.82	- 2 39 32.7		

AN #	System	Notes	Observer(s)
100180	15001601		Fredrick,L
100179	13230000	A	Candy,M.P et al.
100178	11230000		Akhverdyan,L
100177	11150000		Tselishchev,I.E
100176	11230000		Akhverdyan,L
100175	11020000		Osipenko,V.P
100174	11230000		Akhverdyan,L
100173	11020000		Osipenko,V.P
100172	11020000		Osipenko,V.P
100171	11150000		Tselishchev,I.E
100170	11020000		Osipenko,V.P
100169	11020000		Osipenko,V.P
100168	11020000		Osipenko,V.P
100167	10690000		Pundure
100166	10460000		Mrkos,A

NOTE A Additional observers: Candy,V/Jekabsons,P/Johnston,J/Sultana,M

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
27.13000	500016	3115	OH	-9.712	
27.13000	500016	3650	Cont	-13.153	
27.13000	500016	3871	CN	-9.639	
27.13000	500016	4060	C_3	-10.547	
27.13000	500016	4845	Cont	-12.851	
27.13000	500016	5140	C_2	-9.916	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500016	38.7			56880000	Millis,R
500016	38.7			56880000	Millis,R
500016	38.7			56880000	Millis,R
500016	38.7			56880000	Millis,R
500016	38.7			56880000	Millis,R
500016	38.7			56880000	Millis,R

COMMENT Old OH filter
TELESCOPE 1.8 m

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
27.0200	800289	S	8.2	AC	3.5	5						
27.0200	800290	?			1.8	6						
27.021	800291	S	8.5	Z Cet	2.2	3						
27.4300	800292	S	7.9	AA	3.4	6						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800289	.08	Binoculars		20	6.5	Y	1		Bortle,J.
800290	.32	Newtonian	5.6	68					Bortle,J.
800291	.15	Newtonian	8	51	4 :	Y	1		De Young,J.A.
800292	.08	Binoculars		15	5.1	Y	1		Seargent,D.A.J.

DATE: 28 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 44.849
Declination (eq. 1950.0; deg,arcmin)	- 2 45.53
Geocentric distance (AU)	.8940
Heliocentric distance (AU)	.7497
Radial geocentric velocity (km/s)	-14.44
Radial heliocentric velocity (km/s)	6.64
Angle Sun-Earth-comet (deg)	46.5
Angle Sun-comet-Earth (deg)	73.5
Position angle of prolonged radius vector (deg)	80.9
Position angle of negative orbital velocity vector (deg)	317.5
Angle comet-Earth-Moon (deg)	85.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
28.51875	100165	1 47 51.24	- 2 58 34.1		
28.68263	100164	1 48 48.71	- 3 2 55.6		
28.68438	100163	1 48 49.66	- 3 3 1.4		
28.69686	100162	1 48 53.61	- 3 3 16.7		
28.69976	100161	1 48 54.77	- 3 3 21.1		
28.78183	100160	1 49 23.21	- 3 5 12.9		
28.78785	100159	1 49 25.53	- 3 5 25.5		

AN #	System	Notes	Observer(s)
100165	13230000	A	Candy,M.P et al.
100164	11230000		Akhverdyan,L
100163	11150000		Kitkin,V.N
100162	11230000		Akhverdyan,L
100161	11150000		Rizvanov
100160	10510000		Churms,J
100159	10510000		Churms,J

NOTE A Additional observers: Candy,V/Jekabsons,P/Johnston,J/Sultana,M

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
28.61530	500009		4845	65	11.4	±1.4	167	±4

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500009	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

28.68 UT
N W=- FILE=600025 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 1.000 JY/BEAM
OBS = E. Scalise and Z. Abraham

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
28.4400	800293	S	7.5		5	1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800293	.08	Binoculars		15	5.0	Y	1		Price,R.T.

DATE: 29 FEB 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 50.672
Declination (eq. 1950.0; deg,arcmin)	- 3 10.91
Geocentric distance (AU)	.8858
Heliocentric distance (AU)	.7538
Radial geocentric velocity (km/s)	-13.98
Radial heliocentric velocity (km/s)	7.44
Angle Sun-Earth-comet (deg)	47.0
Angle Sun-comet-Earth (deg)	73.9
Position angle of prolonged radius vector (deg)	81.8
Position angle of negative orbital velocity vector (deg)	317.8
Angle comet-Earth-Moon (deg)	75.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
29.02811	100158	1 50 49.68	- 3 11 35.8		
29.03159	100157	1 50 50.79	- 3 11 39.4		
29.03853	100156	1 50 53.19	- 3 11 50.3		
29.42326	100155	1 53 8.34	- 3 21 54.4	8.5	
29.47038	100154	1 53 24.99	- 3 23 8.1		
29.48358	100153	1 53 29.89	- 3 23 25.1		
29.51875	100152	1 53 41.85	- 3 24 12.0		
29.61568	100151	1 54 16.68	- 3 26 55.0		
29.61916	100150	1 54 17.87	- 3 27 1.0		
29.62645	100149	1 54 20.05	- 3 27 13.2		
29.82500	100148	1 55 29.59	- 3 32 19.1		

AN #	System	Notes	Observer(s)
100158	18050000		Torres,C
100157	18050000		Torres,C
100156	18050000		Torres,C
100155	13720000		Seki,T
100154	13300000		Wang,Q
100153	13300000		Wang,Q
100152	13230000	A	Candy,M.P et al.
100151	11650000		Timofeev,S
100150	11650000		Timofeev,S
100149	11650000		Timofeev,S
100148	14820000	B	Stapleton,J.R

NOTE A Additional observers: Candy,V/Jekabsons,P/Johnston,J/Sultana,M
NOTE B Plate quality very poor, result unreliable

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

29.72 UT
N W=- FILE=600026 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.260 JY/BEAM
OBS = E. Scalise and Z. Abraham

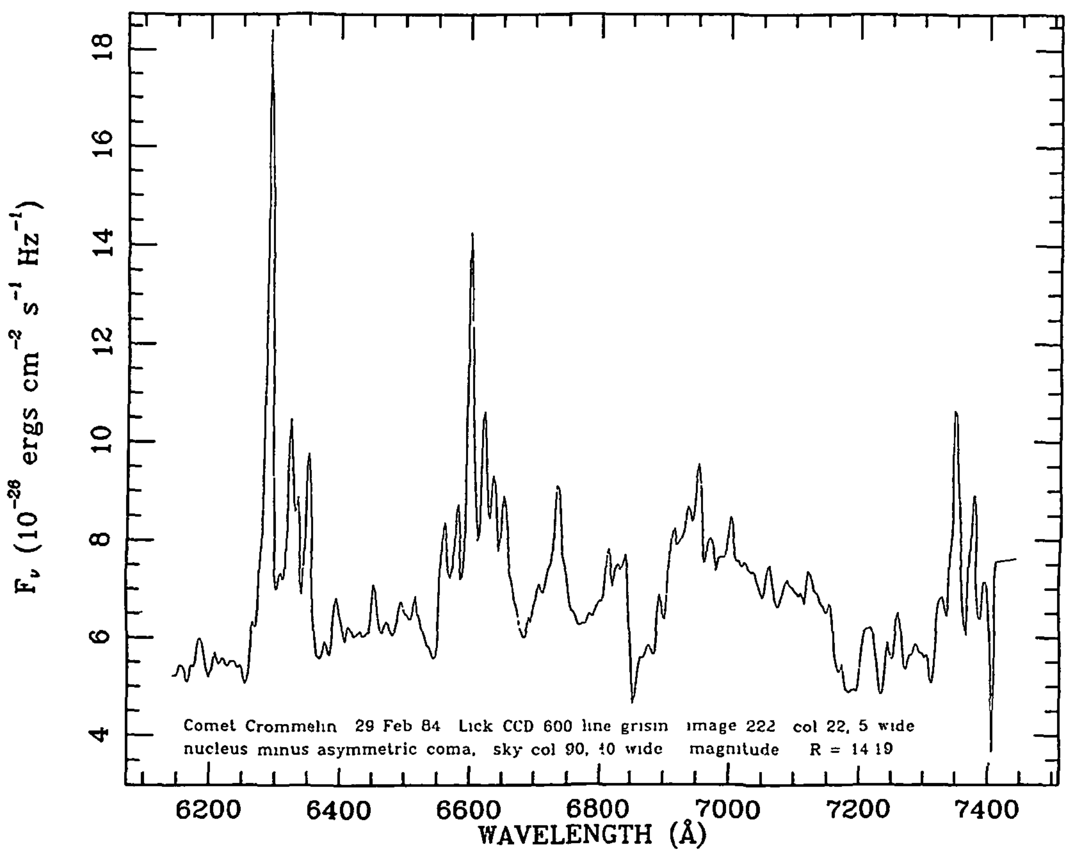
- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
29.09306	700011	13	6150-7450	2		16.7	1	Cass Spect/480x100CCD/600gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700011		.0			2.1x4.0	76620101	Spinrad,H

SSN # 700011



NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
29.0000	800294	B	8.2	SAO								
29.4300	800295	S	8.0	AA	3	5						
29.5200	800296	S	7.4	AA	4	6	0.5	312				
29.792	800297	S	9.0:	o Cet	1.5	6						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800294	.11	Refractor	10.5	29					Ferrin,I.
800295	.08	Binoculars		15	5	Y	1		Seargent,D.A.J.
800296	.15	Newtonian	5	30	5.4	Y			Pearce,A.
800297	.25	Jones-Bird	6	76	3.5C	Y	1		Poitevin,P.

 DATE: 1 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	1 56.535
Declination (eq. 1950.0; deg,arcmin)	- 3 36.79
Geocentric distance (AU)	.8779
Heliocentric distance (AU)	.7583
Radial geocentric velocity (km/s)	-13.50
Radial heliocentric velocity (km/s)	8.21
Angle Sun-Earth-comet (deg)	47.4
Angle Sun-comet-Earth (deg)	74.1
Position angle of prolonged radius vector (deg)	82.8
Position angle of negative orbital velocity vector (deg)	318.2
Angle comet-Earth-Moon (deg)	64.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
1.50903	100147	1 59 31.43	- 3 50 3.2		
1.52222	100146	1 59 36.15	- 3 50 21.8		
1.62627	100145	2 0 13.08	- 3 53 25.0		
1.63044	100144	2 0 14.57	- 3 53 32.1		
1.73507	100143	2 0 50.88	- 3 56 14.0		
1.73854	100142	2 0 52.46	- 3 56 19.2		
1.74005	100141	2 0 53.07	- 3 56 22.9		
1.74201	100140	2 0 53.90	- 3 56 26.6		
1.74502	100139	2 0 55.12	- 3 56 27.5		

AN #	System	Notes	Observer(s)
100147	13230000	A	Birch,P. et al.
100146	13230000	A	Birch,P. et al.
100145	11650000		Timofeev,S
100144	11650000		Timofeev,S
100143	10610000		Ignatovich,S
100142	10610000		Ignatovich,S
100141	10610000		Ignatovich,S
100140	10610000		Ignatovich,S
100139	10610000		Ignatovich,S

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
1.4300	800298	S	7.4		5	2						
1.5300	800299	S	7.9		2.5	6						
1.5300	800300	S	7.5	AA	4	6	0.5	317				
1.9700	800301	B	8.4	SAO	2.3	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800298	.08	Binoculars		15	4.0	Y	1	A	Price,R.T.
800299	.20	Newtonian	6	60	11.8	Y	1	B	Clark,M.L.
800300	.15	Newtonian	5	30	5.3	Y			Pearce,A.
800301	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A Not visible in 7x50 W.A. binoculars, F. star 8.3
NOTE B (F. star prob. telescopic, not vis. Ed.)

DATE: 2 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 2.437
Declination (eq. 1950.0; deg,arcmin)	- 4 3.13
Geocentric distance (AU)	.8702
Heliocentric distance (AU)	.7633
Radial geocentric velocity (km/s)	-13.00
Radial heliocentric velocity (km/s)	8.97
Angle Sun-Earth-comet (deg)	47.9
Angle Sun-comet-Earth (deg)	74.4
Position angle of prolonged radius vector (deg)	83.7
Position angle of negative orbital velocity vector (deg)	318.4
Angle comet-Earth-Moon (deg)	54.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
2.00994	100138	2 2 29.46	- 4 3 29.3		
2.46343	100137	2 5 10.41	- 4 15 34.2		
2.47384	100136	2 5 14.27	- 4 15 50.0		
2.48669	100135	2 5 19.00	- 4 16 14.3		
2.50208	100134	2 5 24.40	- 4 16 26.6		
2.62323	100133	2 6 7.74	- 4 19 56.2		
2.62540	100132	2 6 8.53	- 4 19 58.0		
2.69308	100131	2 6 32.53	- 4 21 42.5		

AN #	System	Notes	Observer(s)
100138	18010000		McCrosky,R.E et al.
100137	13300000		Liu,T.W
100136	13300000		Liu,T.W
100135	13300000		Yang,J.X
100134	13230000	A	Birch,P. et al.
100133	11650000		Timofeev,S
100132	11650000		Timofeev,S
100131	11150000		Risvanov

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
2.61110	500010		4845	65	10.7	±2.0	168	±5

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500010	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
2.019	800302	S	8.5	o Cet	2.9	2						
2.4300	800303	S	7.6		5	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.		DA	OS	Notes	Observer(s)
800302	.15	Newtonian	8	51	4	:	Y	1	A	De Young,J.A.
800303	.08	Binoculars		15	4.0		Y	1		Price,R.T.

NOTE A Also R Cet used

DATE: 3 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 8.379
Declination (eq. 1950.0; deg,arcmin)	- 4 29.87
Geocentric distance (AU)	.8629
Heliocentric distance (AU)	.7687
Radial geocentric velocity (km/s)	-12.49
Radial heliocentric velocity (km/s)	9.70
Angle Sun-Earth-comet (deg)	48.4
Angle Sun-comet-Earth (deg)	74.6
Position angle of prolonged radius vector (deg)	84.6
Position angle of negative orbital velocity vector (deg)	318.7
Angle comet-Earth-Moon (deg)	44.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
3.77263	100130	2 12 59.17	- 4 50 39.7		
3.98277	100129	2 14 15.06	- 4 56 38.0		

AN #	System	Notes	Observer(s)
100130	10510000		Mack,P
100129	18010000		McCrosky,R.E et al.

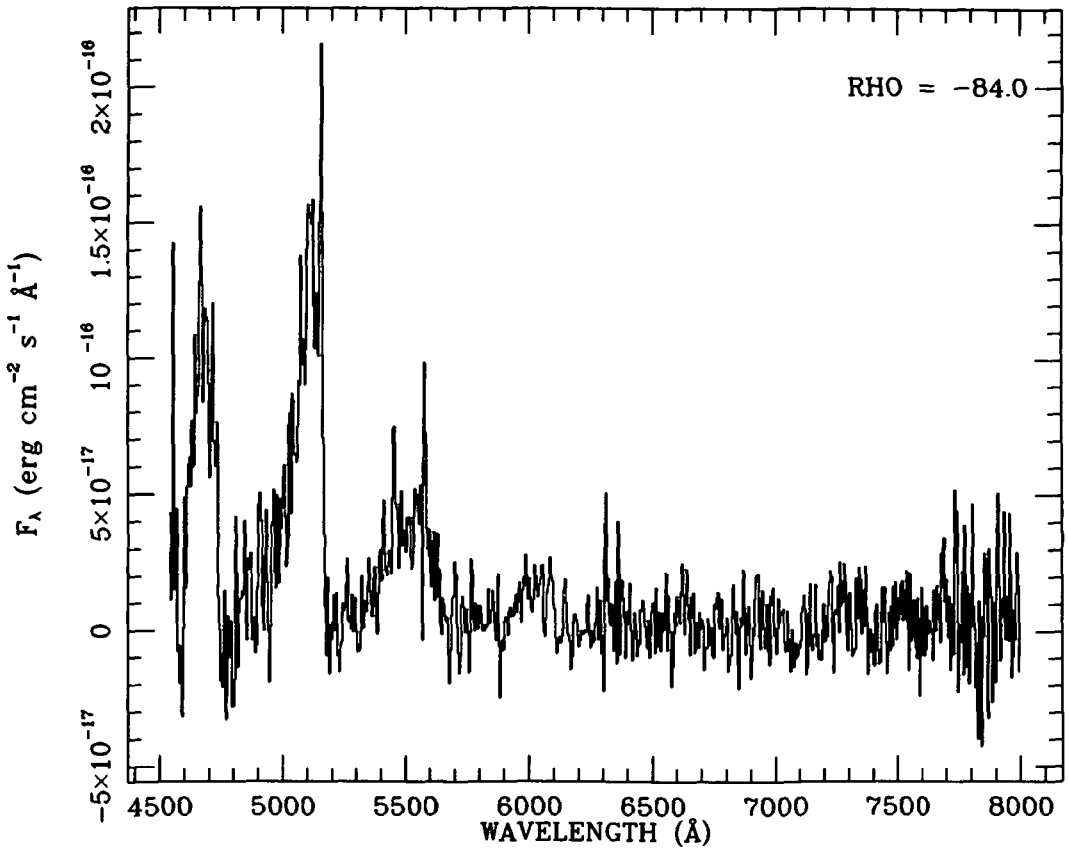
- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

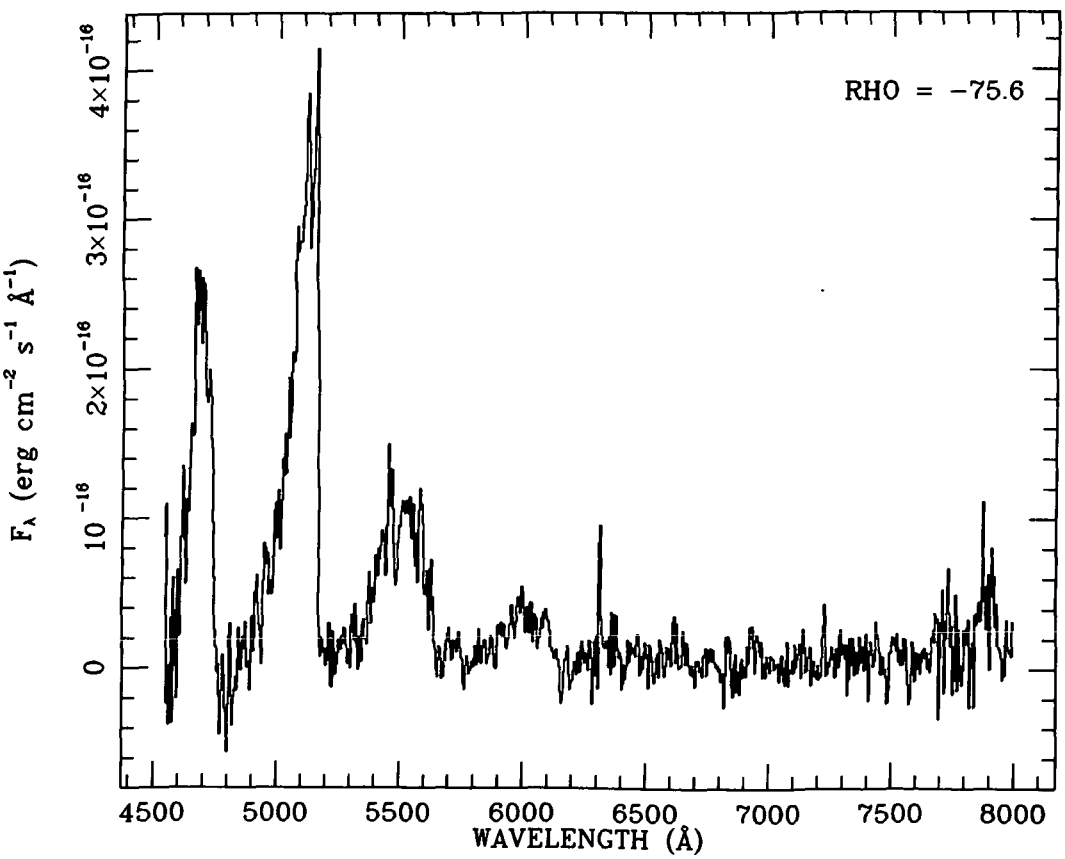
Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
3.13890	700012	17	4545-8000	1	1	10.0	2	RC Spect/Cryocam/TICCD/300gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700012	Reduced digital			85	3.2x6.0	76950101	Belton,M/Wehinger,P

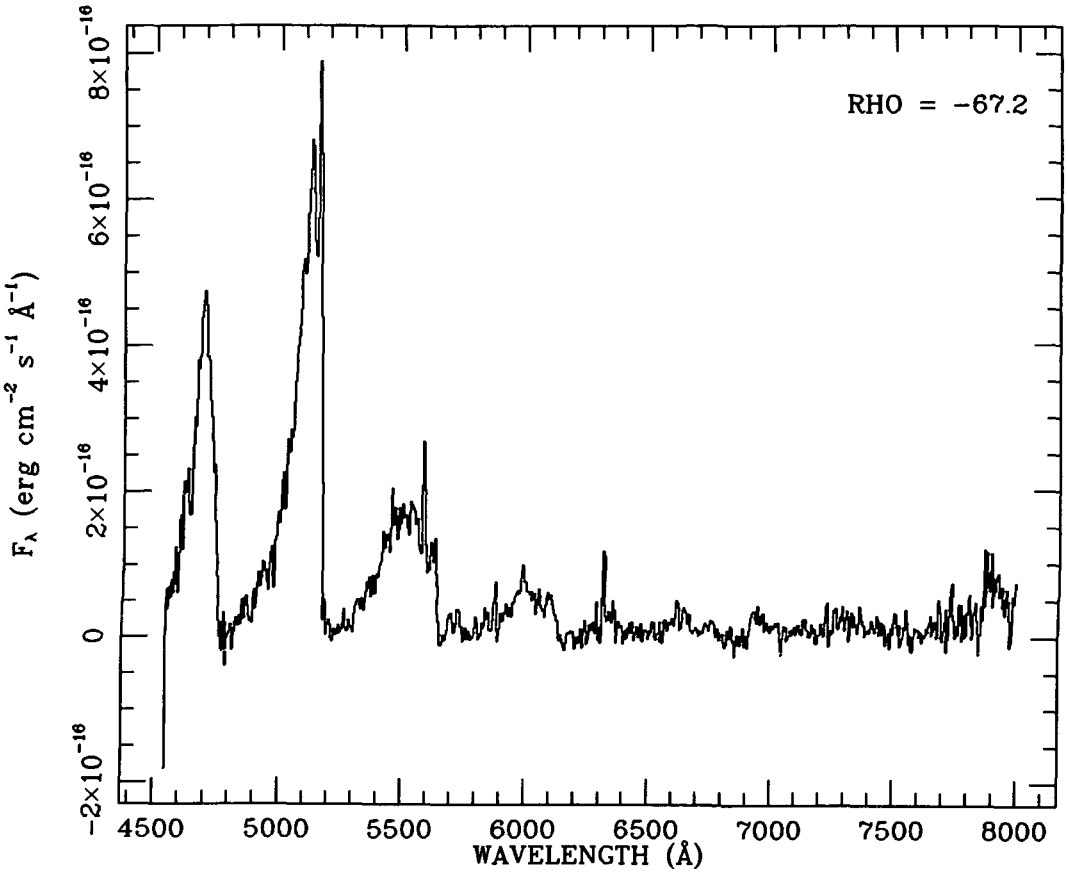
SSN # 700012



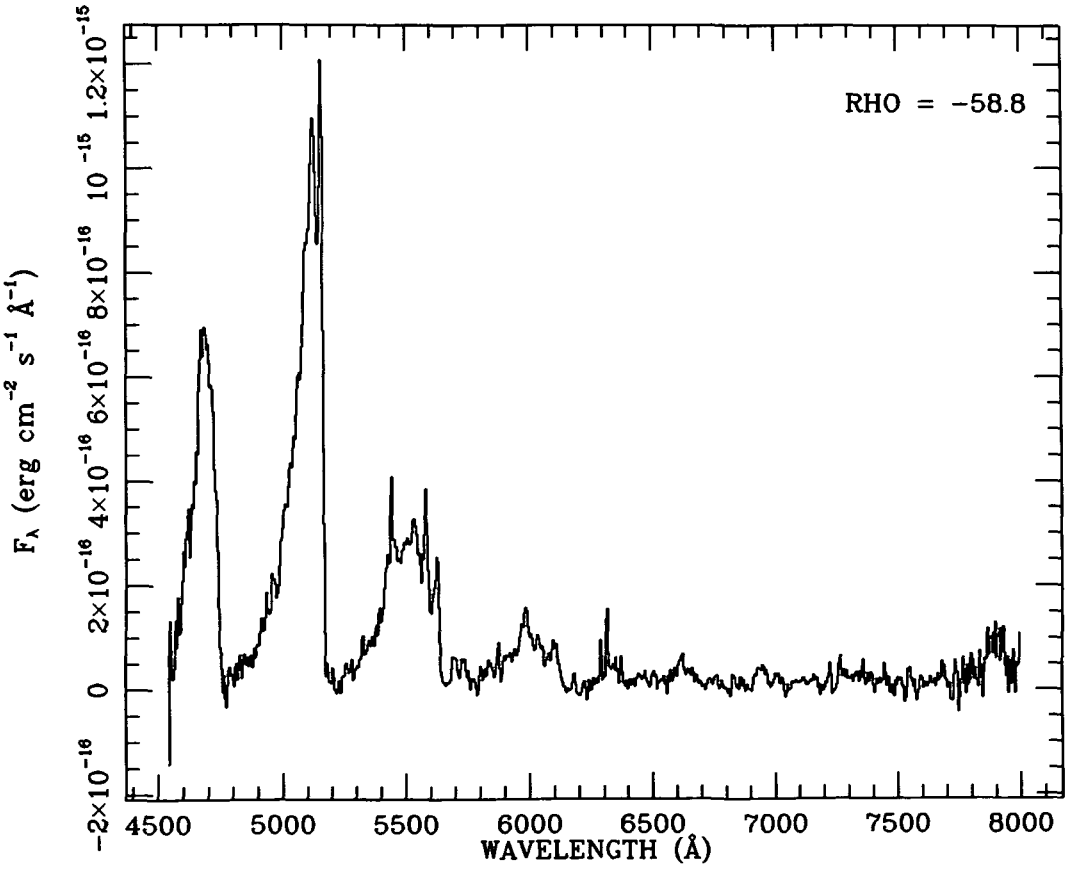
SSN # 700012 (cont.)



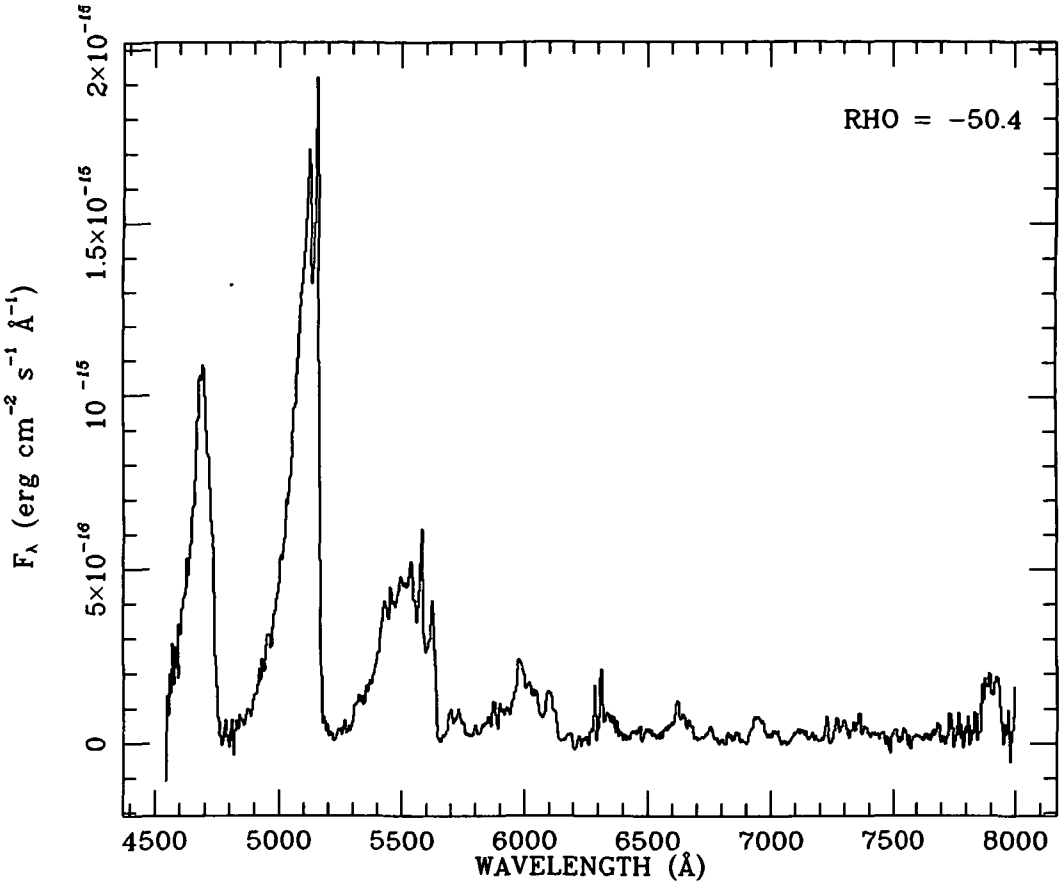
SSN # 700012 (cont.)



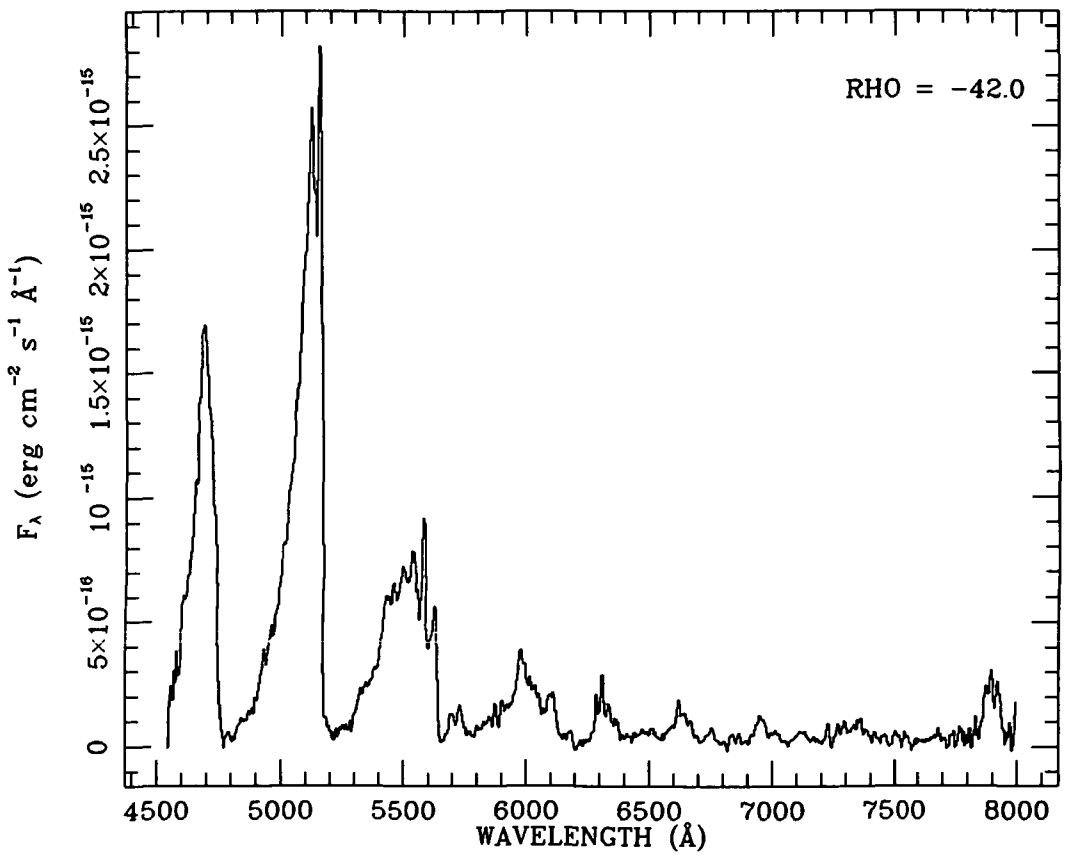
SSN # 700012 (cont.)



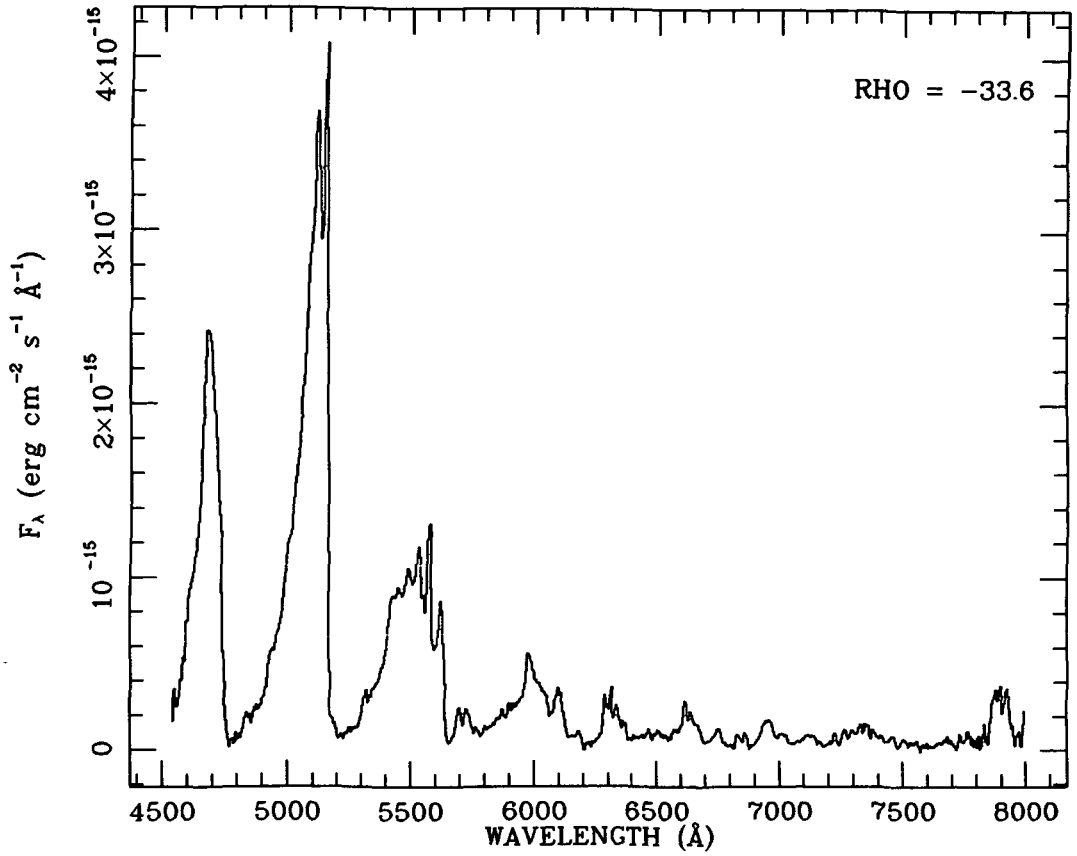
SSN # 700012 (cont.)



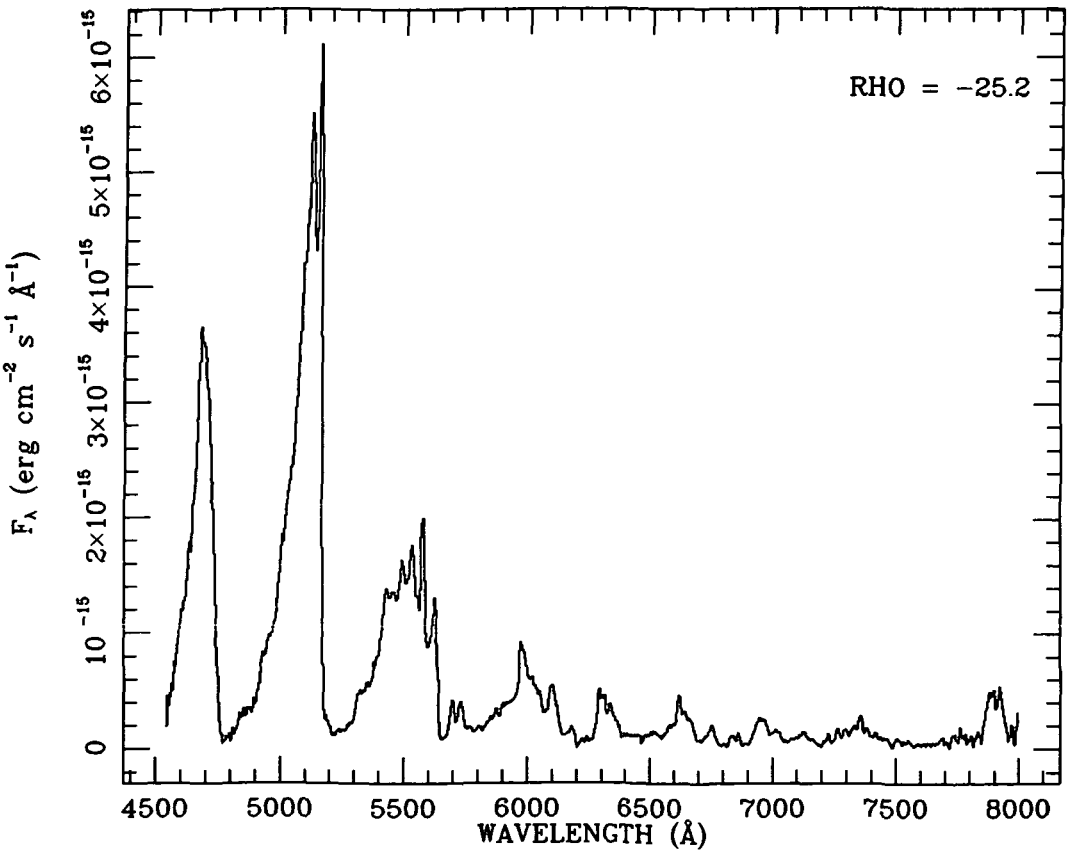
SSN # 700012 (cont.)



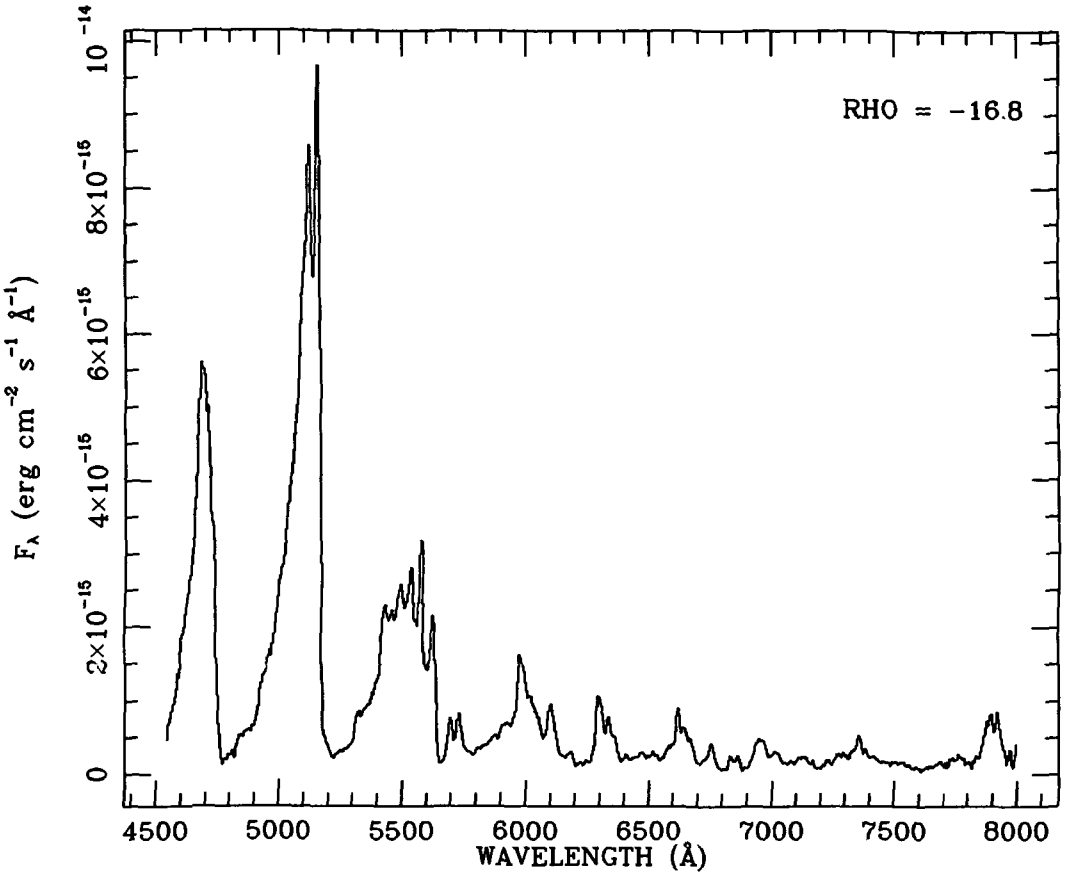
SSN # 700012 (cont.)



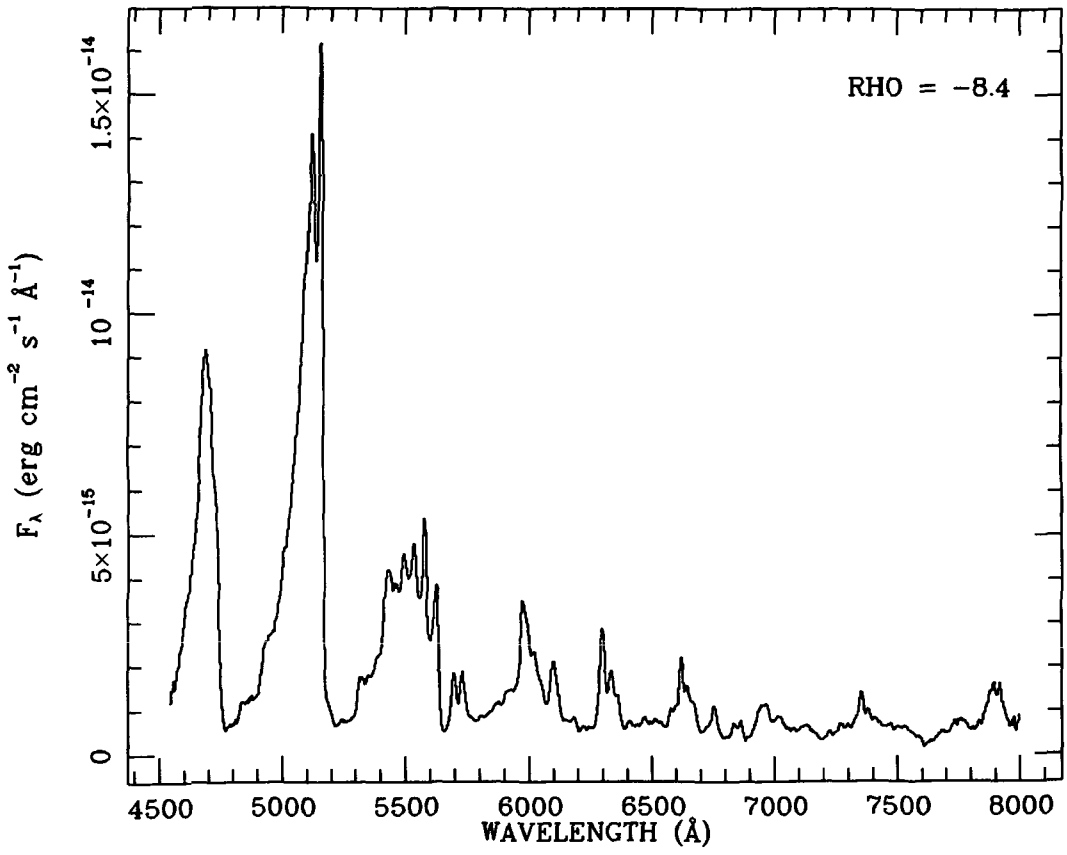
SSN # 700012 (cont.)



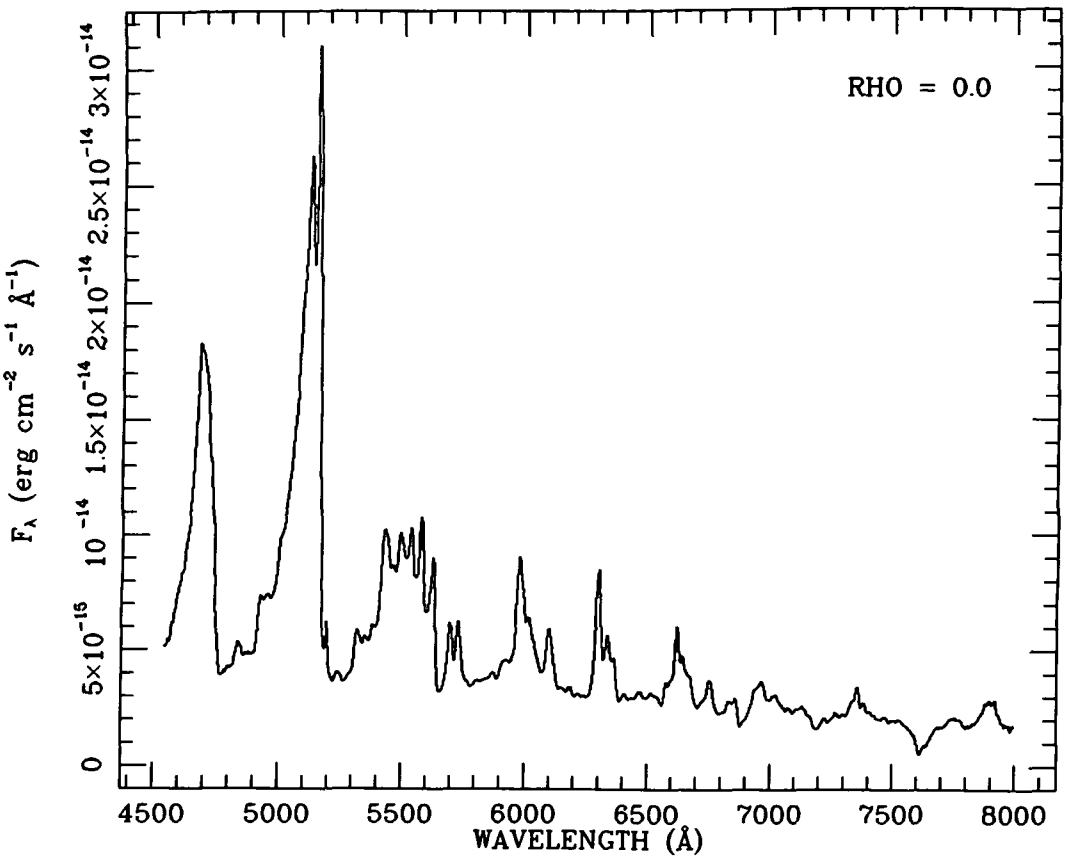
SSN # 700012 (cont.)



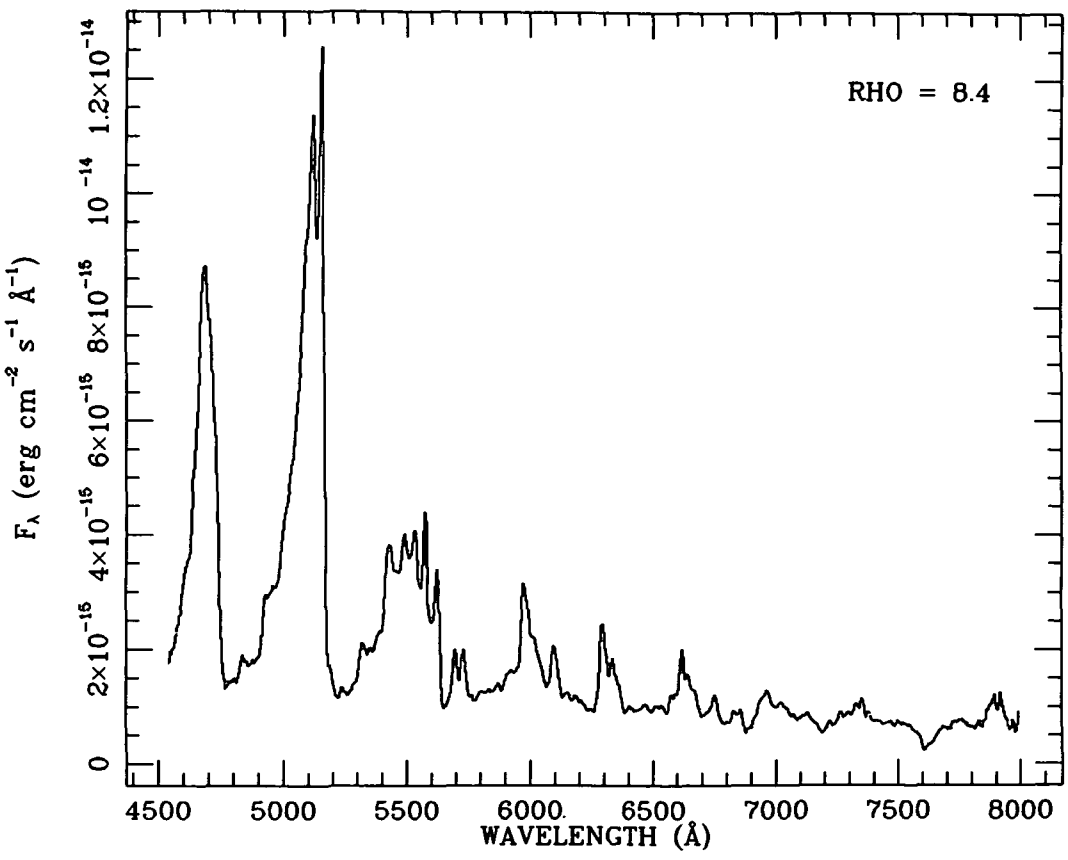
SSN # 700012 (cont.)



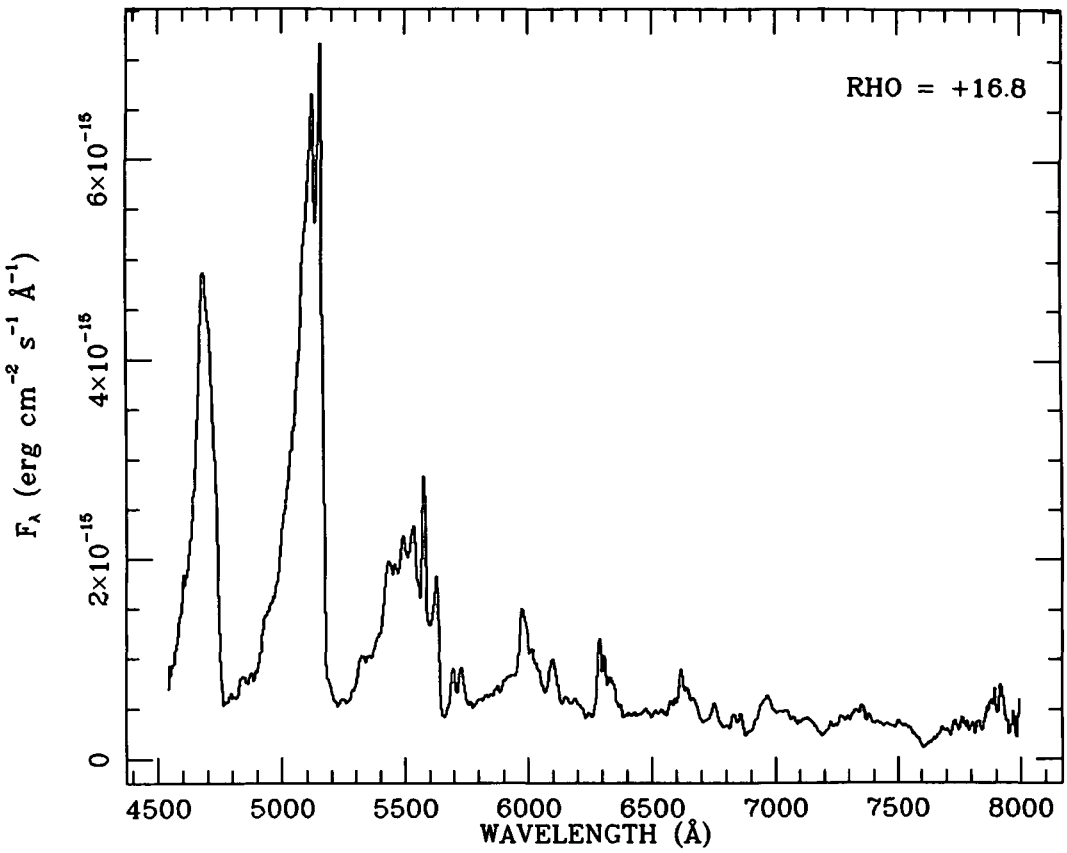
SSN # 700012 (cont.)



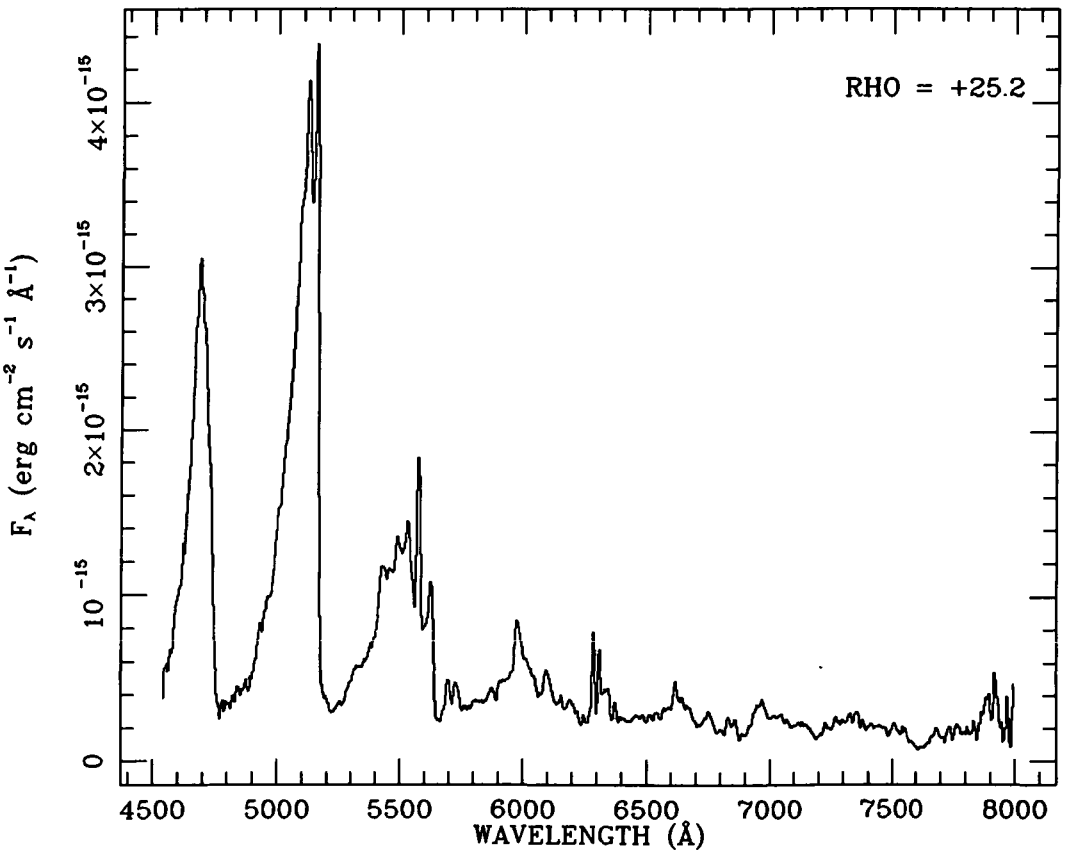
SSN # 700012 (cont.)



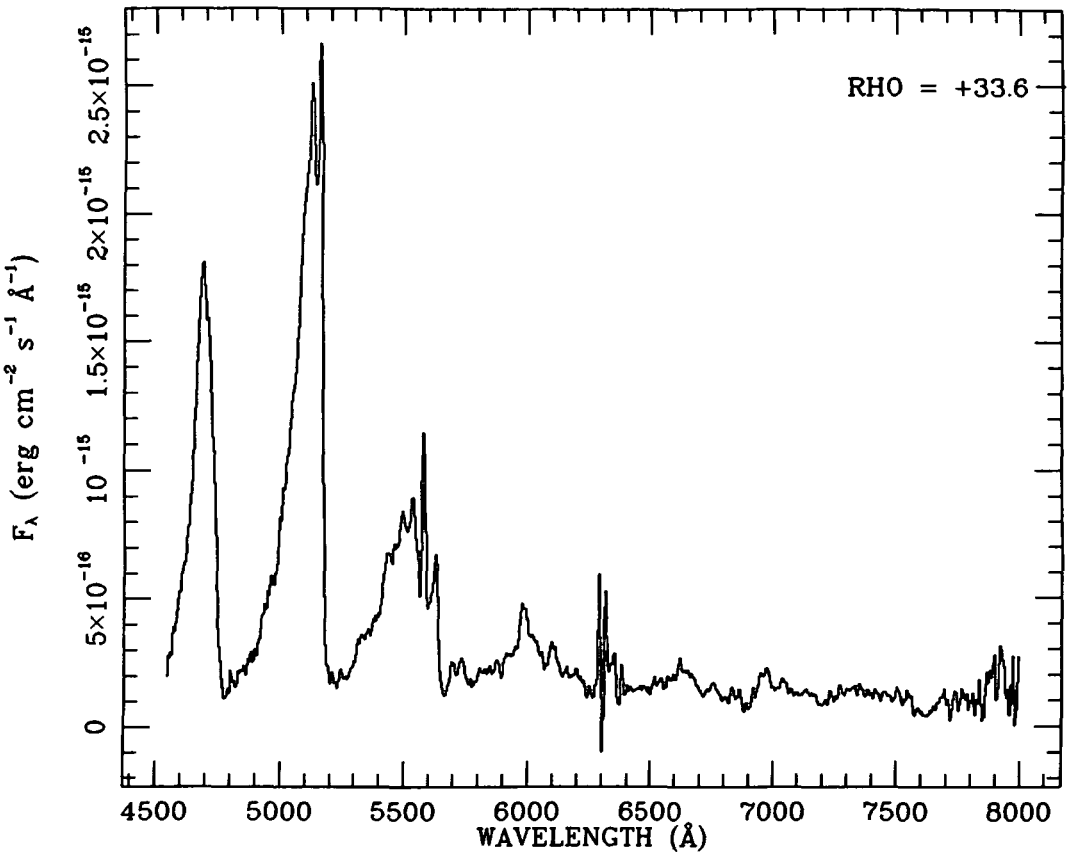
SSN # 700012 (cont.)



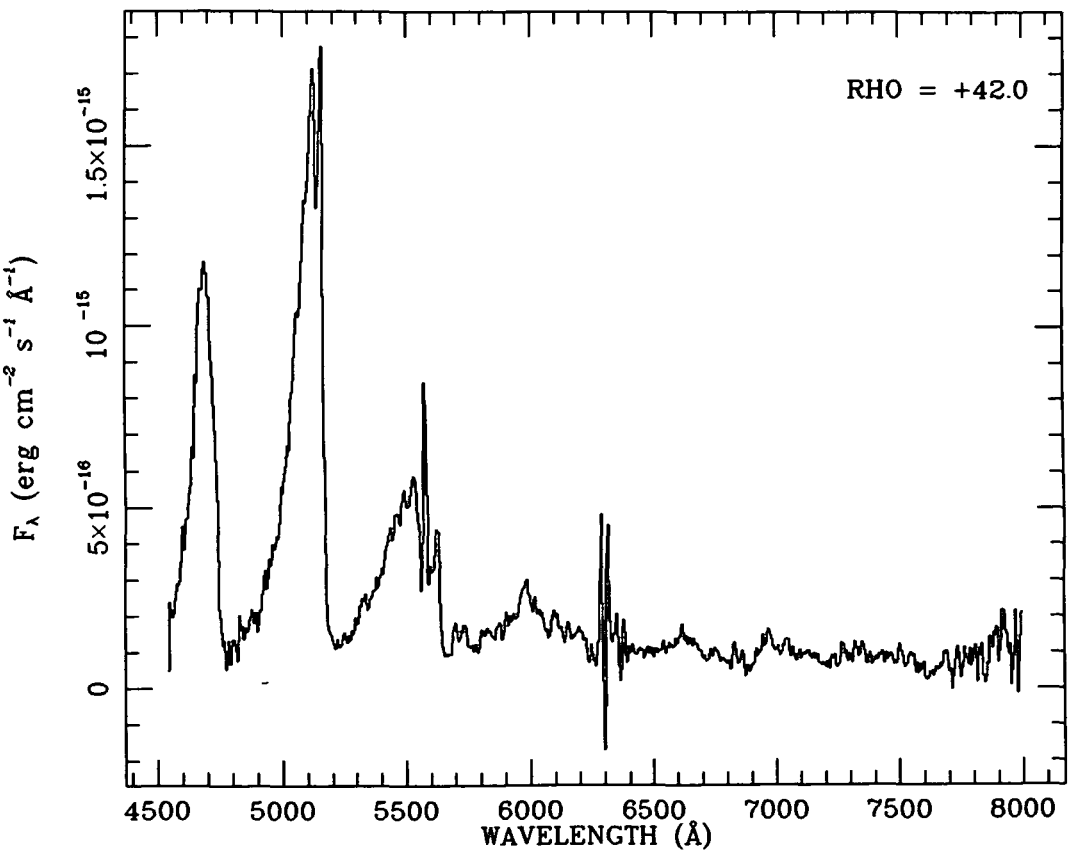
SSN # 700012 (cont.)



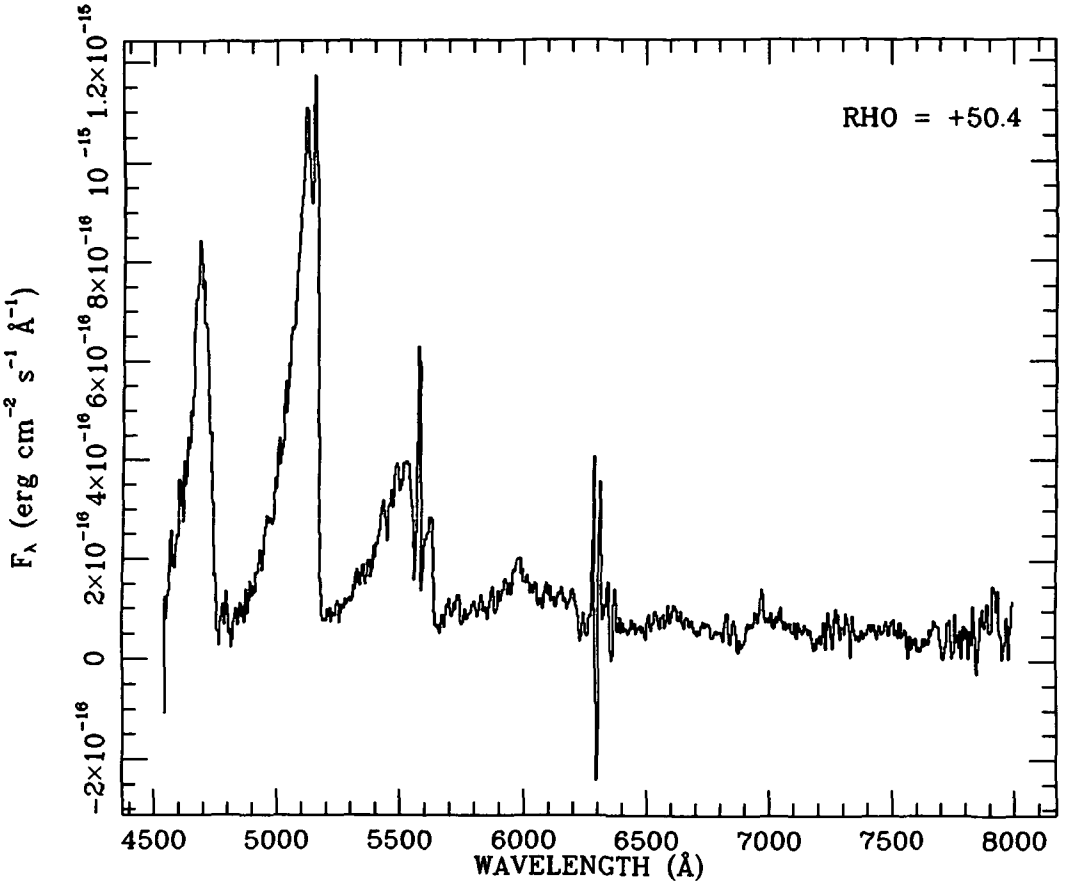
SSN # 700012 (cont.)



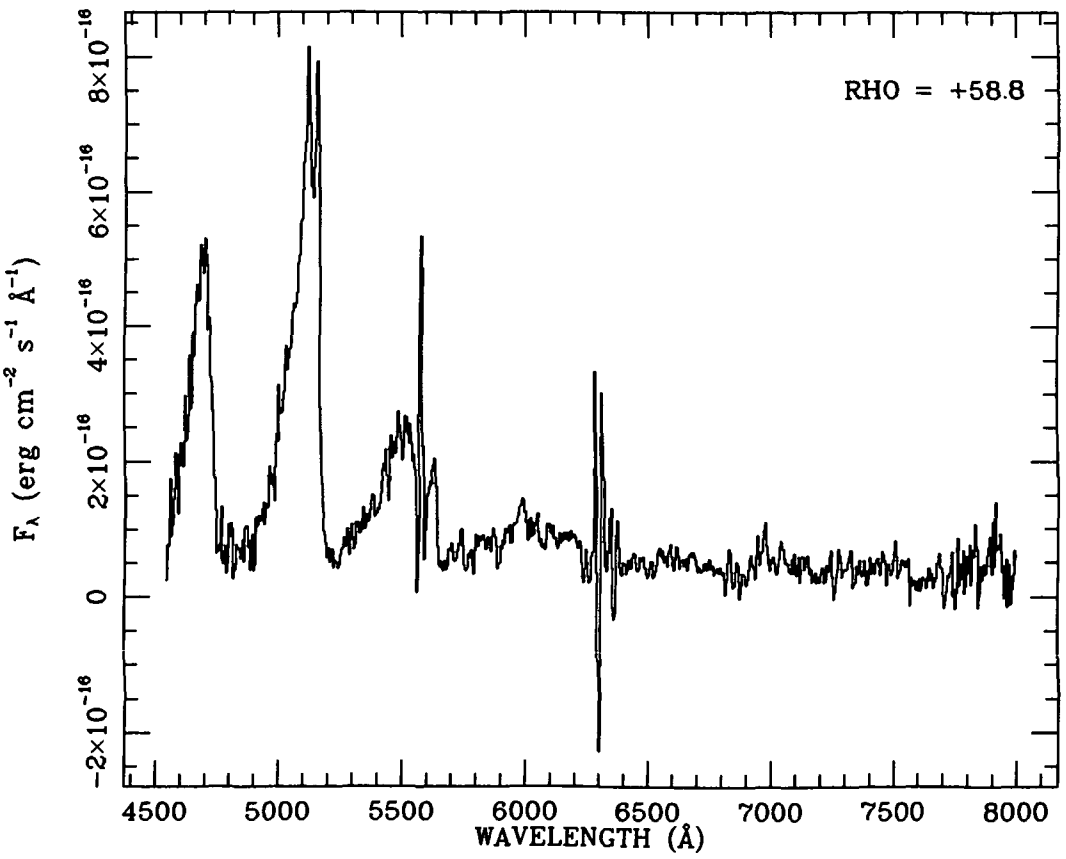
SSN # 700012 (cont.)

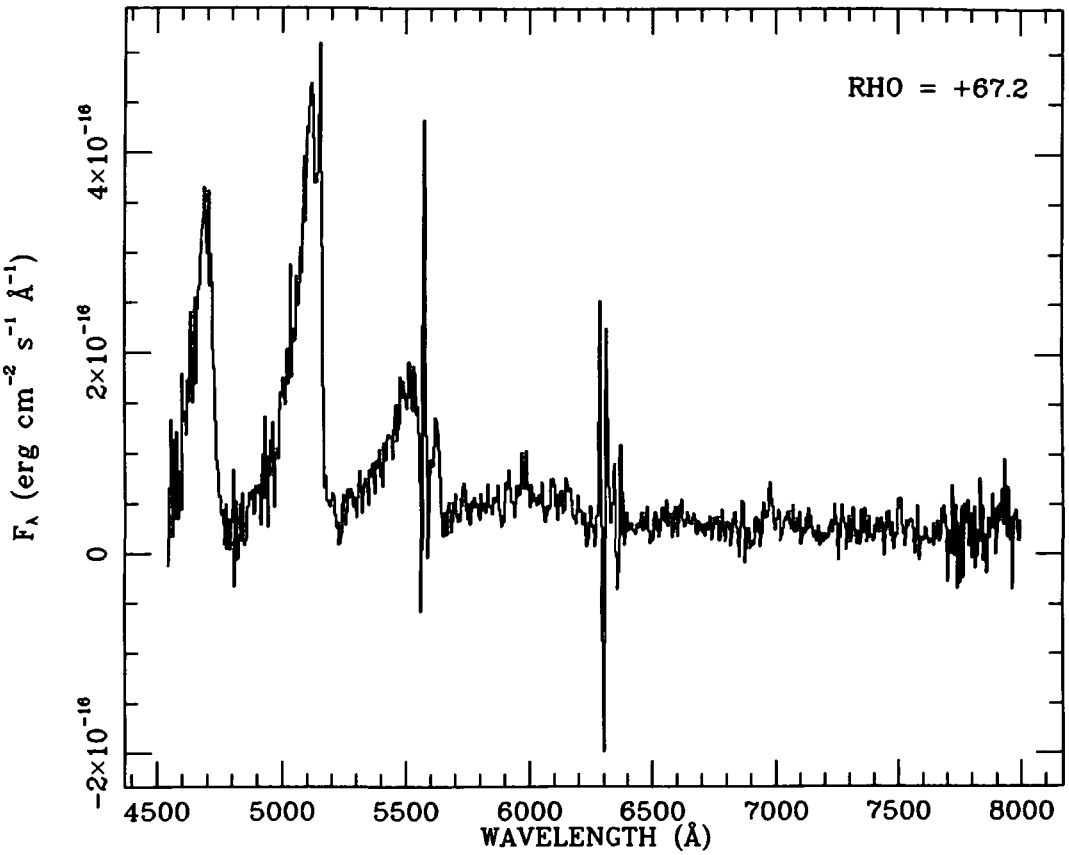


SSN # 700012 (cont.)



SSN # 700012 (cont.)





NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
3.0200	800304	S	8.5	AC	3.5	4						
3.0200	800305	?			2.9	5						
3.1500	800306	S	8.3	SAO	4.5	6						
3.1500	800307	S	7.8	o Cet	5.0	5						
3.4300	800308	S	7.9	AA	3.9	4						
3.4300	800309	S	7.4		4	2						
3.4300	800310	S	7.6	AA	4	5						
3.9600	800311	B	8.5	SAO	2.3	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800304	.08	Binoculars		20	6.0	Y	1		Bortle,J.
800305	.32	Newtonian	5.6	68					Bortle,J.
800306	.08	Binoculars		20	7.0	Y	3		Morris,C.S.
800307	.14	Schmidt-Newt.	3.6	43	11.0	Y	3	A	Spratt,C.
800308	.20	Schmidt-Cass.	10	50	5	Y	1		Dixon,I.
800309	.08	Binoculars		15	4.0	Y	1		Price,R.T.
800310	.08	Binoculars		15	5	Y	1		Seargent,D.A.J.
800311	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A Low alt. (F. star prob. telescopic, not vis. Ed.)

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 14.360
Declination (eq. 1950.0; deg,arcmin)	- 4 56.98
Geocentric distance (AU)	.8558
Heliocentric distance (AU)	.7745
Radial geocentric velocity (km/s)	-11.97
Radial heliocentric velocity (km/s)	10.41
Angle Sun-Earth-comet (deg)	48.9
Angle Sun-comet-Earth (deg)	74.7
Position angle of prolonged radius vector (deg)	85.5
Position angle of negative orbital velocity vector (deg)	318.9
Angle comet-Earth-Moon (deg)	34.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
4.46689	100128	2 17 9.52	- 5 9 51.0		
4.80002	100127	2 19 9.92	- 5 19 .7		
4.80484	100126	2 19 11.13	- 5 19 6.2		
4.80899	100125	2 19 12.88	- 5 19 18.2		
4.81458	100124	2 19 15.34	- 5 19 24.7		

AN #	System	Notes	Observer(s)
100128	13300000		Wang,D.C
100127	10260000		Wild,P
100126	10220000		Massone,G/Zappala,V
100125	10220000		Massone,G/Zappala,V
100124	10260000		Wild,P

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
4.15700	500015	3115	OH	-9.306	
4.15700	500015	3650	Cont	-13.109	
4.15700	500015	3871	CN	-9.387	
4.15700	500015	4060	C_3	-10.422	
4.15700	500015	4845	Cont	-12.796	
4.15700	500015	5140	C_2	-9.628	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500015	74.6			56880000	A'Hearn,M
500015	74.6			56880000	A'Hearn,M
500015	74.6			56880000	A'Hearn,M
500015	74.6			56880000	A'Hearn,M
500015	74.6			56880000	A'Hearn,M
500015	74.6			56880000	A'Hearn,M

COMMENT Old OH filter
TELESCOPE 1.1 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
4.0200	800312	S	8.5	AC	3.5	3						
4.0200	800313	?			3.2	5						
4.021	800314	S	8.6	o Cet	3.7	2						
4.0310	800315	S	8.6	o Cet	4	4						
4.1600	800316	M	8.4	SAO	3.6	5	0.05	100				
4.1600	800317	S	7.4	o Cet	4.5	4						
4.4300	800318	S	7.8	AA	3.6	4						
4.4300	800319	S	7.7	AA								
4.4400	800320	S	7.5		4	3						
4.8100	800321	S	8.0	SAO	7.5	4	0.06	100				

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800312	.08	Binoculars		20	6.0	Y	1		Bortle,J.
800313	.32	Newtonian	5.6	68					Bortle,J.
800314	.15	Newtonian	8	51	4 :	Y	1		De Young,J.A.
800315	.15	Refractor	5	31	4.6	Y	2		Morrison,W.C.
800316	.08	Binoculars		20	6.0	Y			Morris,C.S.
800317	.20	Schmidt-Cass.	10.0	64	12.0	Y	3	A	Spratt,C.
800318	.20	Schmidt-Cass.	10	50	4.5	Y	1		Dixon,I.
800319	.08	Binoculars		15		Y	1	B	Seargent,D.A.J.
800320	.08	Binoculars		15	4.0	Y	1		Price,R.T.
800321	.15	Newtonian	5	25				C	Merlin,J.C.

NOTE A Low alt. (F. star prob. telescopic, not vis. Ed.)
NOTE B Drifting cloud
NOTE C Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 20.379
Declination (eq. 1950.0; deg,arcmin)	- 5 24.40
Geocentric distance (AU)	.8490
Heliocentric distance (AU)	.7807
Radial geocentric velocity (km/s)	-11.43
Radial heliocentric velocity (km/s)	11.10
Angle Sun-Earth-comet (deg)	49.4
Angle Sun-comet-Earth (deg)	74.9
Position angle of prolonged radius vector (deg)	86.4
Position angle of negative orbital velocity vector (deg)	319.1
Angle comet-Earth-Moon (deg)	26.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
5.61364	100123	2 24 5.22	- 5 41 28.7		
5.79034	100122	2 25 9.24	- 5 46 23.4		
5.79519	100121	2 25 11.40	- 5 46 32.1		
5.81236	100120	2 25 17.40	- 5 47 1.7		

AN #	System	Notes	Observer(s)
100123	11900000		Gerasimenko,S
100122	10220000		Massone,G/Zappala,V
100121	10220000		Massone,G/Zappala,V
100120	10260000		Wild,P

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
5.63190	500011		4845	65	12.0	±1.0	171	±2

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500011	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
5.1600	800322	S	7.5	o Cet	4.0	4						
5.1681	800323	S	8.6	SAO	4	5						
5.4300	800324	S	7.6	AA	3.8	4						
5.4300	800325	S	7.5		3	3						
5.4300	800326	S	7.6	AA	3.5	4						
5.5300	800327	S	7.5	AA			0.12	65	0.33	300		
5.8000	800328	S	8.2	SAO	7.0	3	0.03	111				
5.8100	800329	S	8.1	SAO		3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800322	.20	Schmidt-Cass.	10.0	64	12.5	Y	3	A	Spratt,C.
800323	.25	Newtonian	4	32			2		Machholz,D.
800324	.20	Schmidt-Cass.	10	50	5	Y	1		Dixon,I.
800325	.08	Binoculars		15	3.5	Y	1	B	Price,R.T.
800326	.08	Binoculars		15	5	Y	1		Seargent,D.A.J.
800327	.15	Newtonian	5	30	5.4	Y		C	Pearce,A.
800328	.26	Newtonian	6	39				D	Merlin,J.C.
800329	.09	Newtonian	9	28					Merlin,J.C.

NOTE A Low alt. (F. star prob. telescopic, not vis. Ed.)
NOTE B Heavy smoke
NOTE C PA 65 uncertain.
NOTE D Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 26.437
Declination (eq. 1950.0; deg,arcmin)	- 5 52.09
Geocentric distance (AU)	.8426
Heliocentric distance (AU)	.7873
Radial geocentric velocity (km/s)	-10.88
Radial heliocentric velocity (km/s)	11.77
Angle Sun-Earth-comet (deg)	50.0
Angle Sun-comet-Earth (deg)	74.9
Position angle of prolonged radius vector (deg)	87.3
Position angle of negative orbital velocity vector (deg)	319.2
Angle comet-Earth-Moon (deg)	19.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
6.10347	100119	2 27 3.54	- 5 55 3.4		
6.10556	100118	2 27 4.14	- 5 55 6.3		
6.11667	100117	2 27 8.32	- 5 55 25.9		
6.11840	100116	2 27 8.95	- 5 55 29.5		
6.47242	100115	2 29 18.19	- 6 5 18.9		
6.48804	100114	2 29 24.17	- 6 5 37.4		
6.51736	100113	2 29 34.55	- 6 6 25.7		
6.68545	100112	2 30 36.25	- 6 11 19.4		
6.75779	100111	2 31 2.64	- 6 13 19.7		
6.76057	100110	2 31 3.24	- 6 13 23.0		
6.77986	100109	2 31 10.66	- 6 13 57.7		
6.78542	100108	2 31 12.43	- 6 14 6.7		
6.79097	100107	2 31 14.64	- 6 14 16.7		
6.99512	100106	2 32 29.74	- 6 20 .5		

AN #	System	Notes	Observer(s)
100119	16880000		Bowell,E
100118	16880000		Bowell,E
100117	16880000		Bowell,E
100116	16880000		Bowell,E
100115	13300000		Yang,J.X
100114	13300000		Wang,D.C
100113	13230000	A	Birch,P. et al.
100112	11150000		Risvanov
100111	10460000		Mrkos,A
100110	10460000		Mrkos,A
100109	10220000		Massone,G/Zappala,V
100108	10220000		Massone,G/Zappala,V
100107	10220000		Massone,G/Zappala,V
100106	18010000		McCrosky,R.E

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
6.573	200001A	J	>7.4		32				
6.573	200001B	H	>6.8		32				
6.573	200001C	K	>6.3		32				

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec	Or	FT	Notes	System	Observer(s)
200001A		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.
200001B		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.
200001C		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.

WEATHER Clear, negligible wind
SEEING 3 arcsec
COMMENT Comet was clearly seen and centered
ORIGIN=1 Brightest visible point
NOTE A One sigma detector noise upper limit
NOTE B Post focal plane sky chopping (30-40 arcsec)
NOTE C Additional observer: Chandrasekhar, T

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: OH

6.65 UT LINE= OH 2P3/2 J=3/2 F=2-2 RESTF= 1667.359 MHz
S W=- FILE=600033 NANCAY NANCAY FRANCE SYSCODE= 65000401
TEL = 200MX40M E=0.48 BW= 8.2 (5.42, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1667.359 B= 0.800 R= 3.1 TS= 50 TR= -
LINE DATA PEAK= -.011 (0.004) JY/BEAM AREA= -23.0 (6.6) JY/BEAM*M/S
OBS = D. Bockelee-Morvan, J. Crovisier, and E. Gerard

6.65 UT LINE= OH 2P3/2 J=3/2 F=1-1 RESTF= 1665.402 MHz
S W=- FILE=600034 NANCAY NANCAY FRANCE SYSCODE= 65000401
TEL = 200MX40M E=0.48 BW= 8.2 (5.42, 0) OFF=(0.00, 0) PE= -
INS = FET/AC F= 1665.402 B= 0.800 R= 3.1 TS= 50 TR= -
UPPER LIMIT = 0.010 JY/BEAM
OBS = D. Bockelee-Morvan, J. Crovisier, and E. Gerard

SUB-NETWORK: CONTINUUM

6.00 UT
N W=2 FILE=600027 SAO ZELENCHUKSKAYA RSFSR SYSCODE= 65002403
TEL = RATAN 600 E=0.35 BW= 1.7 (41.30, 0) OFF=(0.00, 0) PE= 3
INS = UNK/CONT F= 14400.000 B=1000.000 R= - TS= 250 TR= -
UPPER LIMIT = 0.840 JY/BEAM
OBS = M. Mingaliev

```
 6.00 UT
   N  W=2 FILE=600028   SAO          ZELENCHUKSKAYA  RSFSR SYSCODE= 65002403
   TEL = RATAN 600  E=0.63  BW=   3.0 (41.30,  0)  OFF=(   0.00,  0) PE=  3
   INS = UNK/CONT      F=   7690.000  B= 800.000  R=   -      TS= 200  TR=   -
   UPPER LIMIT =   1.560  JY/BEAM
   OBS =  M. Mingaliev

 6.00 UT
   N  W=2 FILE=600029   SAO          ZELENCHUKSKAYA  RSFSR SYSCODE= 65002403
   TEL = RATAN 600  E=0.75  BW=   5.9 (41.30,  0)  OFF=(   0.00,  0) PE=  3
   INS = PARA/CONT     F=   3950.000  B= 500.000  R=   -      TS=  40  TR=   -
   UPPER LIMIT =   0.030  JY/BEAM
   OBS =  M. Mingaliev

 6.00 UT
   N  W=2 FILE=600030   SAO          ZELENCHUKSKAYA  RSFSR SYSCODE= 65002403
   TEL = RATAN 600  E=0.76  BW=   6.4 (41.30,  0)  OFF=(   0.00,  0) PE=  3
   INS = UNK/CONT      F=   3660.000  B= 100.000  R=   -      TS= 100  TR=   -
   UPPER LIMIT =   0.080  JY/BEAM
   OBS =  M. Mingaliev

 6.00 UT
   N  W=2 FILE=600031   SAO          ZELENCHUKSKAYA  RSFSR SYSCODE= 65002403
   TEL = RATAN 600  E=0.78  BW=  10.1 (41.30,  0)  OFF=(   0.00,  0) PE=  3
   INS = UNK/CONT      F=   2310.000  B= 200.000  R=   -      TS= 200  TR=   -
   UPPER LIMIT =   0.600  JY/BEAM
   OBS =  M. Mingaliev

 6.00 UT
   N  W=2 FILE=600032   SAO          ZELENCHUKSKAYA  RSFSR SYSCODE= 65002403
   TEL = RATAN 600  E=0.80  BW=  22.9 (41.30,  0)  OFF=(   0.00,  0) PE=  3
   INS = UNK/CONT      F=    968.000  B= 200.000  R=   -      TS= 200  TR=   -
   UPPER LIMIT =   0.600  JY/BEAM
   OBS =  M. Mingaliev
```

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
6.1500	800330	S	8.3	SAO								
6.1500	800331	S	7.6	o Cet	6.0	3						
6.4300	800332	S	7.5	AA		4						
6.5100	800333	S	7.7	AA	3.5	5	0.2	298				
6.7900	800334	S	8.1	SAO	6.0	3	0.02	119				

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800330	.08	Binoculars		20	4.5	Y	1		Morris,C.S.
800331	.20	Schmidt-Cass.	10.0	64	12.3	Y	3	A	Spratt,C.
800332	.08	Binoculars		15	5	Y	1		Seargent,D.A.J.
800333	.15	Newtonian	5	30	5.4	Y			Pearce,A.
800334	.26	Newtonian	6	39					Merlin,J.C.

NOTE A Low alt. (F. star prob. telescopic, not vis.Ed.)

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 32.533
Declination (eq. 1950.0; deg,arcmin)	- 6 19.99
Geocentric distance (AU)	.8365
Heliocentric distance (AU)	.7943
Radial geocentric velocity (km/s)	-10.31
Radial heliocentric velocity (km/s)	12.41
Angle Sun-Earth-comet (deg)	50.6
Angle Sun-comet-Earth (deg)	74.9
Position angle of prolonged radius vector (deg)	88.1
Position angle of negative orbital velocity vector (deg)	319.3
Angle comet-Earth-Moon (deg)	17.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
7.76539	100105	2 37 12.77	- 6 41 22.9		

AN #	System	Notes	Observer(s)
100105	10510000		Churms,J

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
7.573	200002A	J	>7.4		32.				
7.573	200002B	H	>6.8		32.				
7.573	200002C	K	>6.3		32.				

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec.	Or	FT	Notes	System	Observer(s)
200002A		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.
200002B		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.
200002C		0.0	0.0	1	8	ABC	25000000	Ashok,N et al.

WEATHER Clear, negligible wind
SEEING 3 arcsec
COMMENT Comet was clearly seen and centered
ORIGIN=1 Brightest visible point
NOTE A One sigma detector noise upper limit
NOTE B Post focal plane rotating (on/off) chopper
NOTE C Additional observer: Chandrasekhar, T

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
7.4200	800335	S	8.0		4	3						
7.4300	800336	S	7.4:	AA								
7.806	800337	S	9.4	AA	2.6	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800335	.08	Binoculars		15	5.0	Y	1	A	Price,R.T.
800336	.08	Binoculars		15	4.5	Y	1	B	Seargent,D.A.J.
800337	.33	Newtonian	4.5	45	3.7M	Y	1		Shanklin,J.D.

NOTE A 4 day Moon
NOTE B Hazy sky

DATE: 8 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 38.665
Declination (eq. 1950.0; deg,arcmin)	- 6 48.06
Geocentric distance (AU)	.8307
Heliocentric distance (AU)	.8016
Radial geocentric velocity (km/s)	-9.74
Radial heliocentric velocity (km/s)	13.02
Angle Sun-Earth-comet (deg)	51.2
Angle Sun-comet-Earth (deg)	74.9
Position angle of prolonged radius vector (deg)	88.9
Position angle of negative orbital velocity vector (deg)	319.4
Angle comet-Earth-Moon (deg)	21.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
8.64861	100104	2 42 39.28	- 7 6 22.3		

AN #	System	Notes	Observer(s)
100104	11650000		Timofeev,S

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
8.0300	800338	S	8.4	AC	5	3						
8.0300	800339	S	8.8	AC	3.5	3						
8.4100	800340	S	8.0		4							
8.7900	800341	S	8.3	SAO	5.0	3	0.02	104				
8.800	800342	S	8.1	SAO	3	3						
8.802	800343	S	8.2	SAO	3	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800338	.08	Binoculars		20					Bortle,J.
800339	.32	Newtonian	5.6	68					Bortle,J.
800340	.08	Binoculars		15	5.0	Y	1	A	Price,R.T.
800341	.26	Newtonian	6	39				B	Merlin,J.C.
800342	.16	Newtonian	4.9	29	4.5M	Y	2	C	Bouma,R.J.
800343	.16	Newtonian	4.9	29	4.5M	Y	2	C	Bus,E.P.

NOTE A High haze, 5 day Moon (seen by averted vision only)
NOTE B Coma diameter uncertain.
NOTE C Comp. Stars SAO 130070, 130072, 130085, and 130106

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 44.835
Declination (eq. 1950.0; deg,arcmin)	- 7 16.23
Geocentric distance (AU)	.8252
Heliocentric distance (AU)	.8093
Radial geocentric velocity (km/s)	-9.15
Radial heliocentric velocity (km/s)	13.62
Angle Sun-Earth-comet (deg)	51.9
Angle Sun-comet-Earth (deg)	74.8
Position angle of prolonged radius vector (deg)	89.7
Position angle of negative orbital velocity vector (deg)	319.4
Angle comet-Earth-Moon (deg)	29.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
9.42835	100103	2 47 27.88	- 7 28 7.7		
9.50243	100102	2 47 56.31	- 7 30 17.7		
9.50972	100101	2 47 59.15	- 7 30 33.2		
9.65243	100100	2 48 52.19	- 7 34 47.2		
9.74306	100099	2 49 26.79	- 7 37 9.3		
9.74826	100098	2 49 27.87	- 7 37 17.7		

AN #	System	Notes	Observer(s)
100103	14150000		
100102	13230000	A	Birch,P. et al.
100101	13230000	A	Birch,P. et al.
100100	11650000		Timofeev,S
100099	10610000		Ignatovich,S
100098	10610000		Ignatovich,S

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
9.5000	800344	S	7.6		3	5						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800344	.20	Schmidt-Cass.	10.0	50	6.5	Y			Wood,J.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 51.041
Declination (eq. 1950.0; deg,arcmin)	- 7 44.46
Geocentric distance (AU)	.8201
Heliocentric distance (AU)	.8174
Radial geocentric velocity (km/s)	-8.55
Radial heliocentric velocity (km/s)	14.19
Angle Sun-Earth-comet (deg)	52.5
Angle Sun-comet-Earth (deg)	74.7
Position angle of prolonged radius vector (deg)	90.5
Position angle of negative orbital velocity vector (deg)	319.4
Angle comet-Earth-Moon (deg)	38.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
10.70347	100097	2 55 24.92	- 8 4 23.0		
10.71231	100096	2 55 28.43	- 8 4 31.2		

AN #	System	Notes	Observer(s)
100097	11020000		Yurevich
100096	11020000		Yurevich

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
10.0200	800345	S	8.5	AC	2.3	3						
10.5200	800346	S	7.4		2.5	6						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800345	.32	Newtonian	5.6	68	5.5	Y	1		Bortle,J.
800346	.20	Newtonian	6	60	11.2	Y	1	A	Clark,M.L.

NOTE A Moon up. (F. star prob. telescopic, not vis. Ed.)

DATE: 11 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	2 57.282
Declination (eq. 1950.0; deg,arcmin)	- 8 12.68
Geocentric distance (AU)	.8154
Heliocentric distance (AU)	.8257
Radial geocentric velocity (km/s)	-7.94
Radial heliocentric velocity (km/s)	14.73
Angle Sun-Earth-comet (deg)	53.2
Angle Sun-comet-Earth (deg)	74.5
Position angle of prolonged radius vector (deg)	91.3
Position angle of negative orbital velocity vector (deg)	319.3
Angle comet-Earth-Moon (deg)	49.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
11.14145	100095	2 58 9.55	- 8 16 47.7		
11.60807	100094	3 1 5.22	- 8 29 55.2		
11.61826	100093	3 1 8.82	- 8 30 11.8		
11.78472	100092	3 2 11.54	- 8 34 53.8		
11.79063	100091	3 2 13.97	- 8 35 .4		

AN #	System	Notes	Observer(s)
100095	16750000		Gibson,J
100094	11900000		Gerasimenko,S
100093	11900000		Gerasimenko,S
100092	10220000		Massone,G/Zappala,V
100091	10220000		Massone,G/Zappala,V

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
11.1800	800347	S	8.7	SAO	4.5	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800347	.20	Newtonian	6	61	5.0	Y	3		Morris,C.S.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 3.557
Declination (eq. 1950.0; deg,arcmin)	- 8 40.85
Geocentric distance (AU)	.8109
Heliocentric distance (AU)	.8344
Radial geocentric velocity (km/s)	-7.33
Radial heliocentric velocity (km/s)	15.25
Angle Sun-Earth-comet (deg)	53.9
Angle Sun-comet-Earth (deg)	74.3
Position angle of prolonged radius vector (deg)	92.0
Position angle of negative orbital velocity vector (deg)	319.3
Angle comet-Earth-Moon (deg)	60.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
12.48785	100090	3 6 36.87	- 8 54 20.4		
12.73264	100089	3 8 12.12	- 9 1 45.5		

AN #	System	Notes	Observer(s)
100090	13230000	A	Birch,P. et al.
100089	10690000		Alksnis,A

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
12.7800	800348	S	8.9	SAO	3.0	3						

AON #	Tel.	Instrument	f/	Pwr. Lim.	DA	OS	Notes	Observer(s)
800348	.26	Newtonian	6	63			A	Merlin,J.C.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 9.866
Declination (eq. 1950.0; deg,arcmin)	- 9 8.90
Geocentric distance (AU)	.8069
Heliocentric distance (AU)	.8433
Radial geocentric velocity (km/s)	-6.70
Radial heliocentric velocity (km/s)	15.74
Angle Sun-Earth-comet (deg)	54.7
Angle Sun-comet-Earth (deg)	74.0
Position angle of prolonged radius vector (deg)	92.7
Position angle of negative orbital velocity vector (deg)	319.2
Angle comet-Earth-Moon (deg)	72.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
13.48576	100088	3 12 56.09	- 9 22 25.4		
13.60317	100087	3 13 41.06	- 9 25 56.4		
13.61590	100086	3 13 45.95	- 9 26 22.1		

AN #	System	Notes	Observer(s)
100088	13230000	A	Birch,P. et al.
100087	12140000		Gorodetskij,D
100086	12140000		Gorodetskij,D

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 16.207
Declination (eq. 1950.0; deg,arcmin)	- 9 36.79
Geocentric distance (AU)	.8032
Heliocentric distance (AU)	.8526
Radial geocentric velocity (km/s)	-6.07
Radial heliocentric velocity (km/s)	16.22
Angle Sun-Earth-comet (deg)	55.4
Angle Sun-comet-Earth (deg)	73.7
Position angle of prolonged radius vector (deg)	93.3
Position angle of negative orbital velocity vector (deg)	319.0
Angle comet-Earth-Moon (deg)	83.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
14.77436	100085	3 21 7.81	- 9 58 8.0		

AN #	System	Notes	Observer(s)
100085	10510000		Churms,J

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

14.84 UT
N W=- FILE=600035 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.325 JY/BEAM
OBS = E. Scalise and Z. Abraham

 DATE: 15 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 22.578
Declination (eq. 1950.0; deg,arcmin)	-10 4.44
Geocentric distance (AU)	.7999
Heliocentric distance (AU)	.8620
Radial geocentric velocity (km/s)	-5.42
Radial heliocentric velocity (km/s)	16.67
Angle Sun-Earth-comet (deg)	56.2
Angle Sun-comet-Earth (deg)	73.4
Position angle of prolonged radius vector (deg)	94.0
Position angle of negative orbital velocity vector (deg)	318.9
Angle comet-Earth-Moon (deg)	96.1

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

15.85 UT
N W=- FILE=600036 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.585 JY/BEAM
OBS = E. Scalise and Z. Abraham

DATE: 18 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 41.859
Declination (eq. 1950.0; deg,arcmin)	-11 25.51
Geocentric distance (AU)	.7922
Heliocentric distance (AU)	.8920
Radial geocentric velocity (km/s)	-3.45
Radial heliocentric velocity (km/s)	17.88
Angle Sun-Earth-comet (deg)	58.6
Angle Sun-comet-Earth (deg)	72.2
Position angle of prolonged radius vector (deg)	95.7
Position angle of negative orbital velocity vector (deg)	318.2
Angle comet-Earth-Moon (deg)	130.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
18.73958	100084	3 46 38.43	-11 45	4.6	

AN #	System	Notes	Observer(s)
100084	10690000		Shimanskij

DATE: 19 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 48.335
Declination (eq. 1950.0; deg,arcmin)	-11 51.72
Geocentric distance (AU)	.7904
Heliocentric distance (AU)	.9024
Radial geocentric velocity (km/s)	-2.79
Radial heliocentric velocity (km/s)	18.25
Angle Sun-Earth-comet (deg)	59.4
Angle Sun-comet-Earth (deg)	71.7
Position angle of prolonged radius vector (deg)	96.2
Position angle of negative orbital velocity vector (deg)	317.9
Angle comet-Earth-Moon (deg)	139.9

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
19.000	200003A	J	11.4	±0.1	30	.000	.000		1
19.000	200003B	H	11.0	±0.1	30	.000	.000		1
19.000	200003C	K	11.0	±0.1	30	.000	.000		1
19.000	200004	J	>13.4		10	.000	.000		

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec	Or	FT	Notes	System	Observer(s)
200003A	60				7	A	28090000	Engels,D/Encrenaz,T
200003B	60				7	A	28090000	Engels,D/Encrenaz,T
200003C	60				7	A	28090000	Engels,D/Encrenaz,T
200004	20				6	AB	28090000	Krautter,J et al.

NOTE A Approximate time
NOTE B Additional observer: Encrenaz, T
COMMENT (20004) Flux is possibly underestimated because the throw was only 20 arcsec

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
19.9300	800349	B	8.7	SAO	2.1	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800349	.07	Binoculars		10					De Assis Neto,V.F.

DATE: 20 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	3 54.832
Declination (eq. 1950.0; deg,arcmin)	-12 17.44
Geocentric distance (AU)	.7890
Heliocentric distance (AU)	.9131
Radial geocentric velocity (km/s)	-2.12
Radial heliocentric velocity (km/s)	18.59
Angle Sun-Earth-comet (deg)	60.2
Angle Sun-comet-Earth (deg)	71.2
Position angle of prolonged radius vector (deg)	96.7
Position angle of negative orbital velocity vector (deg)	317.6
Angle comet-Earth-Moon (deg)	146.3

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
20.00347	100083	3 54 50.80	-12 17 27.6		
20.02431	100082	3 54 58.95	-12 17 59.5		
20.48090	100081	3 57 57.23	-12 29 33.7		
20.49861	100080	3 58 4.35	-12 29 57.4		
20.62800	100079	3 58 55.29	-12 33 24.0		

AN #	System	Notes	Observer(s)
100083	18090000	A	Schuster,H.E
100082	18090000	A	Schuster,H.E
100081	13230000	B	Birch,P. et al.
100080	13230000	B	Birch,P. et al.
100079	11900000		Gerasimenko,S

NOTE A Comet not well defined, estimated accuracy 1 arcsec
NOTE B Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
20.02431	300001	38090400	ES05586	122.0	67.14	U.K. Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300001	6.5 x 6.5	098	GG-495	10.0	No	No	Schuster,H.E

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH OTHER FILTERS

Date(UT)	PPN #	Filter	Wavel.	Band	Mag.	Error
20.32950	500006	V			9.770	
20.32950	500006	B			10.760	
20.32950	500006	U			10.450	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500006	60.0			54830000	Budding,E
500006	60.0			54830000	Budding,E
500006	60.0			54830000	Budding,E

COMMENT Local magnitudes, not in standard UBV system
TELESCOPE 0.4 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
20.1700	800350	S	8.2	AA	10	3						
20.1700	800351	M	8.5	SAO	5	4						
20.4200	800352	S	8.2		5	3						
20.5000	800353	S	8.6	AA	4	2						
20.9300	800354	B	8.7	SAO	2.1	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800350	.08	Binoculars		20	7.0	Y	3	A	Morris,C.S.
800351	.20	Newtonian	6	61	7.0	Y	3		Morris,C.S.
800352	.08	Binoculars		15	5.0	Y	1		Price,R.T.
800353	.15	Newtonian	5	30	5.7	Y			Pearce,A.
800354	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A Flare?

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 1.347
Declination (eq. 1950.0; deg,arcmin)	-12 42.61
Geocentric distance (AU)	.7879
Heliocentric distance (AU)	.9239
Radial geocentric velocity (km/s)	-1.44
Radial heliocentric velocity (km/s)	18.91
Angle Sun-Earth-comet (deg)	61.1
Angle Sun-comet-Earth (deg)	70.7
Position angle of prolonged radius vector (deg)	97.2
Position angle of negative orbital velocity vector (deg)	317.3
Angle comet-Earth-Moon (deg)	148.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
21.15025	100078	4 2 19.12	-12 46 29.3		
21.51389	100077	4 4 41.55	-12 55 14.1		

AN #	System	Notes	Observer(s)
100078	16750000		Gibson,J
100077	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
21.121	200005	N	2.28	±0.05	11.	.119	.122	2.37	2,3
21.127	200005	M	6.09	±0.3	11.	.126	.128	2.52	2,3

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec	Or	FT	Notes	System	Observer(s)
200005	30 NS	0.0	0.0	1	5		26950000	Joyce,R/Campins,H
200005	30 NS	0.0	0.0	1	5		26950000	Joyce,R/Campins,H

WEATHER Clear
SEEING 3 arcsec
ORIGIN=1 Nucleus

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
21.4900	800355	S	8.9	AA	3.7	3						
21.5300	800356	S	7.6		2.8	4						
21.5500	800357	S	8.5	AA	3.5	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800355	.15	Newtonian	5	30	5.5	Y			Pearce,A.
800356	.41	Newtonian	4.2	86	14.8	Y	1	A	Clark,M.L.
800357	.15	Newtonian	5	30	5.5	Y			Pearce,A.

NOTE A Getting diffuse. (F. star prob. telescopic, not vis. Ed.)

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 7.877
Declination (eq. 1950.0; deg,arcmin)	-13 7.21
Geocentric distance (AU)	.7873
Heliocentric distance (AU)	.9349
Radial geocentric velocity (km/s)	-.76
Radial heliocentric velocity (km/s)	19.22
Angle Sun-Earth-comet (deg)	61.9
Angle Sun-comet-Earth (deg)	70.1
Position angle of prolonged radius vector (deg)	97.7
Position angle of negative orbital velocity vector (deg)	317.0
Angle comet-Earth-Moon (deg)	146.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
22.13647	100076	4 8 45.65	-13 10 38.9		
22.48029	100075	4 11 .53	-13 18 44.2		
22.49696	100074	4 11 6.49	-13 19 9.8		
22.61256	100073	4 11 51.99	-13 22 8.2		

AN #	System	Notes	Observer(s)
100076	16750000		Gibson,J
100075	13300000		Yang,J.X
100074	13300000		Yang,J.X
100073	12140000		Gorodetskij,D

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
22.5100	800358	S	8.6	AA	4	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800358	.15	Newtonian	5	30	5.7	Y			Pearce,A.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 14.419
Declination (eq. 1950.0; deg,arcmin)	-13 31.17
Geocentric distance (AU)	.7871
Heliocentric distance (AU)	.9461
Radial geocentric velocity (km/s)	-.08
Radial heliocentric velocity (km/s)	19.51
Angle Sun-Earth-comet (deg)	62.8
Angle Sun-comet-Earth (deg)	69.5
Position angle of prolonged radius vector (deg)	98.1
Position angle of negative orbital velocity vector (deg)	316.6
Angle comet-Earth-Moon (deg)	141.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
23.11806	100072	4 15 11.28	-13 34 3.0		
23.12014	100071	4 15 11.96	-13 34 6.0		
23.12222	100070	4 15 12.88	-13 34 10.5		
23.12431	100069	4 15 13.87	-13 34 13.3		
23.50139	100068	4 17 41.46	-13 42 45.9		
23.59503	100067	4 18 19.54	-13 45 7.0		
23.60727	100066	4 18 23.52	-13 45 26.1		

AN #	System	Notes	Observer(s)
100072	16880000		Skiff,B.A
100071	16880000		Skiff,B.A
100070	16880000		Skiff,B.A
100069	16880000		Skiff,B.A
100068	13230000	A	Birch,P. et al.
100067	12140000		Gorodetskij,D
100066	12140000		Gorodetskij,D

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
23.79167	300002	35000702	CA0707	41.0	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300002	4.2 x 4.2	103a-O	None	18.0	No	No	Cristaldi,S.

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
23.65420	500012		5140	40	4.5	1.5	11	10

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500012	44.6			52000000	Kiselev,N/Chernova,G

COMMENT IHW standard filters
TELESCOPE 1.02 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: SPECTRAL LINE

23.81 UT LINE= H2O 6(1,6)-5(2,3) RESTF= 22235.080 MHz
N W=- FILE=600037 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/FB F= 22235.080 B= 500.000 R= 100.0 TS= - TR=1000
UPPER LIMIT = 26.000 JY/BEAM
OBS = E. Scalise and Z. Abraham

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
23.1600	800359	S	8.6	AA	8	2						
23.1600	800360	M	8.9	SAO		3						
23.9500	800361	B	8.4	SAO	4.5	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800359	.08	Binoculars		20	6.5	Y	3		Morris,C.S.
800360	.20	Newtonian	6	61	6.5	Y	3		Morris,C.S.
800361	.07	Binoculars		10					De Assis Neto,V.F.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 20.971
Declination (eq. 1950.0; deg,arcmin)	-13 54.47
Geocentric distance (AU)	.7872
Heliocentric distance (AU)	.9575
Radial geocentric velocity (km/s)	.60
Radial heliocentric velocity (km/s)	19.78
Angle Sun-Earth-comet (deg)	63.6
Angle Sun-comet-Earth (deg)	68.9
Position angle of prolonged radius vector (deg)	98.5
Position angle of negative orbital velocity vector (deg)	316.2
Angle comet-Earth-Moon (deg)	134.5

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
24.04067	100065	4 21 13.53	-13 55 16.4		
24.60572	100064	4 24 56.05	-14 8 23.9		

AN #	System	Notes	Observer(s)
100065	18080000		
100064	12140000		Gorodetskij,D

- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
24.77153	300003	35000702	CA0708	41.0	169.0	Schmidt	DS
24.80104	300004	35000702	CA0709	41.0	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300003	4.2 x 4.2	103a-O	None	20.0	No	No	Cristaldi,S
300004	4.2 x 4.2	103a-F	RG-610/2	25.0	No	No	Cristaldi,S

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
24.51100	500002	3650	Cont	-13.430	
24.51100	500002	3871	CN	-9.899	
24.51100	500002	4060	C_3	-10.770	
24.51100	500002	4845	Cont	-12.956	
24.51100	500002	5140	C_2	-9.865	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500002	141.0			53230000	Birch,P
500002	141.0			53230000	Birch,P
500002	141.0			53230000	Birch,P
500002	141.0			53230000	Birch,P
500002	141.0			53230000	Birch,P

TELESCOPE 0.6 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

24.70 UT
N W=- FILE=600038 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.455 JY/BEAM
OBS = E. Scalise and Z. Abraham

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
24.0300	800362	S	9.5	AC	3.5	1						
24.0420	800363	S	9.7	R Lep	2.5							
24.4300	800364	S	9 :			2						
24.5000	800365	S	8.8	AA	3.5	2						
24.9500	800366	S	9.2	SAO	2.0							

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800362	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.
800363	.15	Refractor	5	31	5.0	N	2		Morrison,W.C.
800364	.08	Binoculars		15	6	Y	1		Seargent,D.A.J.
800365	.15	Newtonian	5	30	5.7	Y			Pearce,A.
800366	.07	Binoculars		10					De Assis Neto,V.F.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 27.529
Declination (eq. 1950.0; deg,arcmin)	-14 17.06
Geocentric distance (AU)	.7878
Heliocentric distance (AU)	.9690
Radial geocentric velocity (km/s)	1.29
Radial heliocentric velocity (km/s)	20.04
Angle Sun-Earth-comet (deg)	64.5
Angle Sun-comet-Earth (deg)	68.3
Position angle of prolonged radius vector (deg)	98.8
Position angle of negative orbital velocity vector (deg)	315.8
Angle comet-Earth-Moon (deg)	126.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
25.47604	100063	4 30 38.76	-14 27 33.9		
25.60443	100062	4 31 29.52	-14 30 6.1		
25.64759	100061	4 31 42.91	-14 31 23.3		
25.76403	100060	4 32 30.98	-14 33 48.6		

AN #	System	Notes	Observer(s)
100063	13230000	A	Birch,P. et al.
100062	12140000		Gorodetskij,D
100061	11860000		Rakhmatov,E
100060	10710000		Shkodrov,V

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
25.77500	300005	35000702	CA0710	41.0	169.0	Schmidt	DS
25.80729	300006	35000702	CA0711	41.0	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300005	4.2 x 4.2	103a-F	RG-610/2	30.0	No	No	Cristaldi,S
300006	4.2 x 4.2	103a-O	GG-385/2	15.0	No	No	Cristaldi,S

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
25.51100	500017	3650	Cont	-13.530	
25.51100	500017	3871	CN	-9.992	
25.51100	500017	4060	C_3	-10.669	
25.51100	500017	4845	Cont	-13.020	
25.51100	500017	5140	C_2	-9.868	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500017	141.0			53230000	Birch,P
500017	141.0			53230000	Birch,P
500017	141.0			53230000	Birch,P
500017	141.0			53230000	Birch,P
500017	141.0			53230000	Birch,P

TELESCOPE 0.6 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: SPECTRAL LINE

25.89 UT LINE= H2O 6(1,6)-5(2,3) RESTF= 22235.080 MHz
N W=- FILE=600040 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/FB F= 22235.080 B= 500.000 R= 100.0 TS= - TR=1000
UPPER LIMIT = 21.500 JY/BEAM
OBS = E. Scalise and Z. Abraham

SUB-NETWORK: CONTINUUM

25.00 UT
N W=- FILE=600041 CLRO BORREGO SPRINGS CA SYSCODE= 65001607
TEL = ARRAY E= - BW= 13.9 (1.14, 0) OFF=(0.00, 0) PE= -
INS = SPEC/SPEC F= 30.900 B= 0.750 R= - TS= - TR= -
UPPER LIMIT = 60.000 JY/BEAM
OBS = T. Gergely and W. Erickson

25.73 UT
N W=- FILE=600039 ROI ATIBAIA BRAZIL SYSCODE= 65000201
TEL = 14M E=0.38 BW= 4.5 (1.00, 0) OFF=(0.00, 0) PE= 12
INS = MIXER/CONT F= 22200.000 B= 500.000 R= - TS= - TR=1000
UPPER LIMIT = 0.390 JY/BEAM
OBS = E. Scalise and Z. Abraham

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
25.0400	800367	S	9.2	AC	4.5	1						
25.1800	800368	S	8.9	AA	6.7	1						
25.1800	800369	S	9.2	AA	3.4	2						
25.1833	800370	S	9.0	SAO	4	1						
25.4900	800371	S	8.9	AA	3.5	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800367	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.
800368	.08	Binoculars		20	7.0	Y	3		Morris,C.S.
800369	.26	Newtonian	4.5	45	7.0	Y	3		Morris,C.S.
800370	.25	Newtonian	3.8	32			1		Machholz,D.
800371	.15	Newtonian	5	30	5.8	Y			Pearce,A.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 34.088
Declination (eq. 1950.0; deg,arcmin)	-14 38.92
Geocentric distance (AU)	.7887
Heliocentric distance (AU)	.9806
Radial geocentric velocity (km/s)	1.97
Radial heliocentric velocity (km/s)	20.28
Angle Sun-Earth-comet (deg)	65.4
Angle Sun-comet-Earth (deg)	67.6
Position angle of prolonged radius vector (deg)	99.2
Position angle of negative orbital velocity vector (deg)	315.4
Angle comet-Earth-Moon (deg)	118.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
26.01443	100059	4 34 10.84	-14 39 10.4		
26.38490	100058	4 36 34.93	-14 46 45.4		
26.41088	100057	4 36 46.41	-14 47 38.1		
26.42436	100056	4 36 51.67	-14 47 54.5		
26.44119	100055	4 36 58.57	-14 48 24.8		
26.46603	100054	4 37 7.88	-14 48 48.5		
26.47708	100053	4 37 12.66	-14 49 .5		
26.50312	100052	4 37 22.75	-14 49 34.1		
26.61337	100051	4 38 6.35	-14 52 4.6		
26.62753	100050	4 38 11.72	-14 52 22.8		

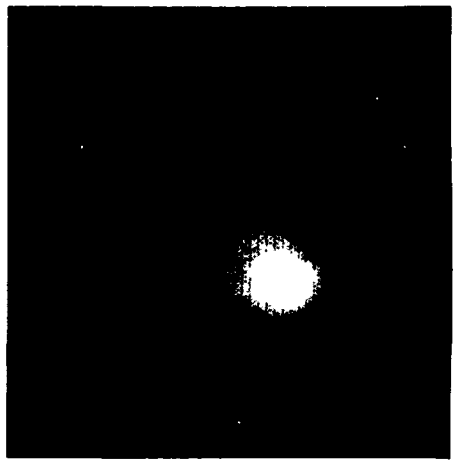
AN #	System	Notes	Observer(s)
100059	18080000		Sanguin,J.G
100058	14130000		Russell,K
100057	14130000		Russell,K
100056	14130000		Russell,K
100055	13810000		Kosai,H
100054	14130000		Russell,K
100053	13230000	A	Birch,P. et al.
100052	13230000	A	Birch,P. et al.
100051	12140000		Gorodetskij,D
100050	12140000		Gorodetskij,D

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

NETWORK: NEAR NUCLEUS STUDIES

Date(UT)	NNSN #	Filter	Exp.	Detector	Scale	Tel.	System	Observer(s)
26.1234	400002	V	5.0	RCA CCD	30.00	.90	46950501	Belton

NNSN # 400002



Linear scale: bar = 20,000 km
North is up, East to left

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
26.51400	500021	3871	CN	-9.970	
26.51400	500021	4060	C_3	-10.870	
26.51400	500021	4845	Cont	-13.053	
26.51400	500021	5140	C_2	-9.907	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500021	141.0			53230000	Birch,P
500021	141.0			53230000	Birch,P
500021	141.0			53230000	Birch,P
500021	141.0			53230000	Birch,P

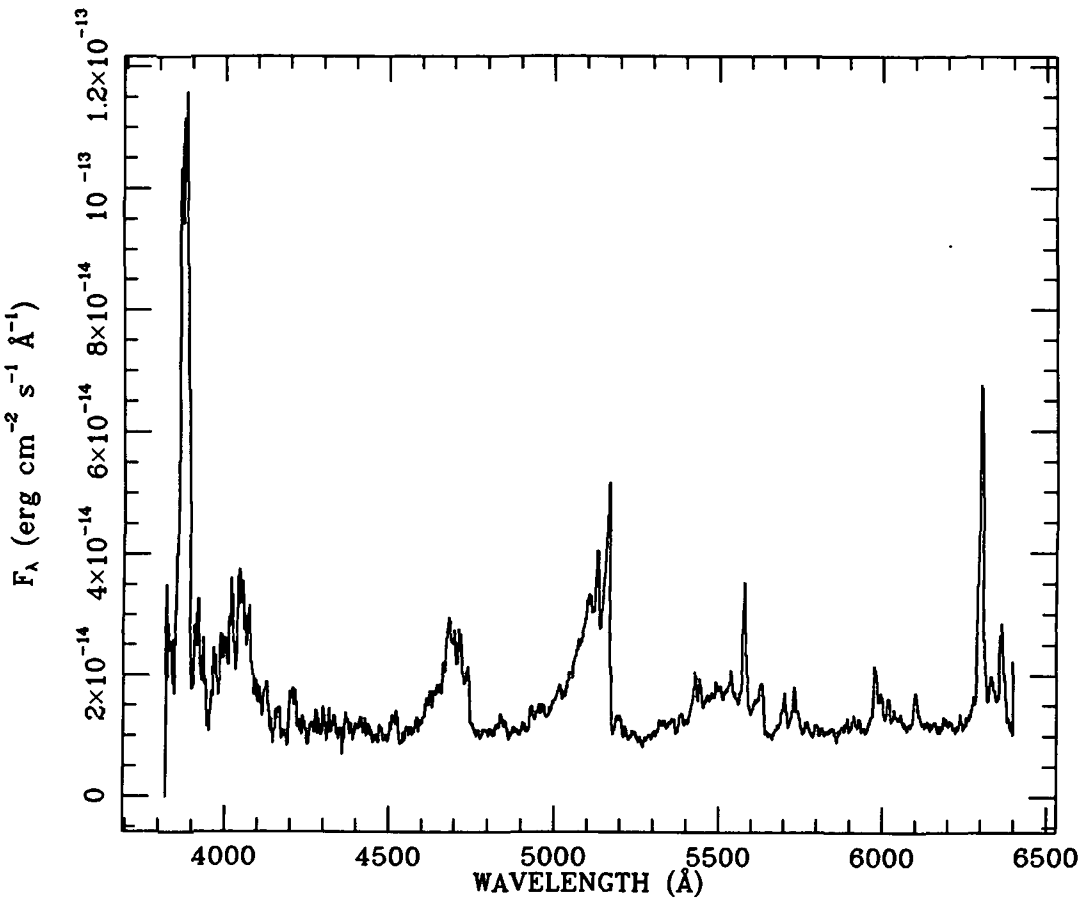
TELESCOPE 0.6 m

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
26.12153	700014	9	3820-6400	4	2,3	24.0	1	Y Spect/IDS/600gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700014	Reduced digital	.0			7.46	76880101	Lutz,B/Wagner,M

SSN # 700014



- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m!	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
26.0000	800372	B	8.4									
26.4300	800373	S	9.3		4	2						
26.5000	800374	S	9.0	AA	3.5	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800372	.11	Refractor	10.5	29					Ferrin,I.
800373	.08	Binoculars		15	6.1	Y	1	A	Seargent,D.A.J.
800374	.15	Newtonian	5	30	5.8	Y			Pearce,A.

NOTE A Coma diameter uncertain

 DATE: 27 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 40.646
Declination (eq. 1950.0; deg,arcmin)	-15 .02
Geocentric distance (AU)	.7900
Heliocentric distance (AU)	.9924
Radial geocentric velocity (km/s)	2.66
Radial heliocentric velocity (km/s)	20.50
Angle Sun-Earth-comet (deg)	66.2
Angle Sun-comet-Earth (deg)	67.0
Position angle of prolonged radius vector (deg)	99.5
Position angle of negative orbital velocity vector (deg)	315.0
Angle comet-Earth-Moon (deg)	110.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.02282	100049	4 40 46.75	-15 0 34.8		
27.03324	100048	4 40 50.52	-15 0 39.4		
27.47708	100047	4 43 45.97	-15 9 46.2		

AN #	System	Notes	Observer(s)
100049	18110000		Silverwood,D
100048	18080000		Sanguin,J.G
100047	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
27.244	200006A	H	13.38	±0.04	6.2	.244	.244	1.86	4,5
27.248	200006B	K	13.14	±0.10	6.2	.248	.248	1.92	4,5
27.251	200006C	J	13.68	±0.08	6.2	.251	.251	1.97	4,5

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec	Or	FT	Notes	System	Observer(s)
200006A	55 EW	0.0	0.0	1	3		25680000	Eaton,N/Zarnecki,J
200006B	55 EW	0.0	0.0	1	3		25680000	Eaton,N/Zarnecki,J
200006C	55 EW	0.0	0.0	1	3		25680000	Eaton,N/Zarnecki,J

WEATHER Volcanic haze
ORIGIN=1 Is nucleus

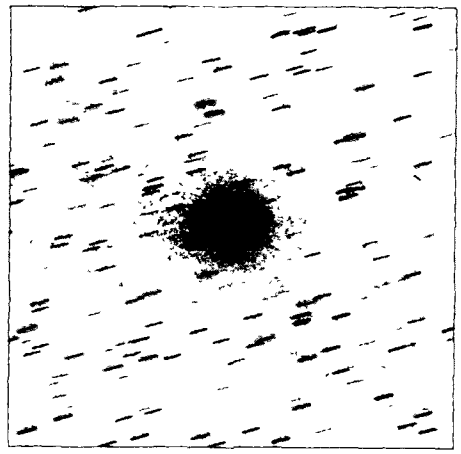
- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
27.01389	300020	38070500	CS26645	0.61	97.0	Curtis Schmidt	A
27.02281	300018	38110100	NA7280	0.19	248.0	Cooke Triplet	DS
27.77708	300007	35000702	CA0712	0.41	169.0	Schmidt	DS
27.80034	300013	35000702	CA0713	0.41	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300020	5.0 x 5.0	IIIa-F	None	20.0	Yes	Yes	Liller,W
300018	14.0 x 17.0	103a-O	None	30.0	No	No	Belserene,E
300007	4.2 x 4.2	103a-F	RG-610/2	20.0	No	No	Cristaldi,S
300013	4.2 x 4.2	103a-O	GG-385/2	15.0	No	No	Cristaldi,S

LSPN # 300020



Linear scale: bar = 500,000 km
North is up, East to left

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
27.0300	800375	S	9.1	AC	3.5	1						
27.4100	800376	S	8.6	AA	4	2						
27.4300	800377	S	9.4			2						
27.5000	800378	S	9.0	AA	3.2	2						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800375	.32	Newtonian	5.6	68	6.5	Y	1		Bortle,J.
800376	.08	Binoculars		15	5.5	Y	1		Price,R.T.
800377	.08	Binoculars		15	6.1	Y	1		Seargent,D.A.J.
800378	.15	Newtonian	5	30	5.8	Y			Pearce,A.

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 47.199
Declination (eq. 1950.0; deg,arcmin)	-15 20.32
Geocentric distance (AU)	.7918
Heliocentric distance (AU)	1.0043
Radial geocentric velocity (km/s)	3.34
Radial heliocentric velocity (km/s)	20.72
Angle Sun-Earth-comet (deg)	67.1
Angle Sun-comet-Earth (deg)	66.3
Position angle of prolonged radius vector (deg)	99.8
Position angle of negative orbital velocity vector (deg)	314.6
Angle comet-Earth-Moon (deg)	102.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
28.00521	100046	4 47 13.89	-15 20 29.5		
28.48233	100045	4 50 20.43	-15 30 1.4	13.0	
28.49656	100044	4 50 25.87	-15 30 13.9	13.0	
28.50802	100043	4 50 31.09	-15 30 27.7	13.0	
28.70380	100042	4 51 48.18	-15 34 12.3		
28.75590	100041	4 52 8.25	-15 35 9.1		

AN #	System	Notes	Observer(s)
100046	18010000		McCrosky,R.E
100045	13300000		Yang,J.X
100044	13300000		Yang,J.X
100043	13300000		Yang,J.X
100042	11150000		Tselishchev,I.E
100041	10710000		Shkodrov,V

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
28.234	200007A	N	3.49	±0.10	5.1	.234	.234	1.72	3
28.238	200007B	Q	>1.7		5.1	.238	.238	1.76	3
28.242	200007C	M	7.50	±0.53	5.1	.242	.242	1.81	3
28.245	200007D	8.7	3.90	±0.10	5.1	.245	.245	1.86	3
28.249	200007E	12.5	2.59	±0.10	5.1	.249	.249	1.92	3
28.254	200007F	N	3.45	±0.10	5.1	.254	.254	1.99	3
28.258	200007G	8.7	4.05	±0.10	5.1	.258	.258	2.06	3
28.262	200007H	12.5	2.45	±0.10	5.1	.262	.262	2.14	3

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec	Or	FT	Notes	System	Observer(s)
200007A	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007B	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007C	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007D	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007E	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007F	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007G	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J
200007H	39 EW	0.0	0.0	1	4		25680000	Eaton,N/Zarnecki,J

WEATHER Volcanic haze
ORIGIN=1 Nucleus

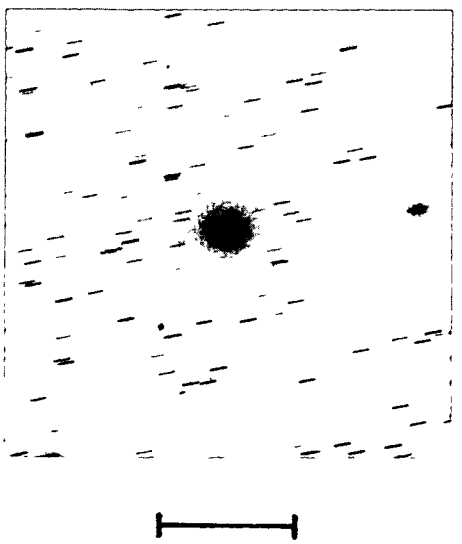
- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
28.04167	300021	38070500	CS26661	0.61	97.0	Curtis Schmidt	A
28.77292	300014	35000702	CA0715	0.41	169.0	Schmidt	DS
28.79201	300015	35000702	CA0716	0.41	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300021	5.0 x 5.0	IIa-O	GG-385	20.0	Yes	Yes	Liller,W
300014	4.2 x 4.2	103a-F	RG-610/2	20.0	No	No	Cristaldi,S
300015	4.2 x 4.2	103a-O	GG-385/2	20.0	No	No	Cristaldi,S

LSPN # 300021

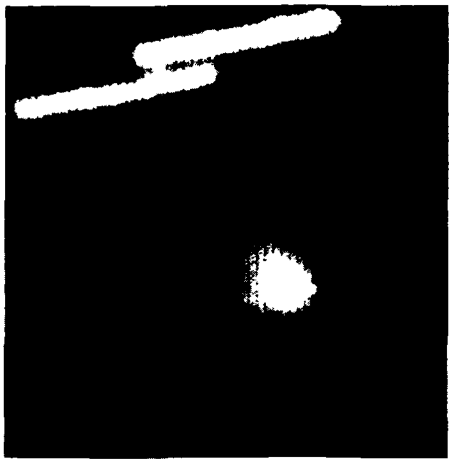


Linear scale: bar = 500,000 km
North is up, East to left

NETWORK: NEAR NUCLEUS STUDIES

Date(UT)	NNSN #	Filter	Exp.	Detector	Scale	Tel.	System	Observer(s)
28.13803	400005	R	10.0	RCA CCD	30.00	.90	46950501	Belton

NNSN # 400005



Linear scale: bar = 20,000 km
North is up, East to left

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
28.1800	800379	S	8.7	AA	9	1						
28.1800	800380	M	8.9	AA	7	2						
28.4400	800381	S	9.8									
28.4600	800382	S	8.8	AA	3	2						
28.9400	800383	B	8.9	SAO	3.2	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800379	.08	Binoculars		20	7.0	Y	3		Morris,C.S.
800380	.26	Newtonian	4.5	45	7.0	Y	3		Morris,C.S.
800381	.25	Newtonian	5	40		Y			Newman,R.
800382	.08	Binoculars		15	5.5	Y	1	A	Price,R.T.
800383	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A Averted vision

DATE: 29 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	4 53.743
Declination (eq. 1950.0; deg,arcmin)	-15 39.82
Geocentric distance (AU)	.7939
Heliocentric distance (AU)	1.0163
Radial geocentric velocity (km/s)	4.02
Radial heliocentric velocity (km/s)	20.91
Angle Sun-Earth-comet (deg)	68.0
Angle Sun-comet-Earth (deg)	65.6
Position angle of prolonged radius vector (deg)	100.1
Position angle of negative orbital velocity vector (deg)	314.1
Angle comet-Earth-Moon (deg)	94.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
29.47500	100040	4 56 50.48	-15 48 47.8		
29.47882	100039	4 56 51.57	-15 48 46.1	13.0	
29.64289	100038	4 57 58.82	-15 52 24.9		
29.71088	100037	4 58 22.94	-15 53 15.9		
29.73586	100036	4 58 32.28	-15 53 48.7		
29.73956	100035	4 58 33.76	-15 53 52.2		

AN #	System	Notes	Observer(s)
100040	13230000	A	Birch,P. et al.
100039	13300000		Wang,D.C/Ge,Y.L
100038	11900000		Gerasimenko,S
100037	11190000	B	Majsuradze,G
100036	10950000	B	Chernykh,N.S
100035	10950000		Chernykh,N.S

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M
NOTE B Faint central condensation, measurements uncertain

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
29.200	200008A	J	13.72	±0.10	7.3				7
29.200	200008B	H	13.14	±0.10	7.3				7
29.200	200008C	K	12.96	±0.10	7.3				7
29.200	200008D	N	2.97	±0.15	7.3				6

IRSN #	ChpThr.	Beam offset R.A.	Dec	Or	FT	Notes	System	Observer(s)
200008A	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke.,R
200008B	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200008C	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200008D	20 NS	0.0	0.0	2	2	BDEF	25680000	Hanner,M/Knacke,R

ERRORS	Estimated from repeatability, noise, and changes in sky transparency
ORIGIN=1	Position of visual image
ORIGIN=2	Position of peak signal
NOTE A	RC1 photometer used
NOTE B	Bolometer used
NOTE C	Airmass between 1.6-2.15
NOTE D	Airmass between 1.25-1.45
NOTE E	Daytime observation
NOTE F	This is a monochromatic magnitude. A correction of -0.05 mag, corresponding to a 290K blackbody and reference wavelength 10.1 microns, has been applied to the raw magnitude.
REFERENCE	For corrections to monochromatic magnitudes, see Hanner,M., et al. 1984,A.J.,89,162.

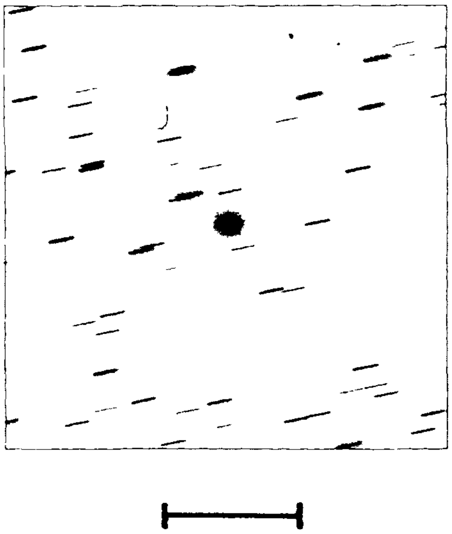
- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
28.02430	300022	38070500	CS26666	0.61	97.0	Curtis Schmidt	A

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300022	5.0 x 5.0	IIIa-J	GG-495	30.0	Yes	Yes	Liller,W

LSPN # 300022

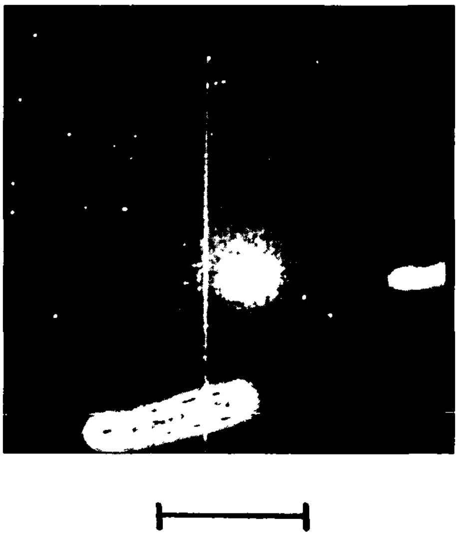


Linear scale: bar = 500,000 km
North is up, East to left

NETWORK: NEAR NUCLEUS STUDIES

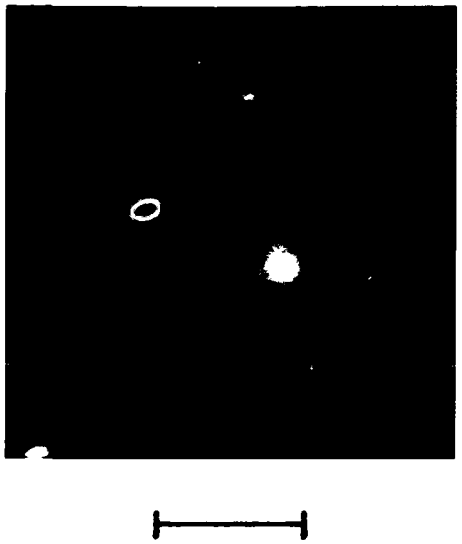
Date(UT)	NNSN #	Filter	Exp.	Detector	Scale	Tel.	System	Observer(s)
29.09803	400006	C2	8.3	RCA CCD	8.67	2.72	47110101	Green
29.13618	400007	ST "R"	1.0	TI CCD	26.70	1.54	46930101	Larson
29.14271	400008	ST "V"	2.0	TI CCD	26.70	1.54	46930101	Larson

NNSN # 400006



Linear scale: bar = 20,000 km
North is up, East to left

NNSN # 400007



Linear scale: bar = 20,000 km
North is up, East to left

NNSN # 400008

Linear scale: bar = 20,000 km
North is up, East to left

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: POLARIMETRY

Date(UT)	PPN #	Filter	Wavel.	Band	Polar.	Error	Angle	Error
29.52000	500004		7640	906	.9	±.2		

PPN #	Diaph.	Offset R.A. Dec.	System	Observer(s)
500004	12.6		55000000	Bastien,P

COMMENT No standard star measured for angle
TELESCOPE 1.6 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

29.00 UT

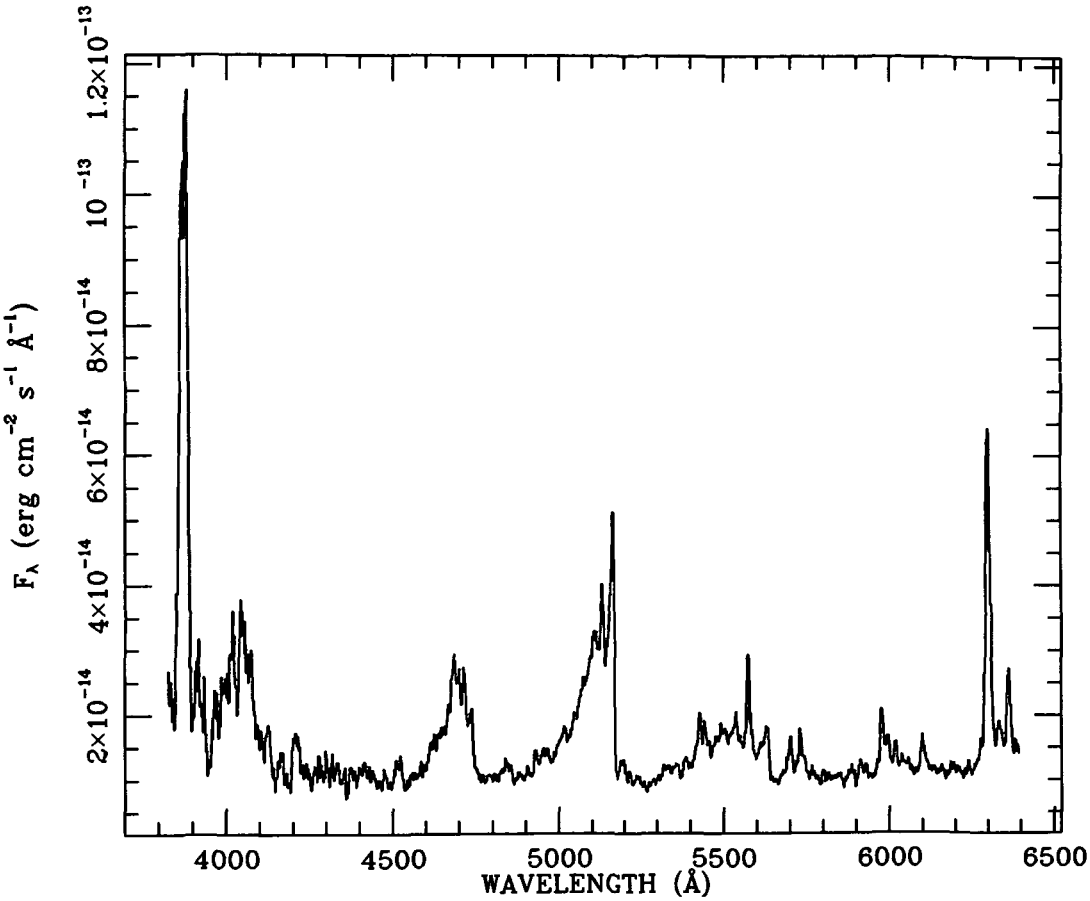
N W=- FILE=600042 CLRO BORREGO SPRINGS CA SYSCODE= 65001607
TEL = ARRAY E= - BW= 8.8 (1.24, 0) OFF=(0.00, 0) PE= -
INS = SPEC/SPEC F= 50.000 B= 1.500 R= - TS= - TR= -
UPPER LIMIT = 15.000 JY/BEAM
OBS = T. Gergely and W. Erickson

- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
29.09653	700015	9	3828-6394	4	4.5	20.0	1	Y Spect/IDS/600gpm

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700015	Reduced digital				7.46	76880101	Lutz,B/Wagner,M



NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
29.3900	800384	S	8.8		5	2						
29.4300	800385	S	9.8									
29.9500	800386	B	9.4	SAO	3.2	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800384	.08	Binoculars		15	5.5	Y	1	A	Price,R.T.
800385	.08	Binoculars		15	6	Y	1		Seargent,D.A.J.
800386	.07	Binoculars		10					De Assis Neto,V.F.

NOTE A Averted vision

DATE: 30 MAR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 .273
Declination (eq. 1950.0; deg,arcmin)	-15 58.48
Geocentric distance (AU)	.7964
Heliocentric distance (AU)	1.0284
Radial geocentric velocity (km/s)	4.70
Radial heliocentric velocity (km/s)	21.10
Angle Sun-Earth-comet (deg)	68.8
Angle Sun-comet-Earth (deg)	64.9
Position angle of prolonged radius vector (deg)	100.4
Position angle of negative orbital velocity vector (deg)	313.7
Angle comet-Earth-Moon (deg)	86.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)			Dec.			m_1	m_2
30.47361	100034	5	3	21.29	-16	6	57.4		
30.70663	100033	5	4	52.46	-16	11	18.4		
30.72135	100032	5	4	58.49	-16	11	26.2		
30.72816	100031	5	5	.77	-16	11	42.6		
30.73785	100030	5	5	4.40	-16	11	51.2		
30.74132	100029	5	5	5.59	-16	11	54.6		

AN #	System	Notes	Observer(s)
100034	13230000	A	Birch,P. et al.
100033	11190000		Maysuradze,G
100032	11190000		Maysuradze,G
100031	11150000	B	Tselischev,I.E
100030	10950000	C	Chernykh,N.S
100029	10950000	D	Chernykh,N.S

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M
NOTE B Faint central condensation, measurements uncertain

- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
30.01389	300011	38070500	CS26682	0.61	97.0	Curtis Schmidt	DS
30.76598	300016	35000702	CA0718	0.41	169.0	Schmidt	DS
30.78680	300017	35000702	CA0719	0.41	169.0	Schmidt	DS

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300011	5.0 x 5.0	IIIa-F	RG-610	30.0	Yes	Yes	Liller,W
300016	4.2 x 4.2	103a-F	RG-610/2	20.0	No	No	Cristaldi,S
300017	4.2 x 4.2	103a-O	GG-385/2	7.0	No	No	Cristaldi,S

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
30.53100	500022	3871	CN	-10.194	
30.53100	500022	4060	C_3	-10.850	
30.53100	500022	5140	C_2	-10.080	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500022	141.0			53230000	Birch,P
500022	141.0			53230000	Birch,P
500022	141.0			53230000	Birch,P

COMMENT Continuum flux negligible
TELESCOPE 0.6 m

- -

NETWORK: RADIO STUDIES

SUB-NETWORK: CONTINUUM

30.00 UT
N W=- FILE=600043 CLRO BORREGO SPRINGS CA SYSCODE= 65001607
TEL = ARRAY E= - BW= 8.8 (1.24, 0) OFF=(0.00, 0) PE= -
INS = SPEC/SPEC F= 50.000 B= 1.500 R= - TS= - TR= -
UPPER LIMIT = 25.000 JY/BEAM
OBS = T. Gergely and W. Erickson

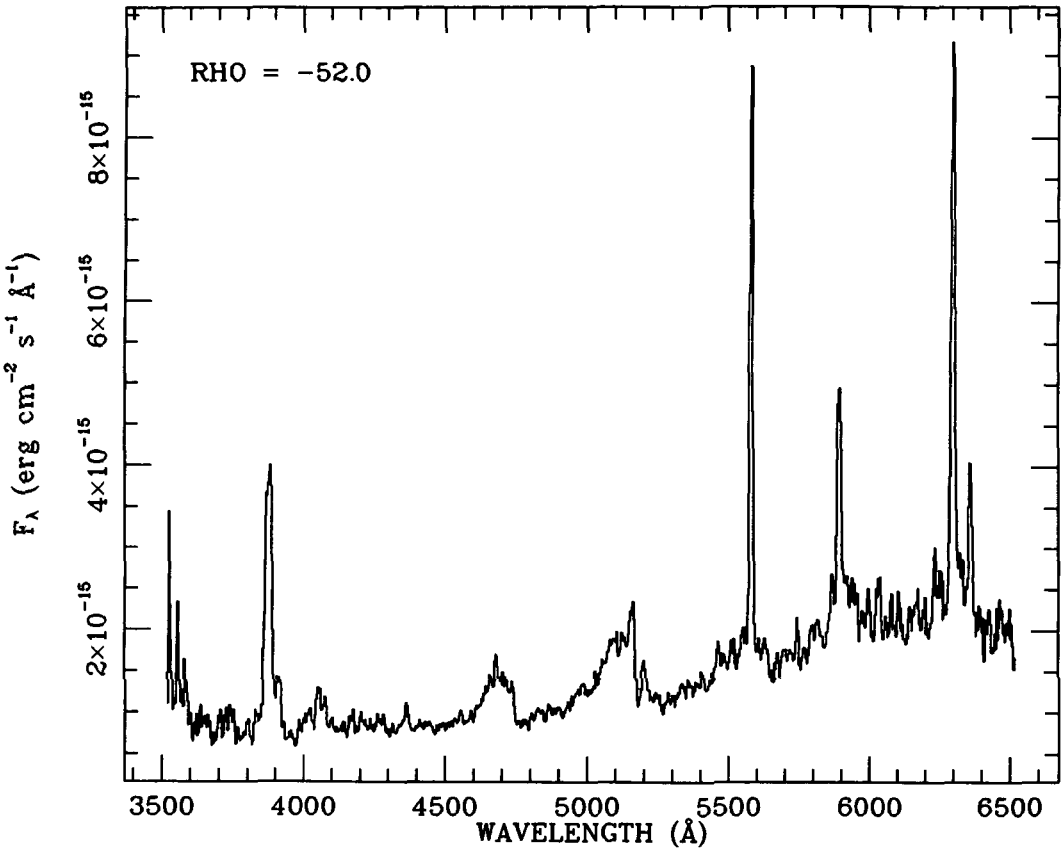
- -

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

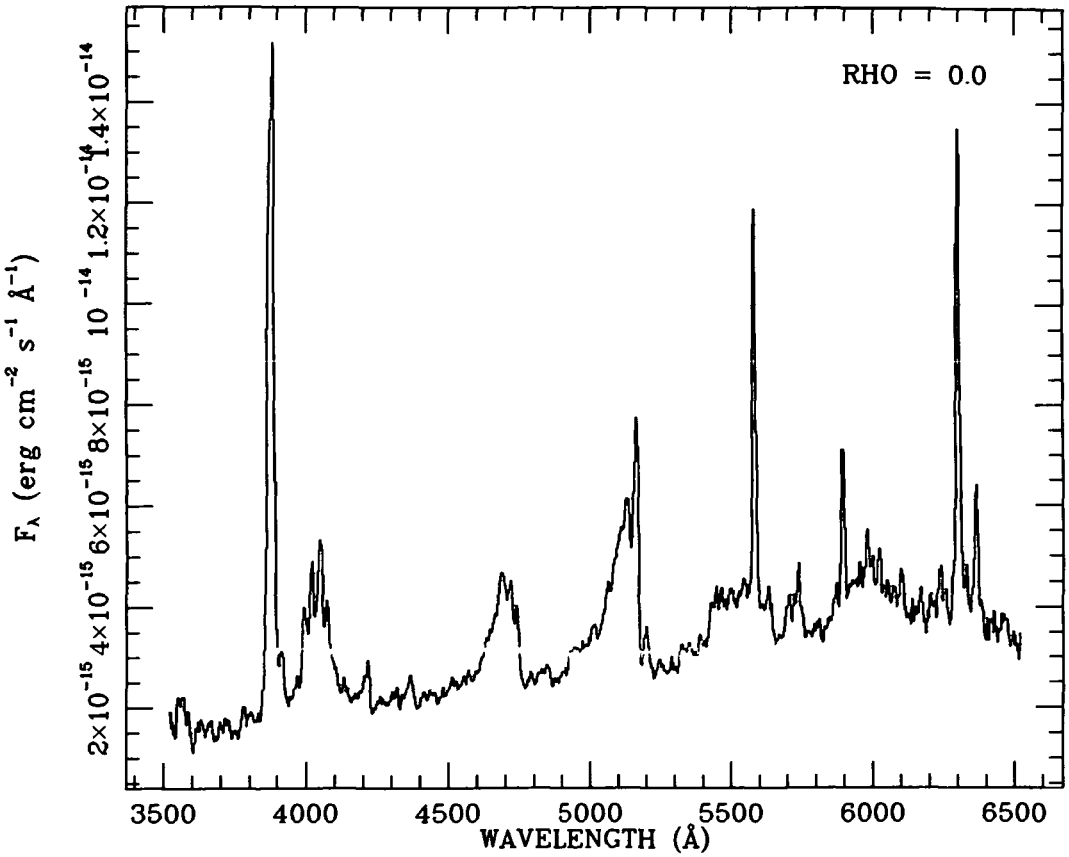
Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
30.11493	700016	11.5	3520-6520	3		30.0	2	Cass Spect/IDS blue chain

SSN #	Data type	Sep.	Orient.	P.A.	Apersize	System	Observer(s)
700016	Reduced digital			81	4.0x4.0	77110101	Cochran,A et al.

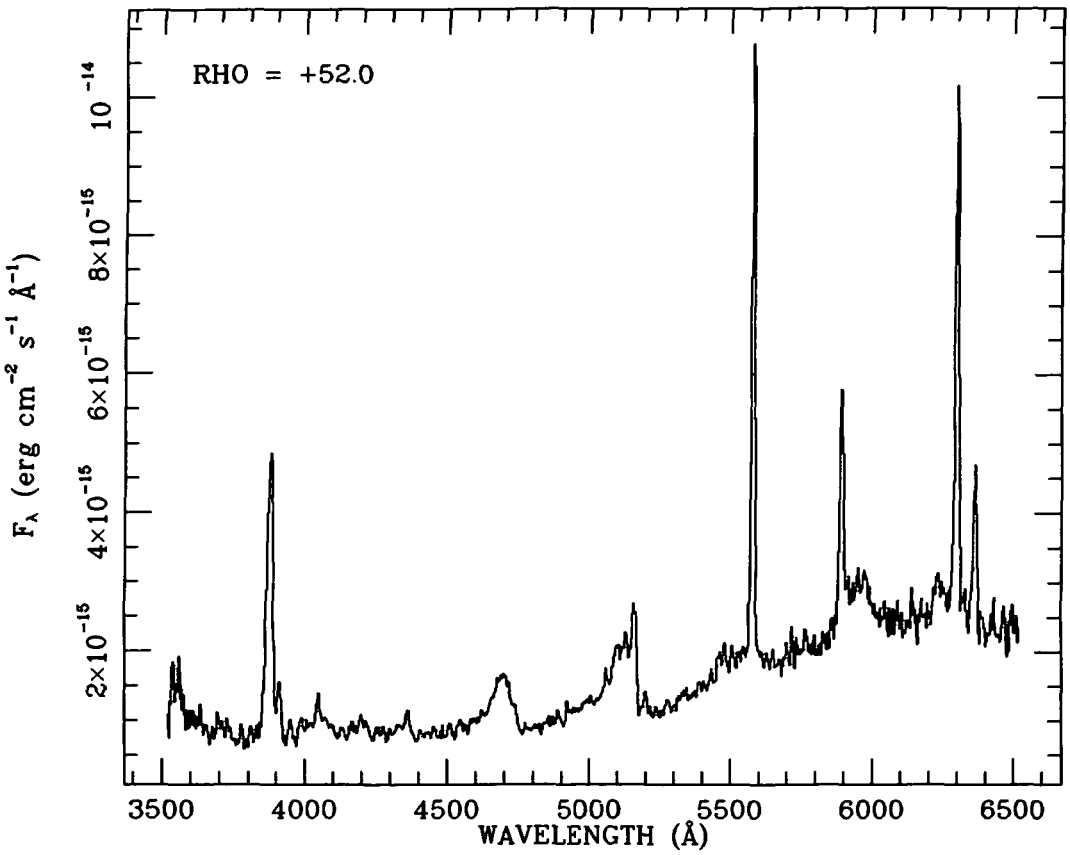
SSN # 700016



SSN # 700016 (cont.)



SSN # 700016 (cont.)



NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
30.4300	800387	S	10.0									
30.8200	800388	S	9.4	AAVSO	4.0	3						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800387	.08	Binoculars		15	6	Y	1		Seargent,D.A.J.
800388	.26	Newtonian	6	63				A	Merlin,J.C.

NOTE A Coma diameter uncertain

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 6.786
Declination (eq. 1950.0; deg,arcmin)	-16 16.30
Geocentric distance (AU)	.7993
Heliocentric distance (AU)	1.0407
Radial geocentric velocity (km/s)	5.38
Radial heliocentric velocity (km/s)	21.27
Angle Sun-Earth-comet (deg)	69.7
Angle Sun-comet-Earth (deg)	64.2
Position angle of prolonged radius vector (deg)	100.6
Position angle of negative orbital velocity vector (deg)	313.2
Angle comet-Earth-Moon (deg)	79.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
31.71777	100028	5 11 26.88	-16 28 40.5		
31.72226	100027	5 11 28.32	-16 28 45.7		
31.77220	100026	5 11 48.58	-16 29 34.9	9.8	
31.78125	100025	5 12 25.48	-16 29 34.9	9.8	

AN #	System	Notes	Observer(s)
100028	11190000		Majsuradze,G
100027	11190000		Majsuradze,G
100026	10530000		Toth,I
100025	10530000		Toth,I

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
31.200	200009A	J	13.88	0.12	7.3				7
31.200	200009B	H	13.38	0.10	7.3				7
31.200	200009C	K	13.21	0.10	7.3				7
31.200	200009D	L	10.60	0.12	7.3				7
31.200	200009E	M	7.96	0.12	7.3				8
31.200	200009F	8.7	3.67	0.10	7.3				6
31.200	200009G	N	3.05	0.08	7.3				6
31.200	200009H	10.3	3.08	0.10	7.3				6
31.200	200009I	Q	1.08	0.08	7.3				6

IRSN #	ChpThr.	Beam offset R.A.	Dec	Or	FT	Notes	System	Observer(s)
200009A	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200009B	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200009C	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200009D	20 NS	0.0	0.0	1	1	AC	25680000	Hanner,M/Knacke,R
200009E	20 NS	0.0	0.0	1	1	ACF	25680000	Hanner,M/Knacke,R
200009F	20 NS	0.0	0.0	2	2	BDE	25680000	Hanner,M/Knacke,R
200009G	20 NS	0.0	0.0	2	2	BDEG	25680000	Hanner,M/Knacke,R
200009H	20 NS	0.0	0.0	2	2	BDE	25680000	Hanner,M/Knacke,R
200009I	20 NS	0.0	0.0	2	2	BDEH	25680000	Hanner,M/Knacke,R

ERRORS Estimated from repeatability, noise, and changes in sky transparency
ORIGIN=1 Position of visual image
ORIGIN=2 Position of peak signal at nucleus
NOTE A RC1 photometer used
NOTE B Bolometer used
NOTE C Airmass between 1.6-2.15
NOTE D Airmass between 1.25-1.45
NOTE E Daytime observation
NOTE F This is a monochromatic magnitude. A correction of -0.05 mag, corresponding to a 290K blackbody and reference wavelength 4.8 microns, has been applied to the raw magnitude.
NOTE G This is a monochromatic magnitude. A correction of -0.05 mag, corresponding to a 290K blackbody and reference wavelength 10.1 microns, has been applied to the raw magnitude.
NOTE H This is a monochromatic magnitude. A correction of -0.04 mag, corresponding to a 290K blackbody and reference wavelength 20.0 microns, has been applied to the raw magnitude.
REFERENCE For corrections to monochromatic magnitudes, see Hanner,M., et al. 1984,A.J.,89,162.

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
31.1300	800389	S	9.2	SAO		1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800389	.15	Refractor	10	76	5.5	Y		A	Morris,C.S.

NOTE A Table Mt. Guide Telescope

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 13.277
Declination (eq. 1950.0; deg,arcmin)	-16 33.26
Geocentric distance (AU)	.8026
Heliocentric distance (AU)	1.0530
Radial geocentric velocity (km/s)	6.06
Radial heliocentric velocity (km/s)	21.44
Angle Sun-Earth-comet (deg)	70.5
Angle Sun-comet-Earth (deg)	63.5
Position angle of prolonged radius vector (deg)	100.9
Position angle of negative orbital velocity vector (deg)	312.8
Angle comet-Earth-Moon (deg)	71.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
1.02921	100024	5 13 27.55	-16 33 38.3		
1.40764	100023	5 15 54.43	-16 39 50.3		
1.41609	100022	5 15 57.78	-16 40 .1		

AN #	System	Notes	Observer(s)
100024	18080000	A	Cesco,M.R et al.
100023	14740000		Gilmore,A.C
100022	14740000		Gilmore,A.C

NOTE A Additional observers: Mira,H/Sanchez,G/Vicentela,J.A

- -

NETWORK: INFRARED STUDIES

Date(UT)	IRSN #	Filter	Mag.	Error	ApDia	Begin	End	Airm.	Std.Star
1.100	200010	N	3.18	±0.06	7.3				6

IRSN #	ChpThr.	Beam offset R.A.	Beam offset Dec.	Or	FT	Notes	System	Observer(s)
200010		0.0	0.0	1	2	AB	25680000	Hanner,M/Knacke,R

C-3

COMMENT	Coma mapped at N to 40 arcsec from peak signal and was asymmetric
COMMENT	Daytime observation
ERRORS	Estimated from repeatability, noise, and changes in sky transparency
ORIGIN=1	Position of peak signal
NOTE A	Airmass between 1.25-1.45
NOTE B	This is a monochromatic magnitude. A correction of -0.05 mag, corresponding to a 290K blackbody and reference wavelength 10.1 microns, has been applied to the raw magnitude.
REFERENCE	For corrections to monochromatic magnitudes, see Hanner,M., et al. 1984,A.J.,89,162.

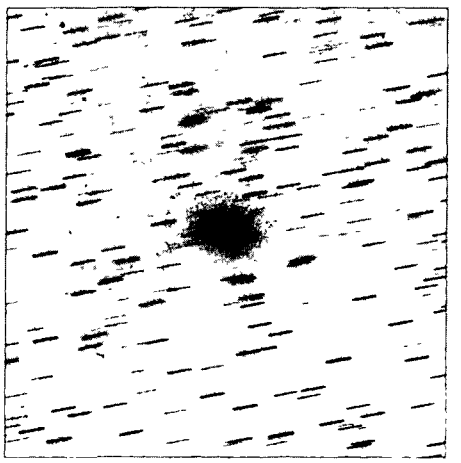
- -

NETWORK: LARGE SCALE PHENOMENA

Date(UT)	LSPN #	System	Plate #	Tel.	Scale	Instrument	Status
1.03550	300019	38110100	NA7288	0.19	248.0	Cooke Triplet	DS
1.04167	300023	38070500	CS26687	0.61	97.0	Curtis Schmidt	A

LSPN #	FOV	Emulsion	Filter	Exp.	Cal.	Hyp.	Observer(s)
300019	14.0 x 17.0	103a-O	None	32.0	No	No	Belserene,E
300023	5.0 x 5.0	IIa-D	GG-495	30.0	Yes	Yes	Liller,W

LSPN # 300023



Linear scale: bar = 500,000 km
North is up, East to left

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
1.038	800390	S	10.4	X Lep	0.5	0						
1.5400	800391	S	8.5		3	4						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800390	.15	Newtonian	8	67	4 :	Y	1	A	De Young,J.A.
800391	.41	Newtonian	4.2	86	14.8	Y	1	B	Clark,M.L.

NOTE A At limit of visibility
NOTE B Much fainter. (F. star prob. telescopic, not vis. Ed.)

 DATE: 2 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 19.743
Declination (eq. 1950.0; deg,arcmin)	-16 49.37
Geocentric distance (AU)	.8063
Heliocentric distance (AU)	1.0654
Radial geocentric velocity (km/s)	6.73
Radial heliocentric velocity (km/s)	21.59
Angle Sun-Earth-comet (deg)	71.4
Angle Sun-comet-Earth (deg)	62.8
Position angle of prolonged radius vector (deg)	101.1
Position angle of negative orbital velocity vector (deg)	312.3
Angle comet-Earth-Moon (deg)	64.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
2.00894	100021	5 19 47.69	-16 49 35.9		

AN #	System	Notes	Observer(s)
100021	18010000		McCrosky,R.E

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
2.0400	800392	S	9.8	AC	3.2	1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800392	.32	Newtonian	5.6	68	6.0	Y	1		Bortle,J.

DATE: 3 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 26.178
Declination (eq. 1950.0; deg,arcmin)	-17 4.61
Geocentric distance (AU)	.8104
Heliocentric distance (AU)	1.0779
Radial geocentric velocity (km/s)	7.40
Radial heliocentric velocity (km/s)	21.73
Angle Sun-Earth-comet (deg)	72.2
Angle Sun-comet-Earth (deg)	62.1
Position angle of prolonged radius vector (deg)	101.3
Position angle of negative orbital velocity vector (deg)	311.8
Angle comet-Earth-Moon (deg)	58.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
3.01890	100020	5 26 17.00	-17 4 45.6		
3.52778	100019	5 29 33.01	-17 12 15.3		
3.71912	100018	5 30 46.88	-17 15 9.3		

AN #	System	Notes	Observer(s)
100020	18080000	A	Cesco,M.R et al.
100019	13230000	B	Birch,P. et al.
100018	11150000		Tselishchev,I.E

NOTE A Additional observers: Mira,H/Sanchez,G/Vicentela,J.A
NOTE B Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
3.15400	500005	3115	OH	-10.479	
3.15400	500005	3650	Cont	-13.974	
3.15400	500005	3871	CN	-11.045	
3.15400	500005	4845	Cont	-13.713	
3.15400	500005	5140	C_2	-11.001	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500005	38.7			56880000	Millis,R
500005	38.7			56880000	Millis,R
500005	38.7			56880000	Millis,R
500005	38.7			56880000	Millis,R
500005	38.7			56880000	Millis,R

COMMENT Old OH filter
TELESCOPE 1.8 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
3.1800	800393	S	9.9	S Ori	4.0	1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800393	.20	Newtonian	6	61	6.5	Y	3	A	Morris,C.S.

NOTE A Much fainter

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 32.580
Declination (eq. 1950.0; deg,arcmin)	-17 18.98
Geocentric distance (AU)	.8149
Heliocentric distance (AU)	1.0905
Radial geocentric velocity (km/s)	8.07
Radial heliocentric velocity (km/s)	21.86
Angle Sun-Earth-comet (deg)	73.0
Angle Sun-comet-Earth (deg)	61.3
Position angle of prolonged radius vector (deg)	101.5
Position angle of negative orbital velocity vector (deg)	311.4
Angle comet-Earth-Moon (deg)	52.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
4.52778	100017	5 35 56.06	-17 26	8.4	

AN #	System	Notes	Observer(s)
100017	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

- -

NETWORK: PHOTOMETRY AND POLARIMETRY

SUB-NETWORK: PHOTOMETRY WITH IHW FILTERS

Date(UT)	PPN #	Filter	Mol./Cont.	LogFlux	Mean error
4.14100	500018	3115	OH	-10.584	
4.14100	500018	3650	Cont	-14.136	
4.14100	500018	3871	CN	-11.082	
4.14100	500018	4845	Cont	-13.790	
4.14100	500018	5140	C_2	-11.055	

PPN #	Diaph.	Offset R.A.	Offset Dec.	System	Observer(s)
500018	38.7			56880000	Millis,R
500018	38.7			56880000	Millis,R
500018	38.7			56880000	Millis,R
500018	38.7			56880000	Millis,R
500018	38.7			56880000	Millis,R

COMMENT Old OH filter
TELESCOPE 1.8 m

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
4.1800	800394	S	9.8	S Ori	5.5	1						
4.5000	800395	?		AA	3	1						

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800394	.26	Newtonian	4.5	67	6.5	Y	3		Morris,C.S.
800395	.15	Newtonian	5	30	5.8	Y			Pearce,A.

DATE: 5 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 38.944
Declination (eq. 1950.0; deg,arcmin)	-17 32.50
Geocentric distance (AU)	.8197
Heliocentric distance (AU)	1.1032
Radial geocentric velocity (km/s)	8.73
Radial heliocentric velocity (km/s)	21.98
Angle Sun-Earth-comet (deg)	73.9
Angle Sun-comet-Earth (deg)	60.6
Position angle of prolonged radius vector (deg)	101.7
Position angle of negative orbital velocity vector (deg)	310.9
Angle comet-Earth-Moon (deg)	47.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
5.46944	100016	5 41 54.66	-17 38 29.3		

AN #	System	Notes	Observer(s)
100016	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

DATE: 6 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 45.266
Declination (eq. 1950.0; deg,arcmin)	-17 45.16
Geocentric distance (AU)	.8250
Heliocentric distance (AU)	1.1159
Radial geocentric velocity (km/s)	9.38
Radial heliocentric velocity (km/s)	22.09
Angle Sun-Earth-comet (deg)	74.7
Angle Sun-comet-Earth (deg)	59.9
Position angle of prolonged radius vector (deg)	101.9
Position angle of negative orbital velocity vector (deg)	310.4
Angle comet-Earth-Moon (deg)	44.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
6.47014	100015	5 48 13.10	-17 50 46.0		
6.50139	100014	5 48 24.70	-17 51 8.7		

AN #	System	Notes	Observer(s)
100015	13230000	A	Birch,P. et al.
100014	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

DATE: 8 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	5 57.770
Declination (eq. 1950.0; deg,arcmin)	-18 7.97
Geocentric distance (AU)	.8365
Heliocentric distance (AU)	1.1415
Radial geocentric velocity (km/s)	10.68
Radial heliocentric velocity (km/s)	22.29
Angle Sun-Earth-comet (deg)	76.2
Angle Sun-comet-Earth (deg)	58.4
Position angle of prolonged radius vector (deg)	102.3
Position angle of negative orbital velocity vector (deg)	309.5
Angle comet-Earth-Moon (deg)	43.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
8.15592	100013	5 58 43.72	-18 9 43.1		

AN #	System	Notes	Observer(s)
100013	16750000		Gibson,J

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	6 3.944
Declination (eq. 1950.0; deg,arcmin)	-18 18.14
Geocentric distance (AU)	.8429
Heliocentric distance (AU)	1.1544
Radial geocentric velocity (km/s)	11.32
Radial heliocentric velocity (km/s)	22.38
Angle Sun-Earth-comet (deg)	77.0
Angle Sun-comet-Earth (deg)	57.7
Position angle of prolonged radius vector (deg)	102.5
Position angle of negative orbital velocity vector (deg)	309.0
Angle comet-Earth-Moon (deg)	47.0

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
9.46875	100012	6 6 49.10	-18 22 35.3		

AN #	System	Notes	Observer(s)
100012	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	6 56.669
Declination (eq. 1950.0; deg,arcmin)	-19 16.58
Geocentric distance (AU)	.9161
Heliocentric distance (AU)	1.2723
Radial geocentric velocity (km/s)	16.75
Radial heliocentric velocity (km/s)	22.90
Angle Sun-Earth-comet (deg)	82.9
Angle Sun-comet-Earth (deg)	51.5
Position angle of prolonged radius vector (deg)	104.0
Position angle of negative orbital velocity vector (deg)	305.0
Angle comet-Earth-Moon (deg)	118.8

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
18.46250	100011	6 59 13.67	-19 18 1.3		

AN #	System	Notes	Observer(s)
100011	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

DATE: 21 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	7 12.948
Declination (eq. 1950.0; deg,arcmin)	-19 24.80
Geocentric distance (AU)	.9466
Heliocentric distance (AU)	1.3121
Radial geocentric velocity (km/s)	18.42
Radial heliocentric velocity (km/s)	22.98
Angle Sun-Earth-comet (deg)	84.4
Angle Sun-comet-Earth (deg)	49.7
Position angle of prolonged radius vector (deg)	104.5
Position angle of negative orbital velocity vector (deg)	303.8
Angle comet-Earth-Moon (deg)	133.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
21.16670	100010	7 13 49.52	-19 25 14.2		

AN #	System	Notes	Observer(s)
100010	16750000	A	Gibson,J

NOTE A Image trailed, star trails curved

- -

NETWORK: AMATEUR OBSERVATIONS

Date(UT)	AON #	M.	m_1	Chart #	Coma diam.	DC	Tail1	PA1	Tail2	PA2	Tail3	PA3
21.1900	800396	S	>11.5	AC								

AON #	Tel.	Instrument	f/	Pwr.	Lim.	DA	OS	Notes	Observer(s)
800396	.26	Newtonian	4.5	67	6.5	Y	4	A	Morris,C.S.

NOTE A Not seen

DATE: 23 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	7 23.415
Declination (eq. 1950.0; deg,arcmin)	-19 27.82
Geocentric distance (AU)	.9685
Heliocentric distance (AU)	1.3386
Radial geocentric velocity (km/s)	19.49
Radial heliocentric velocity (km/s)	23.02
Angle Sun-Earth-comet (deg)	85.4
Angle Sun-comet-Earth (deg)	48.5
Position angle of prolonged radius vector (deg)	104.9
Position angle of negative orbital velocity vector (deg)	303.0
Angle comet-Earth-Moon (deg)	134.4

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
23.38073	100009	7 25 21.99	-19 28	5.3	
23.40382	100008	7 25 28.86	-19 28	6.1	

AN #	System	Notes	Observer(s)
100009	14740000	A	Gilmore,A.C
100008	14740000	A	Gilmore,A.C

NOTE A Image slightly trailed

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	7 38.533
Declination (eq. 1950.0; deg,arcmin)	-19 29.26
Geocentric distance (AU)	1.0036
Heliocentric distance (AU)	1.3786
Radial geocentric velocity (km/s)	21.03
Radial heliocentric velocity (km/s)	23.05
Angle Sun-Earth-comet (deg)	86.6
Angle Sun-comet-Earth (deg)	46.8
Position angle of prolonged radius vector (deg)	105.4
Position angle of negative orbital velocity vector (deg)	301.9
Angle comet-Earth-Moon (deg)	123.1

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
26.51250	100007	7 41 2.66	-19 28 58.6		

AN #	System	Notes	Observer(s)
100007	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

 DATE: 27 APR 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	7 43.417
Declination (eq. 1950.0; deg,arcmin)	-19 29.03
Geocentric distance (AU)	1.0159
Heliocentric distance (AU)	1.3919
Radial geocentric velocity (km/s)	21.52
Radial heliocentric velocity (km/s)	23.06
Angle Sun-Earth-comet (deg)	87.0
Angle Sun-comet-Earth (deg)	46.2
Position angle of prolonged radius vector (deg)	105.7
Position angle of negative orbital velocity vector (deg)	301.6
Angle comet-Earth-Moon (deg)	117.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.45972	100006	7 45 37.81	-19 28 46.9		

AN #	System	Notes	Observer(s)
100006	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

DATE: 3 MAY 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	8 11.129
Declination (eq. 1950.0; deg,arcmin)	-19 22.02
Geocentric distance (AU)	1.0954
Heliocentric distance (AU)	1.4717
Radial geocentric velocity (km/s)	24.31
Radial heliocentric velocity (km/s)	23.03
Angle Sun-Earth-comet (deg)	88.7
Angle Sun-comet-Earth (deg)	43.2
Position angle of prolonged radius vector (deg)	107.0
Position angle of negative orbital velocity vector (deg)	299.7
Angle comet-Earth-Moon (deg)	71.9

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
3.50312	100005	8 13 19.71	-19 20 49.4		

AN #	System	Notes	Observer(s)
100005	13230000	A	Birch,P. et al.

NOTE A Add. obs.: Candy,M.P/Candy,V/Kinnear,G/Jekabsons,P/Martin,R/Sultana,M

DATE: 7 MAY 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	8 28.150
Declination (eq. 1950.0; deg,arcmin)	-19 13.69
Geocentric distance (AU)	1.1535
Heliocentric distance (AU)	1.5249
Radial geocentric velocity (km/s)	25.99
Radial heliocentric velocity (km/s)	22.98
Angle Sun-Earth-comet (deg)	89.4
Angle Sun-comet-Earth (deg)	41.4
Position angle of prolonged radius vector (deg)	107.9
Position angle of negative orbital velocity vector (deg)	298.7
Angle comet-Earth-Moon (deg)	44.6

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
7.17295	100004	8 28 51.20	-19 13 22.5		19.0

AN #	System	Notes	Observer(s)
100004	16750000	A	Gibson,J

NOTE A Hint of coma, star trails irregular

DATE: 26 MAY 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	9 35.617
Declination (eq. 1950.0; deg,arcmin)	-18 26.75
Geocentric distance (AU)	1.4758
Heliocentric distance (AU)	1.7746
Radial geocentric velocity (km/s)	32.34
Radial heliocentric velocity (km/s)	22.47
Angle Sun-Earth-comet (deg)	88.9
Angle Sun-comet-Earth (deg)	34.8
Position angle of prolonged radius vector (deg)	112.6
Position angle of negative orbital velocity vector (deg)	294.9
Angle comet-Earth-Moon (deg)	130.2

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
26.39455	100003	9 36 49.11	-18 25 51.4		

AN #	System	Notes	Observer(s)
100003	14740000		Gilmore,A.C

DATE: 27 MAY 1984

EPHEMERIS FOR 0h UT

Right ascension (eq. 1950.0; h,m)	9 38.659
Declination (eq. 1950.0; deg,arcmin)	-18 24.68
Geocentric distance (AU)	1.4946
Heliocentric distance (AU)	1.7875
Radial geocentric velocity (km/s)	32.61
Radial heliocentric velocity (km/s)	22.44
Angle Sun-Earth-comet (deg)	88.8
Angle Sun-comet-Earth (deg)	34.5
Position angle of prolonged radius vector (deg)	112.9
Position angle of negative orbital velocity vector (deg)	294.8
Angle comet-Earth-Moon (deg)	122.7

- -

NETWORK: ASTROMETRY

Date(UT)	AN #	R.A.(1950.0)	Dec.	m_1	m_2
27.35289	100002	9 39 43.23	-18 23 54.0		
27.39572	100001	9 39 50.82	-18 23 49.1		

AN #	System	Notes	Observer(s)
100002	14740000		Gilmore,A.C
100001	14740000		Gilmore,A.C

APPENDIX I

FORMAT DESCRIPTION AND AUXILIARY INFORMATION

EPHEMERIS

The geocentric ephemeris for 0h UT has been calculated by the Astrometry Net from the following set of orbital elements. Full planetary and nongravitational perturbations have been taken into account. The angular elements are referred to the ecliptic and to the equinox of 1950.

Epoch of Osculation	1984 Feb. 10.0 ET
Time of Perihelion Passage	1984 Feb. 20.17068 ET
Argument of Perihelion	195.85424 deg.
Longitude of Ascending Node	250.19118 deg.
Inclination	29.10277 deg.
Perihelion Distance	0.7345238 AU
Eccentricity	0.9191917

Nongravitational Parameters:

Radial Component, A_1	$+0.1014 \times 10^{-8}$ AU/day^2
Transverse Component, A_2	-0.0004×10^{-8} AU/day^2

Number of observations used in solution: 276 (Nov. 24, 1928 - May 27, 1984)
Weighted RMS of residuals: 1.71 arc sec.
Astrometry Network Orbit No. 20.

Donald K. Yeomans
IHW Astrometry Discipline Specialist Team

A. ASTROMETRY NETWORK

A total of 375 astrometric observations (covering the interval Aug. 9, 1983 through May 27, 1984) were received by the Astrometry Network. In general, observations with residuals less than three times the RMS residual in either right ascension or declination were retained for the final orbit solution No. 20. However, all observations that were not obvious "blunder points" were archived. In the magnetic tape version of this archive, there is a header record and five data lines present for each astrometric observation. Referring to the sample header record below, we note that the file number for this observation is 100001, the date of the observation is 1984 May 27.39572, and the observer is A.C. Gilmore. The system code begins with "1" for the Astrometry Network and is followed by the observatory code (474) and the particular instrument at that observatory (0000). The observatory codes are given in Appendix II. The observatory east longitude and geocentric latitude are given in degrees, minutes and seconds. This Crommelin archive file was delivered on Oct. 12, 1985 by Ravenel N. Wimberly. The header parameters SIMPLE, BITPIX, NAXIS, SPEC-EVT and DAT-FORM do not change from record to record and are not particularly relevant to the Astrometry Network data.

Example of Astrometry Network Data Header

```
SIMPLE  =                    T
BITPIX  =                    8
NAXIS   =                    0
OBJECT  = 'P/CROMMELIN       '
FILE-NUM=               100001
DATE-OBS= '27/ 5/84'
TIME-OBS=              0.39572
DATE-REL= '12/10/85'
DISCIPLN= 'ASTROMETRY'
LONG-OBS= '170/27/35'
```

```
LAT--OBS= '-43/51/28'
SYSTEM  = '14740000'
OBSERVER= ' GILMORE,A.C
SUBMITTR= 'RAVENEL N. WIMBERLY'
SPEC-EVT=                    F
DAT-FORM= 'ASCII    '
END
```

Following each header record, there are five lines for each astrometric position reported. The first line gives the time (Julian Date, ET) of the observation and the reported right ascension and declination. The second line gives the Accept (A) or Delete (D) code indicating whether or not that particular observation was accepted for an orbit solution. This code is followed by the observation time (Calendar date, UT), the ET-UTC correction in tenths of a second, and the right ascension and declination corrected for the small effects of elliptic aberration. The second line then gives the observatory code (see Appendix II), the observatory's east longitude in degrees, and the parallax factors used to correct the geocentric computed positions to topocentric computed positions. The last two entries on the second line give the noise values (in arc seconds) for the observed right ascension and declination. These noise values are used to form weights in the orbit determination process. The third line in the magnetic tape version of the archive gives the observatory name and the total and nuclear magnitude information. The fourth and fifth lines give the reference for the received data, particulars on the instrument used and any problems that might impact the accuracy of the reported position.

In this printed version of the archive, the following information is presented:

Date (UT)	= Date of the middle of the observation (in days and fractions of a day, UT)
AN #	= Astrometry Network number - a unique number for each observation
R.A.(1950.0)	= Right ascension reported (equinox 1950.0)
Dec.(1950.0)	= Declination reported (equinox 1950.0)
m_1	= Total visual magnitude estimate
m_2	= Nuclear magnitude estimate
System	= Observatory system code (see Appendix II)
Notes	= Footnote(s) on the observation
Observers	= Name(s) of observer(s)

Donald K. Yeomans
IHW Astrometry Discipline Specialist Team

B. INFRARED STUDIES NETWORK

Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
IRSN #	= Infrared Studies Network number - a unique number for each observation (identifies first and second half of table)
Filter	= Type of filter used
Mag.	= Magnitude
Error	= Error in magnitude
ApDia	= Diameter of aperture (in arcseconds)
Begin	= Time of beginning of observation (in fractions of a day, UT)
End	= Time of end of observation (in fractions of a day, UT)
Airm.	= Average airmass of observation

Std.Star = Standard Star reference (see below)
ChpThr. = Chopping distance (in arcseconds)
Beam offset R.A. = Beam offset in right ascension from origin (in arcseconds)
Beam offset Dec. = Beam offset in declination from origin (in arcseconds)
Or = Origin reference, given below table
FT = Filter table reference (see below)
Notes = Footnote(s) on the observation
System = Observatory system code (see Appendix II)
Observer(s) = Name(s) of observer(s)

STANDARD STARS

Ref. #	Star	Bandpass H	J	K	M	N	Note
1	HR 1136	1.53	1.98	1.44			
2	Alpha Ari				-0.57	-0.73	
3	Alpha Tau				-2.71	-2.96	
4	HD40335						
5	SAO 149875						Intermediate standard
6	BS 2491						
7	SJ 9514						See Elias, J. et al. 1982, A.J., 87, 1029
8	BS 1552						See Sinton, W. and Tittemore, W. 1984, A.J., 89, 1366

FILTER TABLES

The following format is used:

FT = Filter table reference
Filter set = Name of filter set
Fltr = Type of filter used
Ctr.Wvl. = Center wavelength of filter (in microns)
Eff.Wvl. = Effective wavelength of filter (in microns)
B-pass = Bandpass of filter (in microns)
Identifier = Filter identifier
Notes = Footnote(s) on the filter

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
1	IRTF RC1 PHOT	J		1.25	0.30		
		H		1.65	0.35		
		K		2.20	0.42		
		L		3.45	1.05		
		M		4.80	0.57		

REFERENCE IRTF observer's manual (February 1985)

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
2	IRTF BOLO	8.7		8.7	1.2		
		N		10.1	5.1		
		10.3		10.3	1.3		
		Q		20.	9.		

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
3	UKIRT 2-BANG PHOT	J		1.25	0.3		AB
		H		1.65	0.3		AB
		K		2.20	0.4		AB

NOTE= A Manufactured by Optical Coating Laboratory, Inc. (OCLI)
NOTE= B Reference wavelength given

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
4	UKIRT UKT 7 BOLO	M		4.73	0.46		AB
		8.7		8.7			AB
		N		10.57	2.63		AB
		12.5		12.5			AB
		Q		19.16	4.51		AB

NOTE= A Manufactured by Optical Coating Laboratory, Inc. (OCLI)
NOTE= B Reference wavelength given

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
5	KPNO 1.3-M BOLO	K	2.22		0.42		A
		L	3.45		0.57		A
		M	4.63		0.34		A
		N	10.2		6.0		A

NOTE= A Manufactured by Optical Coating Laboratory, Inc. (OCLI)

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
6	ESO 3.6-M PHOT	J	1.2				

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
7	ESO 1-M PHOT	J	1.2				
		H	1.6				
		K	2.1				

FT	Filter set	Fltr	Ctr.Wvl.	Eff.Wvl.	B-pass	Identifier	Notes
8	UPSO 1-M PHOT	J	1.26		0.32		A
		H	1.65		0.28		B
		K	2.20		0.35		C

NOTE= A Peak transmission 75%
NOTE= B Peak transmission 80%
NOTE= C Peak transmission 70%

C. LARGE SCALE PHENOMENA NETWORK

Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
LSPN #	= Large Scale Phenomena Network number - a unique number for each observation (identifies first and second half of table and relationship between table and figure)
System	= Observatory system code (see Appendix II)
Plate #	= Id. number provided by the submitting observatory on the original plate jacket
Tel.	= Aperture (in meters)
Scale	= Plate scale (in arcseconds/millimeter)
Instrument	= Type of instrument used
Status	= Image Status - A indicates that image was submitted to the archive in digital form, while DS indicates that image is in the possession of the LSPN DS team, but not submitted to the archive
FOV	= Field of view (in degrees)
Emulsion	= Type of emulsion used
Filter	= Type of filter used
Exp.	= Exposure time (in minutes)
Cal.	= Was there calibration data accompanying the plate?
Hyp.	= Was the plate hyper-sensitized?
Observer(s)	= Name(s) of observer(s)

D. NEAR NUCLEUS STUDIES NETWORK

Comet Crommelin was not a very good object for near-nucleus studies because the coma was not bright and remained unchanged during the trial run. There were no discrete coma features, only the edge of the dust envelope. The lack of resolved anisotropic gas and dust distribution in the inner coma of Comet Crommelin would seem to indicate that either the nucleus surface is fairly homogeneous or that the spin rate is high.

The high-resolution, two-dimensional imaging data of P/Crommelin submitted by Near-Nucleus Studies members by the deadline were selected for inclusion in this archive if all relevant data needed for the standard FITS header were available, if the images were well guided, if the nucleus condensation had an RMS signal-to-noise ratio greater than 10, and if no better images were available within six hours of the observation. Because of manpower limitations, we include images taken only during the designated trial run of March 25-31, 1984. A full listing of the data submitted (including those taken outside of the trial run period) may be obtained upon request from a NNSN discipline specialist. We thank all who submitted data.

The reproduced images have a common linear scale (at the comet) of 58,000 km on an edge and are oriented with North at the top and East to the left. The contrast is not normalized but is adjusted so that it is as high as possible while still retaining all detail. The images are reproduced as positives since we have found that inner coma detail is more visible (while faint, outer coma detail is more visible as negative). A grey scale is not included to discourage photometric evaluation from the halftone reproductions.

The data given in the tables accompanying the images include the Universal Time of mid-exposure, a NNSN code number, a filter (see filter table below), exposure time in seconds, type of detector, original plate

scale in arcseconds per millimeter, telescope aperture in meters, IHW observatory "System" code, and observer.

NNSN Filter Bandpasses

Filter	Effective	50%	10%
V	5490	5060-5920	4950-6030
R	6460	5810-7100	5760-7320
C_2	5140	5095-5185	5080-5210
ST "R"	7000	5750-8300	5600-8500
ST "V"	5300	4900-5850	4840-5980

Stephen M. Larson
IHW Near Nucleus Discipline Specialist Team

Date(UT) = Date of the middle of observation (in days and fractions of a day, UT)
NNSN # = Near Nucleus Studies Network number - a unique number for each observation (identifies relationship between table and figure)
Filter = Type of filter used
Exp. = Exposure time (in minutes)
Detector = Detector used
Scale = Plate scale (in arcseconds/millimeter)
Tel. = Telescope aperture (in meters)
System = Observatory system code (see Appendix II)
Observer(s) = Name(s) of observer(s)

E. PHOTOMETRY AND POLARIMETRY NETWORK

1. PHOTOMETRY SUB-NETWORK WITH IHW FILTERS

Date(UT) = Date of the middle of observation (in days and fractions of a day, UT)
PPN # = Photometry and Polarimetry Network number - a unique number for each observation (identifies first and second half of table)
Filter = IHW standard filter used
Mol./Cont. = Molecule or continuum
LogFlux = IHW calibrated flux of emission band (in ergs/second/centimeter^2) or of continuum (in ergs/second/centimeter^2/angstrom)
Mean error = Mean error in LogFlux of emission band (in ergs/second/centimeter^2) or of continuum (in ergs/second/centimeter^2/ angstrom)
Diaph. = Diaphragm diameter (in arcseconds)
Offset R.A. = Offset in right ascension from nucleus (in arcseconds)
Offset Dec. = Offset in declination from nucleus (in arcseconds)
System = Observatory system code (see Appendix II)
Observer(s) = Name(s) of observer(s)

2. PHOTOMETRY SUB-NETWORK WITH OTHER FILTERS

Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
PPN #	= Photometry and Polarimetry Network number - a unique number for each observation (identifies first and second half of table)
Filter	= Type of filter used
Wavel.	= Center wavelength of filter (in angstroms)
Band	= Filter bandwidth (full-width half-maximum, in angstroms)
Mag.	= Magnitude
Error	= Error in magnitude
Diaph.	= Diaphragm diameter (in arcseconds)
Offset R.A.	= Offset in right ascension from nucleus (in arcseconds)
Offset Dec.	= Offset in declination from nucleus (in arcseconds)
System	= Observatory system code (see Appendix II)
Observer(s)	= Name(s) of observer(s)

3. POLARIMETRY SUB-NETWORK

Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
PPN #	= Photometry and Polarimetry Network number - a unique number for each observation (identifies first and second half of table)
Filter	= Type of filter used
Wavel.	= Center wavelength of filter (in angstroms)
Band	= Bandpass of filter (in angstroms)
Polar.	= Percent polarization
Error	= Error in polarization (in percent)
Angle	= Polarization angle (in degrees)
Error	= Error in polarization (in degrees)
Diaph.	= Diaphragm diameter (in arcseconds)
Offset R.A.	= Offset in right ascension from nucleus (in arcseconds)
Offset Dec.	= Offset in declination from nucleus (in arcseconds)
System	= Observatory system code (see Appendix II)
Observer(s)	= Name(s) of observer(s)

F. RADIO STUDIES NETWORK

INTRODUCTION: Data from the Radio Science Net of the International Halley Watch is formatted within the IHW archive according to standards used by all nets within the IHW. Thus, the individual results are presented in FITS format with 1 or more FITS header records containing information describing the data and 0 or more FITS data records containing the actual data. The detailed format of the Radio Science Net and examples of its use are presented in Appendix A and B to this explanatory supplement. Many of the keywords presented in Appendix A are consistent in their use from net to net within the IHW, and will not be discussed further in this guide to the Radio Science data. However, keyword blocks 4 and 5 contain keywords which have been defined specifically for the Radio Science Net to provide a full description of the data and to aid users in finding the data they want within the digital archive.

LOCATING DATA WITHIN THE RADIO SCIENCE ARCHIVE: Users who wish to locate all observations which occur on a specific date or within a range of dates should not have difficulty locating relevant data within the archive. As with any large data base, however, different organizations

of the data might be desirable depending upon the intent of the user. For example, time may be largely irrelevant for those interested in determining whether a specific region of the spectrum was searched or those interested in finding all observations of a particular molecule by all disciplines. The ability to find such subsets within the Radio Science Archive is enhanced through the use of two "summary" keywords in keyword block 4: DIS-CODE and DAT-TYPE.

The DIS-CODE keyword gives an ASCII string containing information on a number of parameters which describe the telescope and receiver used to make the observations. As seen in Appendix A, the telescope type (e.g., Single Antenna, Interferometer), the observing frequency, spectral resolution and bandwidth, a description of the beam size and shape, and an estimate of the sensitivity reached are all provided by this keyword. Thus, DIS-CODE may be used to locate observations obtained with certain types of instruments such as all single antenna measurements with beam sizes within a certain range or all observations in a particular frequency range.

The DAT-TYPE keyword provides an ASCII string which contains a brief description of the type of data obtained by the observation. A primary use of this keyword will be the location of data which fall within the various subnets of the Radio Science net. Thus, the first two characters of the DAT-TYPE string are OH for 18-cm OH observations, SL for non 18-cm OH spectral line observations, CN for continuum observations, OC for observations of occultation events, and RD for radar experiments. The remaining letters in the string are used to indicate whether a detection was made, what type of data is contained in the FITS data records following the header (e.g., none, a spectrum, an image, etc.), whether a summary of the data is given in the HISTORY keyword section of the header (see DATA SUMMARY section below), and whether polarization data is provided.

The combination of the standard IHW keywords DATE-OBS, TIME-OBS, and SYSTEM with the Radio Science keywords DIS-CODE and DAT-TYPE provides a powerful means to locate any particular kind of observation. It is also possible to use other keywords defined within the Radio Science section to locate more specific kinds of observations. We note that the MOLECULE keyword can be used to find all observations of a particular molecule, and can be combined with DAT-TYPE and TRANSITN to find all detections of a particular transition of that molecule within the data base. In general, then, we imagine users creating programs to search the FITS header records for occurences of these keywords and write directories to the files whose keywords satisfy the criteria imposed by the user.

DATA SUMMARY: The data summary pointer provided in the DAT-TYPE keyword is particularly useful since we intend to provide a summary of the data in terms of the quantities which are usually used in tabulations of that specific kind of data. Thus, for spectral lines, the line peak, line width, central velocity and integrated intensity will all be tabulated using the HISTORY keywords designated in keyword block 5, and their presence will be indicted by a T in the appropriate subfield of the DAT-TYPE keyword.

Many of the radio observations in the Crommelin archive did not detect the comet, and these results are expressed in the archive as upper limits. For most cases, the actual data used to obtain the upper limit is not included in FITS data records within the archive. Rather, the upper limit is contained within the data summary section of the FITS header records in the HISTORY section of the keywords. Thus, the HISTORY LIMIT keyword/subkeyword pair are used to present the three-

standard-deviation limit obtained by the observation. For spectral line observations, the rms is obtained from the scatter of the individual channels in the final spectrum; for continuum observations, the rms is obtained from the scatter of the on-off observations of the comet.

UNITS: The Radio Science Net adopts the units janskys per beam to describe all passive observations of comets. This unit is well defined since the signal is described in terms of the flux density of a point source which would produce the same observed signal; the explicit use of "per beam" in the unit acknowledges that the coma is possibly resolved by the beam to an unknown extent. Some observatories, notably the VLA and other interferometers, have already adopted this choice of units since they use celestial point sources to calibrate the instrument. All continuum observations also tend to use janskys to express their results regardless of how the data are actually internally calibrated. On the other hand, most large single antennas doing spectral line observations express their results in "antenna temperature" since the objects that are being observed are often large compared to the beam and calibration is accomplished by inserting signals of known noise temperature into the receiver. In recent years, this unit has become rather confusing as a result of efforts to convert a relatively well defined observed quantity into a more physically meaningful unit which gives an approximation to the true brightness temperature of the source. Thus, various forms of corrected antenna temperature are quoted at different observatories and it is not immediately clear what corrections have been made to the data when corrected antenna temperatures are quoted. We therefore favor a system in which the calibration is achieved by direct comparison of the cometary signal to celestial sources of known flux density, and the results of this comparison are expressed in these terms. All observations in the Crommelin archive are therefore expressed in these terms.

CALIBRATION: We have made no attempt to correct data to a common calibration scale in the Crommelin archive. The calibration scale at centimeter radio wavelengths is well determined and in many instances, our observers utilized a well known standard source to calibrate their data. At wavelengths shorter than about 1 cm, however, the calibration becomes less precise as atmospheric attenuation becomes significant in the observations. Here again, however, most observers utilize a standard source (usually a planet) to calibrate their data. Calibration information that is supplied to us by the observer is contained in the HISTORY section of the FITS header. The CALMETH subkeyword provides an ASCII string with a brief description of the calibration method used (e.g., STANDARDS for standard sources; NOISE TUBE if a noise tube was used; CHOPPER WHEEL for millimeter-wave observations which used that calibration technique). If a standard source was used to do the primary calibration of the data, then its name and assumed flux are given by the CALSRCE subkeyword. Finally, the system temperature (defined to be total system temperature including receiver noise and atmospheric and ground pickup) and the receiver temperature (defined to be the noise temperature of the receiver alone) are given in the TSYSTEM and TRCVR subkeyword fields; the zenith optical depth of the atmosphere is given in the TAUZENTH field.

CLOSING THOUGHTS ABOUT THE TRIAL RUN: The purpose of the trial run was to gain experience in data archiving that will help us to do a better job on the Halley archive. We believe that this effort has been successful in focussing our thoughts on what kinds of information should be included in the archive and in helping us to find areas where more effort will be required in order to collect all the information. We hope that radio observers who are now looking at the archive will help us by letting us know ways in which the radio science section might be more useful. We

also hope that observers who participate in the Halley watch will help us by providing the complete documentation that will be necessary for future users to understand the data.

Finally, we appreciate the efforts of those observers who contributed to this archive and helped us in this first attempt. The success or failure of the International Halley Watch depends upon this kind of unselfish cooperation, and we are extremely grateful to those who have helped us in this task.

The Radio Science entries in the printed archive of data from P/Crommelin are presented in six lines of text. These lines are identical for all types of observations and provide the full information necessary for simple interpretation of the data. Some information is also provided to assist users in the location of data in the digital archive. Each line contains one or more fields; fields are usually identified by a 1 or 2 letter code. Where possible, units are included in the lines to improve readability. A detailed description of the format is given below:

LINE 1 - TIME and LINE PARAMETERS (for OH and Spectral Line Observations)

Field 1 UT time in decimal days

Field 2 LINE= : Contains name of molecular species and transition following convention of NBS Interstellar Line List. Only present for OH and Spectral Line Sub-networks.

Field 3 RESTF= : Line Rest Frequency in MHz. Only present for OH and Spectral Line Sub-networks.

LINE 2 - IHW DAT-FORM KEYWORD, WINDOWS, IHW FILENUM KEYWORD, and OBSERVATORY IDENTIFICATION

Field 1 Indicates type of data present in digital archive according to IHW DAT-FORM keyword:

N : NODATA = No data records
S : STANDARD = standard FITS data records
A : ASCII = ASCII data records
H : HARDCOPY = data exists only as hardcopy

Field 2 W= : Number of observing windows if multiple windows are known. If only 1 window or no information W=- is given.

Field 3 FILE= : Gives the IHW file number (keyword=FILENUM), a unique designation for this file for easy access to the digital archive.

Field 4 Abbreviated name of observatory.

Field 5 Location of observatory as given in Astronomical Almanac. Permits easy access to observatory parameters.

Field 6 SYSCODE= : IHW System Code for observatory.

LINE 3 - TELESCOPE/BEAM PARAMETERS

Field 1 TEL = : Telescope Description (usually gives aperture size in meters).

Field 2 E= : Beam Efficiency (fraction of power received by the telescope that is contained in the main beam)

Field 3 BW= : Beam Width and Shape given in following format:

BW= HPBW (R,PA) where

HPBW - Geometric Mean Beam Half-Power Width in arcminutes, R - Ratio of maximum to minimum beam dimension, PA - Position Angle of maximum beam dimension in degrees

Field 4 OFF= : Offset of beam pointing from position of nucleus given in following format:

OFF= (r,PA) where

r - radial offset in arcminutes, PA - Position Angle of radial offset in degrees

Field 5 PE= : RMS pointing error in arcseconds.

LINE 4 - INSTRUMENT PARAMETERS

Field 1 INS = : Instrument Front End/Back End Identification.
Front End Types:

FET = Field Effect Transistor Amplifier
MASER = Maser Amplifier
PARA = Parametric Amplifier
MIXER = Mixer and Intermediate Frequency Amplifier
SPEC = Special Front End
UNK = Unknown

Back End Types:

FB = Filterbank Spectrometer
SEFB = Filterbank with Spectrum Expander
AC = Autocorrelation Spectrometer
CONT = Broadband Continuum Receiver
AOS = Acousto-Optical Spectrometer
SPEC = Special Back End
UNK = Unknown Back End

Field 2 F= : Center Frequency of Observed Bandwidth (MHz)

Field 3 B= : Observed Bandwidth (MHz)

Field 4 R= : Spectral Resolution (kHz); - is given for continuum observations.

Field 5 TS= : System Temperature (K); Noise Temperature of total system including atmosphere, ground pickup, etc.

Field 6 TR= : Receiver Temperature (K); Noise Temperature of receiver alone.

LINE 5 - DATA SUMMARY. There are two types of data summary lines given in the Crommelin Archive: UPPER LIMIT lines and LINE DATA lines.

UPPER LIMIT gives the 3-standard-deviation upper limit obtained for the observation. For spectral lines, the limit refers to three times the standard deviation of the noise present in the spectrum at the spectral resolution indicated for the observation. The units for all observations are janskys/beam where 1 jansky is defined to be 10(-26) watts/m(-2)/Hz.

LINE DATA gives measurements of spectral lines which were either detected or marginally detected. The PEAK= field gives the peak flux observed in janskys/beam; the rms error in the spectrum is given in parentheses. The AREA= field gives the integral of the spectrum over the spectral region where the line occurs; error is given in parentheses. The line area is related to the total flux observed in the line, and its units are janskys/beam*meters/second. For both fields, we follow the convention that emission lines are represented by positive numbers and absorption lines are represented by negative numbers.

LINE 6 - OBSERVERS. This line gives the names of the participating observers as supplied to the Radio Science.

F. Peter Schloerb
IHW Radio Science Discipline Specialist Team

APPENDIX A

Radio Science FITS Header Description

****
**********KEYWORD BLOCK I - Basic FITS Keywords**********
****

This block is required of FITS tapes

Keyword	Type	Description
SIMPLE	L	Conforms to Basic FITS standards?
BITPIX	I	Bits per pixel in data record
NAXIS	I	Number of axes in data record; if NAXIS = 0, then no data record
NAXIS1	I	Number of pixels in row along first axis; if NAXIS1=0, then this is Extended FITS Format
NAXISn	I	Number of pixels along other axes in image.

****
**********KEYWORD BLOCK II - Extended FITS Keywords**********
****

This block is only present when NAXIS1=0

Keyword	Type	Description
GROUPS	L	Is this Extended FITS?
GCOUNT	I	Number of groups of data in data records
PCOUNT	I	Number of parameters per group

**********KEYWORD BLOCK III - International Halley Watch Keywords**********

These keywords are agreed upon for use by the entire Halley Watch.

Keyword	Type	Description
OBJECT	C	Name of the object. Examples: 'P/CROMMELIN' 'P/HALLEY' 'P/GIACOBINI-ZINNER'
FILENUM	I	Unique, sequential number to identify files sent to IHW Lead Center
DATE-OBS	C	'DD/MM/YY' - UT date of middle of observation If observations made during several intervals, then these intervals will be specified in the HISTORY fields described below.
TIME-OBS	R	UT Time of middle of observation - expressed in decimal days.
DATE-REL	C	'DD/MM/YY' - Date when observations may be publicly released.
DISCIPLN	C	'RADIO STUDIES' - That's us
LONG-OBS	C	'DDD/MM/SS' - East Longitude of Observatory (0-360 degrees)
LAT--OBS	C	'sDD/MM/SS' - Latitude of Observatory
SYSTEM	C	'6OOOCCTT' - System Code Formatted (NOT USED FOR TRIAL RUN): 6 = Radio Studies net OOO = IAU number for observatory (OOO=500 for radio observatories since no IAU number exists) CC = Identifies Country according to LSPN Code TT = Identifies Radio Telescope
OBSERVER	C	Name of Observer Format : 'LASTNAME,I' - 1 author 'LASTNAME,I/NEXTNAME,J' - 2 authors 'LASTNAME,I/ET AL.' - >2 authors
SUBMITTR	C	Name of Submitter of Data
SPEC-EVT	L	Flag for special events as designated by D.S.
DAT-FORM	C	Describes format of FITS data records. 'NODATA ' - no FITS data records written 'STANDARD' - data records conform to FITS standard 'ASCII ' - data records are to be interpreted as logical records of 80 ASCII characters.(Not FITS standard) 'HARDCOPY' - data submitted as hardcopy.

**********KEYWORD BLOCK IV - Radio Science Keywords**********

These keywords are meant to be directly read by computers in the normal manner of FITS header keywords. They are either vital to the interpretation of the data or potentially useful for searches of the data base.

Keyword	Type	Description
DIS-CODE	C	'TFESEWEABENC' Describes the parameters of the telescope/instrument T : Telescope Type S = Single Antenna I = Interferometer U = Unknown/Unclassified FE: Frequency (Center Frequency or Rest Frequency) FE=> Frequency = F X 10**(E) MHz 00= Unknown

SE: Spectral Resolution
SE=> Spectral Resolution = S X 10**(E) Hz
00= Unknown
WE: Bandwidth
WE=> Bandwidth = W X 10**(E) Hz
00= Unknown
A : Beam Description
C = Circular
E = Elliptical
O = Other
U = Unknown
BE: Beam Size (Geometric Mean)
BE=> Beam Size = B X 10**(E) arcsec
00= Unknown
N : Noise Estimate
N => RMS Noise = 10**(N) microjanskys/beam
0 = Unknown
C : Information provided by Observer to D.S. is Complete
T = TRUE
F = FALSE

DAT-TYPE C 'NNSTHP' Indicates the format of data within Header and Data Records

NN: Subnet
OH= OH Subnet
Implies spectral line observations of 18-cm OH
SL= Spectral Line Subnet
Spectral Line Observations (NOT 18-cm OH)
CN= Continuum Subnet
Broadband Continuum observations
OC= Occultation Subnet
Observation of Occultation events
RD= Radar Subnet
Active Experiments
S : Search/Detection Status
S = Search - implies nondetection (< 3 sigma)
D = Detection - implies detection (> 3 sigma)
M = Marginal - implies marginal detection (approx. 3 sigma)
T : Type of Data in FITS Data Records
N = No FITS Data Records
S = Spectrum => Intensity vs Frequency
C = Continuum Scan => Intensity vs Space
T = Time Series => Intensity vs Time
I = Image => Spatial - Spatial Image
D = Dynamic Spectrum => Frequency - Time Image
F = SV Image => Frequency - Spatial Image
V = Visibility Function Data
H : Summary of Data in Header?
T = Summary of Data exists in Header History Section
F = No Summary of Data in Header History Section
P : Polarization Status
I = Intensity Data Only
P = Polarization Data Included

OBSVTORY C Abbreviation for Observatory.

TELESCOP C Telescope Identifier - usually gives aperture size in meters

LOCATION C Location of Observatory as given in American Ephemeris

INSTRUME	C	'FRONT/BACK' - describes "frontend" and "backend" of receiver FRONT : Receiver Front End MASER = Maser Amplifier FET = Field Effect Transistor Amplifier PARA = Parametric Amplifier MIXER = Mixer SPEC = Special Front End UNK = Unknown Front End BACK : Receiver Back End FB = Filterbank SEFB = Filterbank with Spectrum Expander AC = Autocorrelator CONT = Broadband Continuum Receiver SPEC = Special Back End AOS = Acousto-Optical Spectrometer UNK = Unknown Back End
CENTFREQ	R	Center Frequency of Observed Bandwidth (Hz)
BANDWIDT	R	Total Bandwidth (Hz)
BEAMSIZE	R	Geometric Mean of Major and Minor Axes of Elliptical Gaussian Beam (degrees)
BEAMELON	R	Ratio of Major Beam Axis to Minor Beam Axis
BEAMROTA	R	Position Angle of Major Beam Axis (degrees)
BEAMEFF	R	Beam Efficiency - Fraction of power received that is in the Gaussian Main Beam (BEAMEFF = 0.0 if unknown or unspecified)
MOLECULE	C	Chemical Formula for Molecule (Follows Convention of NBS Interstellar line list)
TRANSITN	C	Quantum Numbers for Transition (Follows Convention of NBS Interstellar line list)
RESTFREQ	R	Rest Frequency of line used by observer (Hz)
RES-SPEC	R	Spectral Resolution (Hz)
EQUINOX	R	Equinox of RA-DEC information presented in this file
RAOFF	R	Pointing Offset in RA direction DELTA(RA)/COS(DEC) (degrees)
DECOFF	R	Pointing Offset in Dec direction DELTA(DEC) (degrees)
DATE-BEG	C	'DD/MM/YY' - UT date on which observations began
DATE-END	C	'DD/MM/YY' - UT date on which observations ended

****
**********KEYWORD BLOCK V - Radio Science Data History Section**********
****

This block of FITS HISTORY keywords is provided to give additional information about the observation. In programs which read standard FITS, a HISTORY line in the header records will be ignored. Therefore, in general, this information is not meant to be directly processed by machine; it is here to give important background information which may be useful to its future interpretation. An exception to this general rule will be the inclusion of a summary of the data as the first item in the HISTORY section. The general format of the HISTORY cards is:

```
col.
0         1         2
1         1         1
HISTORY   SUBK  VALUES....            /Comments....
```

where values is a list of values associated with this subkey in free format.

DATA SUMMARY - In order to transmit upper limits or a summary of the data that would be appropriate for tabular presentation in the printed archive, we utilize one of the following HISTORY keyword formats. Such summaries of the data will always be contained in the first part of the HISTORY keyword section; the presences of such a summary shall be indicated in the DAT-TYPE keyword discussed above. All summary lines follow the same general form:

```
HISTORY   SUBKEY    ######  'UNITS   '
```

Format for Upper Limits:

```
COMMENT             *SUMMARY OF DATA - UPPER LIMIT
HISTORY   LIMIT     0.5  'JY/BEAM '
```

Format for Spectral Lines (all values not necessarily given):

```
COMMENT             *SUMMARY OF DATA - SPECTRAL LINE
HISTORY   LINEPEAK  0.5  'JY/BEAM '
HISTORY   ERR-PEAK  0.1  'JY/BEAM '
HISTORY   LINE-VEL  0.0  'M/SEC   '
HISTORY   ERR--VEL  0.2  'M/SEC   '
HISTORY   LINE-WID  2.0  'M/SEC   '
HISTORY   ERR--WID  0.2  'M/SEC   '
HISTORY   LINEAREA  0.1  'JY/B*M/S'
HISTORY   ERR-AREA  0.056  'JY/B*M/S'
```

Format for Continuum Observations:

```
COMMENT             *SUMMARY OF DATA - CONTINUUM
HISTORY   CONTFLUX  0.5  'JY/BEAM '
HISTORY   ERR-FLUX  0.1  'JY/BEAM '
```

OBSERVING WINDOWS - Since many radio observations will take place over several days, we shall include the precise observing windows in the HISTORY section according to the format:

```
COMMENT             *OBSERVING WINDOW SPECIFICATION
HISTORY   N-WINDOW  #
HISTORY   WINDOW    'DD/MM/YY'  .TT  'DD/MM/YY'  .TT
...       ...       ...
...       ...       ...
HISTORY   WINDOW    'DD/MM/YY'  .TT  'DD/MM/YY'  .TT
```

where N-WINDOW gives total number of windows for observation and subsequent window lines give date and time (in decimal days as in TIME-OBS) of beginning and end of the observing window.

ORBITAL ELEMENTS - Radio observers track the comet "blind" and it is important to know the precise position on the sky that they were tracking. We include a provision in the HISTORY section to specify the two-body elements and observatory position data used to produce the topocentric ephemeris for tracking. (N.B. THIS OPTION NOT USED IN TRIAL RUN ARCHIVE!!)

```
COMMENT             *ORBITAL ELEMENT SPECIFICATION
HISTORY   ORBELEM   T                    /T if orbital elements are present
HISTORY   LONGEAST  243.11046715         /E. Long of Obs.
HISTORY   RHO--COS  0.8159113419         /radius*cos(lat) for Obs.
HISTORY   RHO--SIN  0.5765085118         /radius*sin(lat) for Obs.
HISTORY   ET-UT     53.18439             /Ephemeris Time - UT correction
HISTORY   JD        2446471.16128        /Time of Perihelion Passage
HISTORY   Q         0.5870959            /Perihelion Distance
```

```
HISTORY   E          0.9672671              /Eccentricity
HISTORY   SOMEGQ     111.85336              /Arg. of Perihelion
HISTORY   LOMEGA     58.15313               /Long. of Ascending Node
HISTORY   I          162.23779              /Inclination
```

ANTENNA TRACKING - Specifies the antenna pointing errors

```
COMMENT              *RMS POINTING ERROR OF TELESCOPE (ARCSEC)
HISTORY   POINTERR   PPPP.PPPP
```

CALIBRATION - Information about details of the calibration process.

```
COMMENT              *CALIBRATION METHOD INFORMATION
HISTORY   CALMETH    'DESCRIPTION OF CAL METHOD'
```

If calibration method is unknown, then no line appears. Current possible values are 'CHOPPER WHEEL', 'NOISE TUBE', 'STANDARDS'

```
COMMENT              *CALIBRATION STANDARD INFORMATION
HISTORY   CALSRCE    'SOURCE NAME'   VVVVV.VVVVV   'UNITS'
```

Source used to provide principal calibration. For planets as the calibrators, the assumed brightness temperature is given; otherwise, the calibrator flux density is given in janskys.

```
COMMENT              *SYSTEM TEMPERATURE ETC.
HISTORY   TSYSTEM    TTTT.TTTT SB     '
HISTORY   TRCVR      TTTT.TTTT SB     '
```

Total system temperature (TSYSTEM) and noise temperature of the receiver alone (TRCVR). SB ' allows single side band measurement ('SSB ') or double sideband measurement ('DSB ') to be indicated.

```
HISTORY   TAUZENTH   TTTT.TTTT
```

Atmospheric opacity at zenith.

OBSERVERS COMMENTS - Any extra comments about conditions, data quality, etc. that are sent to D.S. will be recorded here in the HISTORY section.

```
COMMENT              *OBSERVER COMMENTS
HISTORY   OBSCOMM    ROOM TO REPORT OBSERVERS COMMENTS
HISTORY   OBSCOMM
HISTORY   OBSCOMM
HISTORY   OBSCOMM    MORE ROOM FOR OBSERVERS COMMENTS
```

D.S. COMMENTS - Extra comments by the D.S. team on this observation.

```
COMMENT              *D.S. COMMENTS
HISTORY   DSCOMM     ROOM TO REPORT D.S. COMMENTS
HISTORY   DSCOMM
HISTORY   DSCOMM
HISTORY   DSCOMM     MORE ROOM FOR D.S. COMMENTS
```

****
**********KEYWORD BLOCK VII - Standard FITS Keywords**********
****

These keywords are used to describe the FITS data records. All are standard.

Keyword	Type	Description
BSCALE	R	Scale Factor Data = tape * BSCALE + BZERO
BZERO	R	Zero Value
BUNIT	C	Units of Data 'JY/BEAM ' - for line and continuum data.
BLANK	I	Value for out-of-range data
CRVALn	R	Value of physical coordinate of nth axis at the reference pixel.
CRPIXn	R	Array location of reference pixel for nth axis
CDELTn	R	Increment in physical coordinate along nth axis
CTYPEn	C	Type of physical coordinate. 'VELO-COM' - frequency coordinate for line work in meters/second defined to be velocity with respect to the comet. 'RAOFF ' - spatial coordinate for maps in degrees 'DECOFF ' - spatial coordinate for maps in degrees or other values as defined by the observer.
CROTAn	R	Rotation angle of physical coordinate axis n

****
**********KEYWORD BLOCK VIII - Extended FITS Keywords**********
****

These keywords are used to define the parameters which describe the groups in the data records under the FITS extension. All are standard.

Keyword	Type	Description
PSCALn	R	Scale Factor Parametern = tapen * PSCALn + PZEROn
PZEROn	R	Zero Value
PTYPEn	C	Parameter Type

****
**********KEYWORD BLOCK IX - End Statement**********
****

This keyword is required by FITS to terminate the header.

END

Header with Data Records (continued)

```
COMMENT   INTERNATIONAL HALLEY WATCH KEYWORDS
OBJECT  = 'P/CROMMELIN'          /NAME OF OBJECT
FILENUM =                600015 /UNIQUE, SEQUENTIAL FILE NUMBER
DATE-OBS= '15/02/84'             /UT DATE OF MIDPOINT OF OBSERVATION
TIME-OBS=                  0.35 /UT OF MIDPOINT (DECIMAL DAYS)
DATE-REL= '01/04/85'             /RELEASE DATE OF DATA
DISCIPLN= 'RADIO STUDIES'        /NAME OF DISCIPLINE
LONG-OBS= '280/09/30'            /LONGITUDE (POSITIVE EAST: 0-360 DEGREES)
LAT--OBS= '+38/25/48'            /LATITUDE
SYSTEM  = '65001613'             /IHW SYSTEM CODE
OBSERVER= 'SCHLOERB,P/ET AL.'    /OBSERVER NAMES
SUBMITTR= 'SCHLOERB,P'           /SUBMITTER NAME
SPEC-EVT=                    T /FLAG FOR SPECIAL EVENTS DEFINED BY D.S.
DAT-FORM= 'STANDARD'             /FORM OF DATA IN FITS DATA RECORDS

COMMENT   RADIO SCIENCE CODE KEYWORDS
DAT-TYPE= 'OHDSTI  '             /CODE TO SPECIFY TYPE OF OBSERVATION
DIS-CODE= 'S231335C134T'         /CODE TO SPECIFY INSTRUMENTAL PARAMETERS
COMMENT   RADIO SCIENCE KEYWORDS
OBSVTORY= 'NRAO-KP '             /OBSERVATORY ABBREVIATION
TELESCOP= '43M     '             /TELESCOPE
LOCATION= 'GREEN BANK  WV'       /LOCATION
INSTRUME= 'FET/AC  '             /RECEIVER/BACKEND CONFIGURATION
CENTFREQ=       1667.3590E+06 /CENTER FREQUENCY OF BAND (HZ)
BANDWIDT=          0.3125E+06 /TOTAL BANDWIDTH (HZ)
BEAMSIZE=           301.7E-03 /BEAM SIZE (DEGREES)
BEAMELON=                 1.0 /RATIO OF MAJOR TO MINOR BEAM AXES
BEAMROTA=                 0.0 /POSITION ANGLE OF BEAM MAJOR AXIS (DEGREES)
BEAMEFF =                 0.7 /BEAM EFFICIENCY
COMMENT   RADIO SCIENCE KEYWORDS FOR SPECTRAL LINE OBSERVATIONS
MOLECULE= 'OH      '             /CHEMICAL FORMULA OF MOLECULE
TRANSITN= '2P3/2 J=3/2 F=2-2'    /QUANTUM NUMBERS OF TRANSITION
RESTFREQ=       1667.5390E+06 /REST FREQUENCY OF TRANSITION (HZ)
RES-SPEC=           1.22E+03 /SPECTRAL RESOLUTION (HZ)
COMMENT   RADIO SCIENCE KEYWORDS TO SPECIFY FULL WINDOW OF OBSERVATION
DATE-BEG= '14/02/84'             /UT DATE OF BEGINNING OF OBSERVATION
DATE-END= '16/02/84'             /UT DATE OF END OF OBSERVATION

COMMENT   RADIO SCIENCE OBSERVATION HISTORY
COMMENT             *SUMMARY OF DATA - SPECTRAL LINE
HISTORY   LINEPEAK    -0.03    'JY/BEAM '
HISTORY   ERR-PEAK     0.01    'JY/BEAM '
HISTORY   LINEAREA   -33.0     'JY/B*M/S'
HISTORY   ERR-AREA     6.0     'JY/B*M/S'

COMMENT             *OBSERVING WINDOW SPECIFICATION
HISTORY   N-WINDOW  2
HISTORY   WINDOW    '14/02/84'  .70  '15/02/84'  .04
HISTORY   WINDOW    '15/02/84'  .65  '16/02/84'  .02
COMMENT             *CALIBRATION METHOD INFORMATION
HISTORY   CALMETH   'NOISE TUBE'
COMMENT             *CALIBRATION STANDARD INFORMATION
HISTORY   CALSRCE   'CAS A   '  1770.00   'JY      '
COMMENT             *SYSTEM TEMPERATURE ETC.
HISTORY   TSYSTEM     25.0    'SSB     '
COMMENT             *OBSERVER COMMENTS
HISTORY   OBSCOMM   UNUSUAL DOUBLE PEAKED LINE PROFILE
HISTORY   OBSCOMM   COMBINED RIGHT AND LEFT CIRCULAR POLARIZATION
```

Header with Data Records (continued)

```
COMMENT             *D.S. COMMENTS
HISTORY   DSCOMM    SIMULTANEOUS OBSERVATION OF 1665 MHZ LIN IN 600016

COMMENT   STANDARD FITS KEYWORDS TO DESCRIBE DATA RECORDS
BSCALE  =               1.0E-05 /
BZERO   =                   0.0 /
BUNIT   = 'JY/BEAM '            /
BLANK   =                 -32767 /
CRVAL1  =              -12466.66 /
CRPIX1  =                     1 /
CDELT1  =                219.48 /
CTYPE1  = 'VELO-COM'            /METERS PER SECOND

END
```

Header Example with no FITS data records.

```
SIMPLE  =                     T /BASIC FITS KEYWORDS
BITPIX  =                    16
NAXIS   =                     0

COMMENT   INTERNATIONAL HALLEY WATCH KEYWORDS
OBJECT  = 'P/CROMMELIN'         /NAME OF OBJECT
FILENUM =                600012 /UNIQUE, SEQUENTIAL FILE NUMBER
DATE-OBS= '10/02/84'            /UT DATE OF MIDPOINT OF OBSERVATION
TIME-OBS=                  0.81 /UT OF MIDPOINT (DECIMAL DAYS)
DATE-REL= '01/04/85'            /RELEASE DATE OF DATA
DISCIPLN= 'RADIO STUDIES'       /NAME OF DISCIPLINE
LONG-OBS= '287/39/18'           /LONGITUDE (POSITIVE EAST: 0-360 DEGREES)
LAT--OBS= '+42/23/33'           /LATITUDE
SYSTEM  = '65001615'            /IHW SYSTEM CODE
OBSERVER= 'SCHLOERB,P/ET AL.'   /OBSERVER NAMES
SUBMITTR= 'SCHLOERB,P'          /SUBMITTER NAME
SPEC-EVT=                     F /FLAG FOR SPECIAL EVENTS DEFINED BY D.S.
DAT-FORM= 'NODATA  '            /FORM OF DATA IN FITS DATA RECORDS

COMMENT   RADIO SCIENCE CODE KEYWORDS
DAT-TYPE= 'SLSNTI  '            /CODE TO SPECIFY TYPE OF OBSERVATION
DIS-CODE= 'S945417C616T'        /CODE TO SPECIFY INSTRUMENTAL PARAMETERS
COMMENT   RADIO SCIENCE KEYWORDS
OBSVTORY= 'FCRAO   '            /OBSERVATORY ABBREVIATION
TELESCOP= '14M     '            /TELESCOPE
LOCATION= 'NEW SALEM  MA'       /LOCATION
INSTRUME= 'MIXER/SEFB'          /RECEIVER/BACKEND CONFIGURATION
CENTFREQ=        88631.847E+06 /CENTER FREQUENCY OF BAND (HZ)
BANDWIDT=             12.5E+06 /TOTAL BANDWIDTH (HZ)
BEAMSIZE=             16.4E-03 /BEAM SIZE (DEGREES)
BEAMELON=                  1.0 /RATIO OF MAJOR TO MINOR BEAM AXES
BEAMROTA=                  0.0 /POSITION ANGLE OF BEAM MAJOR AXIS (DEGREES)
BEAMEFF =                  0.6 /BEAM EFFICIENCY
COMMENT   RADIO SCIENCE KEYWORDS FOR SPECTRAL LINE OBSERVATIONS
MOLECULE= 'HCN     '            /CHEMICAL FORMULA OF MOLECULE
TRANSITN= '1-0 F=2-1'           /QUANTUM NUMBERS OF TRANSITION
RESTFREQ=       88631.8473E+06 /REST FREQUENCY OF TRANSITION (HZ)
RES-SPEC=              50.E+03 /SPECTRAL RESOLUTION (HZ)
```

Header without Data Records (continued)

```
COMMENT   RADIO SCIENCE KEYWORDS TO SPECIFY FULL WINDOW OF OBSERVATION
DATE-BEG= '10/02/84'           /UT DATE OF BEGINNING OF OBSERVATION
DATE-END= '10/02/84'           /UT DATE OF END OF OBSERVATION
COMMENT   RADIO SCIENCE OBSERVATION HISTORY
COMMENT             *SUMMARY OF DATA - UPPER LIMIT
HISTORY   LIMIT        2.0    'JY/BEAM '
COMMENT             *RMS POINTING ERROR OF TELESCOPE (ARCSEC)
HISTORY   POINTERR     7.0
COMMENT             *CALIBRATION METHOD INFORMATION
HISTORY   CALMETH   'CHOPPER WHEEL'
COMMENT             *CALIBRATION STANDARD INFORMATION
HISTORY   CALSRCE   'JUPITER '   175.0    'KELVIN  '
COMMENT             *SYSTEM TEMPERATURE ETC.
HISTORY   TSYSTEM    350.     'SSB     '
HISTORY   TRCVR      200.     'SSB     '

END
```

G. SPECTROSCOPY AND SPECTROPHOTOMETRY NETWORK

Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
SSN #	= Spectroscopy and Spectrophotometry Network number - a unique number for each observation (identifies first and second half of table and relationship between table and figure)
Sp.Res.	= Approximate spectral resolution (in angstroms)
Sp.Range	= Approximate spectral range (in angstroms)
Sky	= Sky quality indicator
Star	= Solar analog reference (see below)
Exp.	= Exposure/integration time (in minutes)
Dim.	= Dimension
Instrument	= Instrument/detector used
Data type	= Type of data
Sep.	= Separation between nucleus and center of slit or aperture (in arcseconds)
Orient.	= Position angle of aperture/slit center with respect to the nucleus, measured N through E (in degrees)
P.A.	= Position angle of the slit, measured N through E (in degrees)
Apersize	= Entrance aperture size or slit width and length of submitted spectrum (in arcseconds)
System	= Observatory system code (see Appendix II)
Observer(s)	= Name(s) of observer(s)

LIST OF SOLAR ANALOGS

The following format is used:

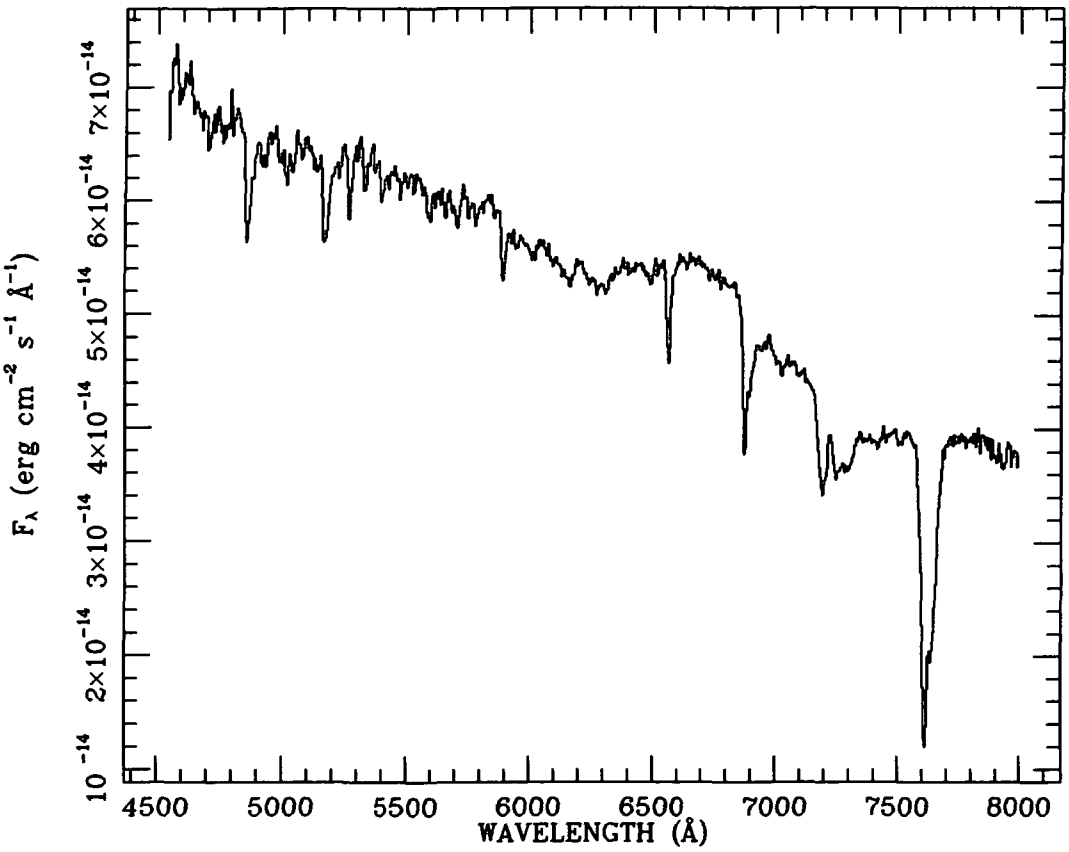
Date(UT)	= Date of the middle of observation (in days and fractions of a day, UT)
SSN #	= Spectroscopy and Spectrophotometry Network number - a unique number for each observation (identifies first and second half of table and relationship between table and figure)

Sp.Res. = Approximate spectral resolution (in angstroms)
Sp.Range = Approximate spectral range (in angstroms)
Sky = Sky quality indicator
Star = Solar analog reference number
Exp. = Exposure/integration time (in minutes)
Dim. = Dimension
Instrument = Instrument/detector used
Data type = Type of data
System = Observatory system code (see Appendix II)
Observer(s) = Name(s) of observer(s)

Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
4.10970	700003	17	4545-8000	1	1	8	1	RC Spect/Cryocam/TICCD/300gpm

SSN #	Data type	System	Observer(s)
700003	Reduced digital	76950101	Spinrad, H/Wehinger,P

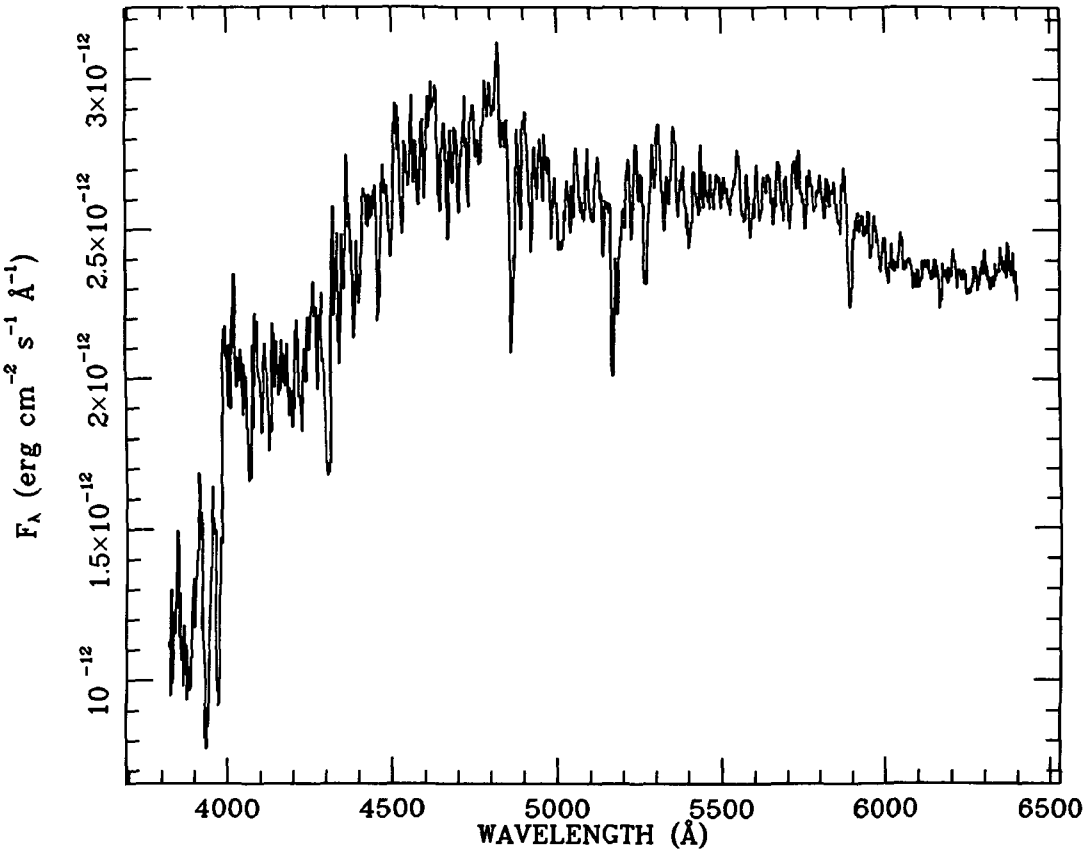
SSN# 700003



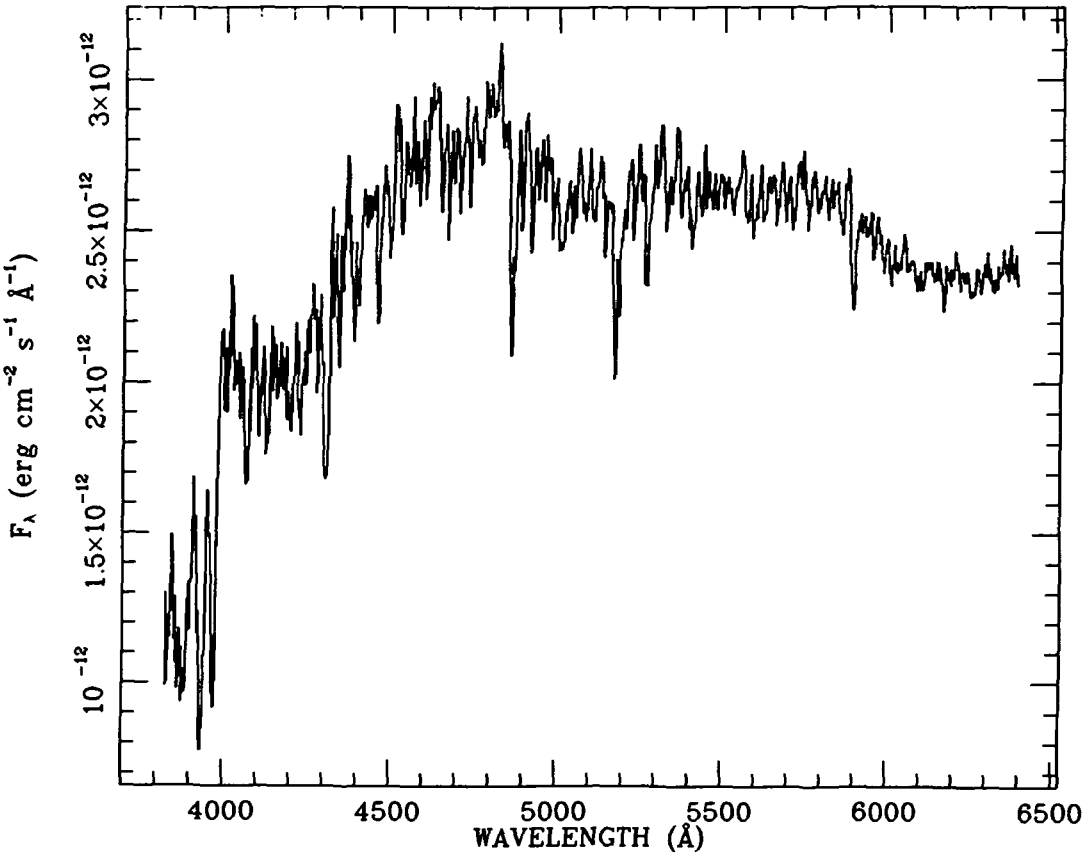
Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
20.09090	700004	9	3820-6400	2	2	26.7	1	Y Spect/IDS/600gpm
20.09090	700005	9	3820-6400	2	3	32.0	1	Y Spect/IDS/600gpm
20.09090	700006	9	3828-6394	2	4	26.7	1	Y Spect/IDS/600gpm
20.09090	700007	9	3828-6394	2	5	32.0	1	Y Spect/IDS/600gpm

SSN #	Data type	System	Observer(s)
700004	Reduced digital	76880101	Lutz,B/Wagner,M
700005	Reduced digital	76880101	Lutz,B/Wagner,M
700006	Reduced digital	76880101	Lutz,B/Wagner,M
700007	Reduced digital	76880101	Lutz,B/Wagner,M

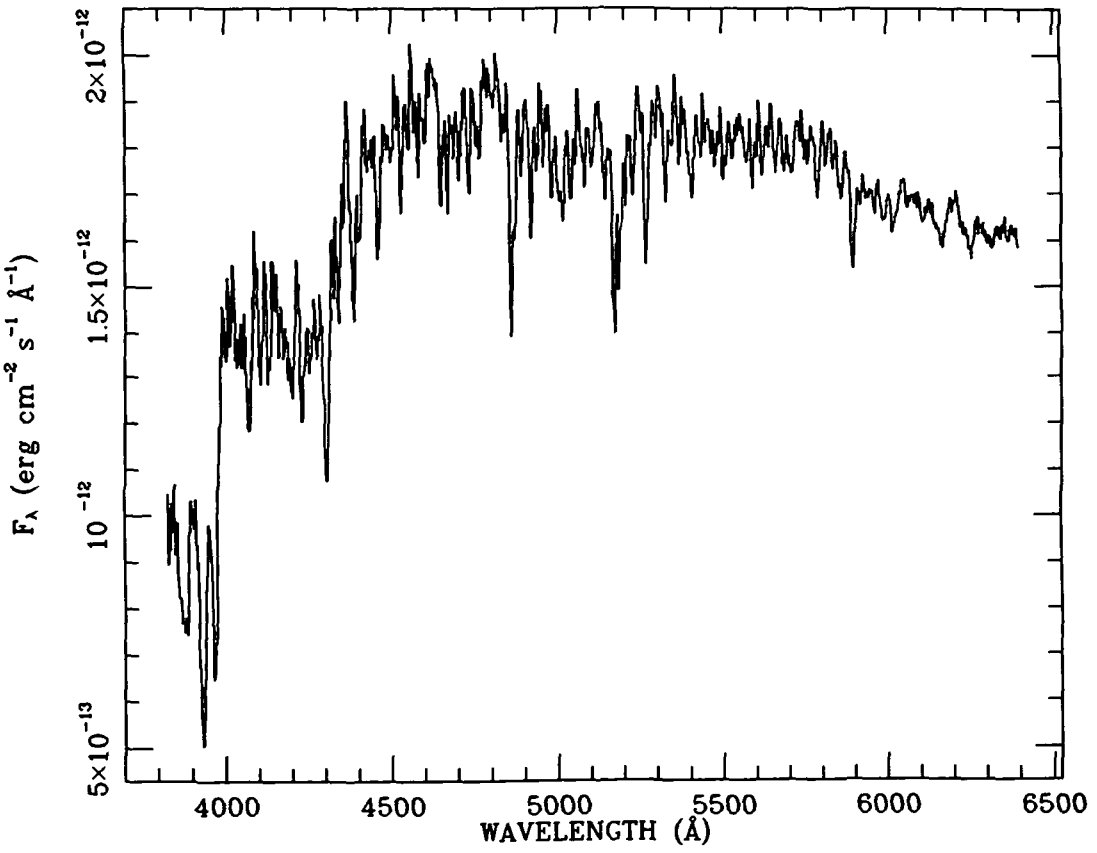
SSN # 700004



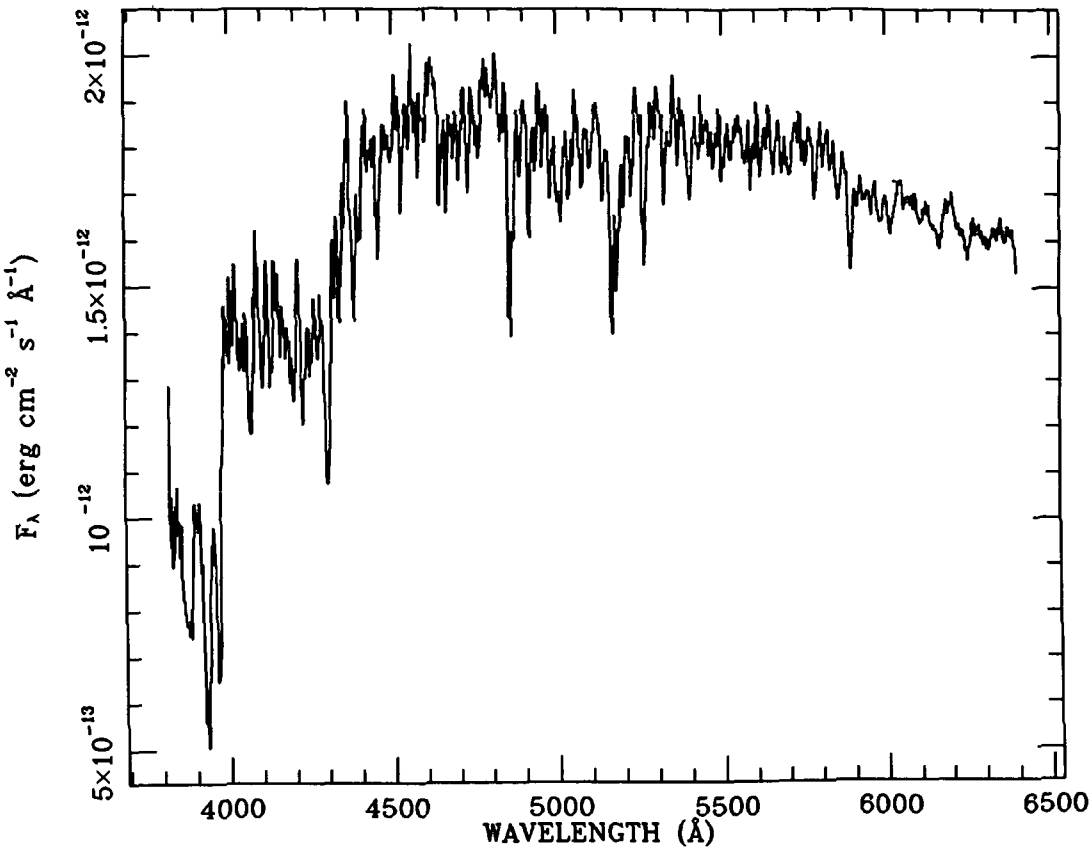
SSN # 700005



SSN # 700006



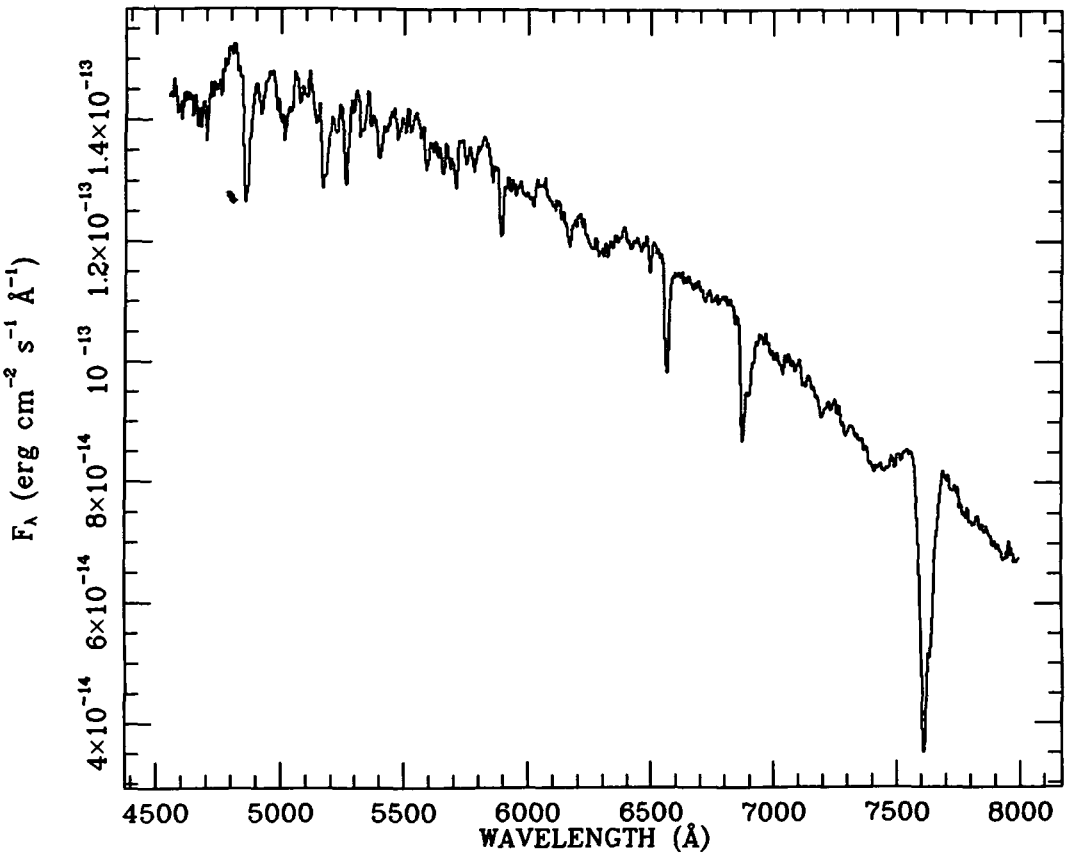
SSN # 700007



Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
24.12570	700009	17	4550-8000	1	6	.7	1	RC Spect/Cryocam/TICCD/300gpm

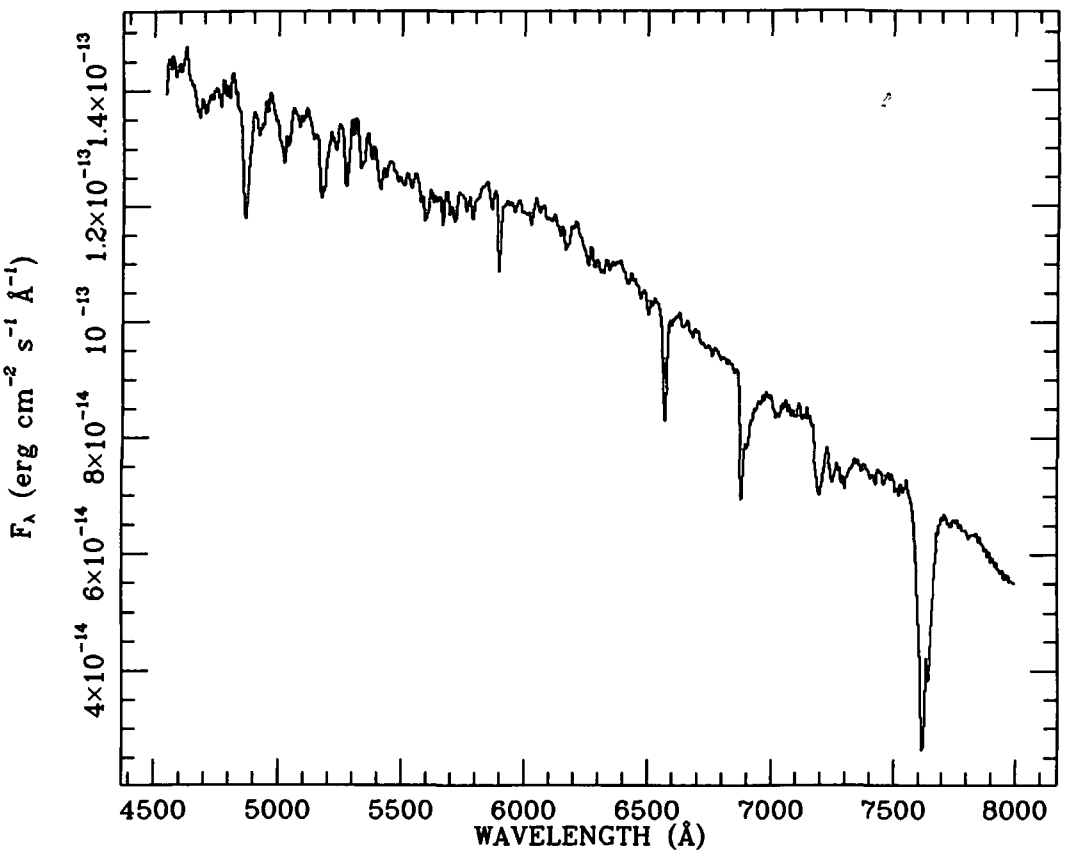
SSN #	Data type	System	Observer(s)
700009	Reduced digital	76950101	Belton,M et al.

SSN # 700009



Date(UT)	SSN #	Sp.Res.	Sp.Range	Sky	Star	Exp.	Dim.	Instrument
3.13890	700013	17	4545-8000	1	7	.7	1	RC Spect/Cryocam/TICCD/300gpm

SSN #	Data type	System	Observer(s)
700013	Reduced digital	76950101	Belton,M/Wehinger,P



H. AMATEUR OBSERVATION NETWORK

The first positive amateur observations of periodic Comet Crommelin commenced on 1983 December 29 with the visual recovery by Jean-Claude Merlin. They concluded with a negative observation by Charles Morris on 1984 April 21. In all, a total of 197 visual observations of various types were recorded by 21 amateur astronomers. For this trial run comet, only a handful of photographs were received, at image scales not particularly useful and often with incomplete documentation. Thus they were unfortunately not useful to the archives. No other types of observations (e.g., photoelectric, astrometric, spectroscopic) were submitted to the Amateur Observation Network coordinator.

Because each observer tends to follow his or her own habits, there is diversity in the type and quality of information recorded in the archive:

Date - While four decimal places are recorded, it is recommended that only a precision of two places be considered if the final two places are filled with zeroes.

AON # - Amateur Observation Network number - a unique number for each observation (identifies first and second half of table).

M. - The magnitude estimation method was one of three types:

1) The Bobrovnikoff (B) method compares defocused both the comet and comparison stars.

2) The Sidgwick or In-Out (S) method compares an in-focus comet and defocused stars.

3) The Morris (M) method compares a partially defocused comet with stars defocused to the size of the comet.

See The International Halley Watch Amateur Observers' Manual for Scientific Comet Studies by Stephen J. Edberg (1983) for details of the methods. Any other estimation method indicated was reason not to include the observation in the archive. Occasionally a "?" was inserted if the method was unknown but accepted for the archive.

m_1 - The total magnitude of the comet is recorded here. A colon indicates uncertainty on the part of the observer. A > indicates that the comet was fainter than the given magnitude.

Chart # - This column reflects the comparison star magnitude source. For the trial run the IHW did not issue a standard set of charts so a variety are referenced by the various observers:

1) Variable star comparison fields are indicated by the variable star designation with the exception of o (omicron) Ceti, Mira.

2) SAO refers to the Smithsonian Astrophysical Observatory Star Catalog (1966).

3) AA refers to The American Association of Variable Star Observers (AAVSO) Variable Star Atlas prepared by Charles Scovil (1980).

4) AC and AAVSO refer to AAVSO variable star comparison charts that were not specified by the observer.

5) BAAVS refers to variable star charts prepared by the British Astronomical Association but not specified by the observer.

In a few cases observers were ambiguous about or did not specify their comparison star magnitude source.

Coma diam. - The coma diameter (in arcminutes) was estimated by timing its passage through the field of view (caused by the Earth's rotation) and corrected for the declination or by estimation based on the known separation of a pair of stars.

The method used was not indicated by the observers. On a few occasions archive formatting required rounding off the value from two decimal places to the one place given.

DC - The degree of condensation is a judgement of the shape of the brightness profile across the coma. See the IHW Amateur Manual for details. The value can be severely affected by the quality of the sky: its darkness and transparency. Rounding off for archive formatting always went to the more diffuse value: "3/" became "3", "4 1/2" became "4", or "5-6" became "5".

Tail - Room is supplied for the length of up to three tails (in degrees); only two tails were ever indicated and this on only one occasion.

PA - The position angle (in degrees) measured north through east is given for each tail.

Tel., Instrument, f/, Pwr - These instrumentation characteristics are supplied to assist in data analysis. The affect of aperture on magnitudes is well documented, though it may perhaps be superseded soon by a better understanding of instrumental effects.

In most cases the actual optical system design is given. In a few cases, a Cassegrainian designation may have been applied by the observer to a Schmidt-Cassegrain system.

The aperture size (in meters) was supplied by the observer. The vagaries of conversion from avoirdupois to metric units and the rounded-off aperture used in common conversation suggest that apertures of 0.25, 0.254, and 0.26 meters may all refer to the same size instrument. The focal ratio (f/) and magnification (Pwr.) were supplied by the observer and may not be exact.

The instrument used may be either homebuilt or commercially manufactured. In general, Maksutov, Cassegrain, and Schmidt-Cassegrain telescopes are commercially made. Common commercial Schmidt-Cassegrains have apertures (in meters) and focal ratios of:

0.102, f/10
0.125, f/10
0.200, f/10
0.250, f/10
0.280, f/10
0.350, f/11

Newtonians and refractors may be either homebuilt or commercial.

The Jones-Bird design is Newtonian in layout with an achromatic negative lens placed immediately next to the flat diagonal and between it and the spherical primary. The achromat slightly increases the focal ratio of the system while correcting some aberrations. These instruments are generally homebuilt.

Lim., DA - The magnitude of the faintest star visible to the naked eye and whether or not the observer was dark adapted are indicated. (Y = yes, N = no.) These physiological values may also affect magnitude estimates. When necessary the stellar magnitude was rounded off to one decimal place.

OS - The observing site identification number used by the amateur astronomer is given when supplied. (See Appendix II for a site identification number key.) Many amateurs have portable instruments they use at a variety of sites, the selection of which depends on atmospheric conditions, distance from home, height and darkness of the horizon, and azimuth of the target, among others.

Notes - This section contains comments by the observer or the Coordinator for Amateur Observations to help in interpreting the observation.

Observer(s) - In this archive the observations were all made by independent observers.

Stephen J. Edberg
IHW Amateur Observation Network

APPENDIX II
OBSERVATORY CODES

The following formats are used:

Sections A and B

System = Assigned observatory system code
Observatory = Observatory name
Long. = Geographical longitude, east of Greenwich (in deg)
Lat. = Geographical latitude (in deg)
Δxy = Parallax constant (in units of 0.0000001 AU)
ΔZ = Parallax constant (in units of 0.0000001 AU)

Section C

System = Assigned observatory system code
Observatory = Observatory name
Orbit = Type of orbit
Perigee = Initial distance of perigee from the Earth's center (in km)
Apogee = Initial distance of apogee from the Earth's center (in km)
Incl. = Orbit inclination relative to the Earth's equatorial plane (in deg)

Section D

Observer = Name of observer
OS = Observing site identification number
Long. = Geographical longitude, east of Greenwich (in deg)
Lat. = Geographical latitude (in deg)
Alt. = Altitude above sea level (in m)

A. OBSERVATORIES WHOSE CODES INCLUDE IAU-ASSIGNED CODES

System	Observatory	Long.	Lat.	Δxy	ΔZ
10170000	Hoher List	6.85	+50.14	-274	-326
10220000	Pino Torinese	7.78	+45.00	-302	-300
10240000	Heidelberg-Konigstuhl	8.72	+49.38	-278	-322
10260000	Berne-Zimmerwald	7.47	+46.90	-292	-310
10460000	Klet Observatory	14.29	+42.21	-281	-319
10510000	Cape of Good Hope	18.48	-33.98	-354	+237
10530000	Konkoly Observatory, Budapest	18.96	+47.47	-289	-313
10560000	Skalnate Pleso	20.24	+49.19	-279	-321
10610000	Uzhgorod	22.30	+48.62	-282	-318
10690000	Baldone	24.41	+56.79	-234	-355
10710000	Sofia	24.72	+41.67	-319	-282
10890000	Nikolaev	31.98	+47.00	-291	-310
10950000	Crimea-Nauchnij	34.02	+44.81	-303	-299
11020000	Zvenigorod	36.59	+55.71	-241	-351
11150000	Zelenchukskaya	41.44	+43.67	-309	-293
11190000	Abastumani	42.82	+41.77	-319	-283
11230000	Byurakan	44.29	+40.34	-326	-275
11650000	Sverdlovsk	59.50	+56.98	-233	-356
11860000	Kitab	66.88	+39.19	-331	-268
11900000	Gissar	68.60	+38.51	-334	-264
52000000	Sanglok	69.22	+38.32	-335	-263

12140000	Kazakh Astrophys. Inst., Coronal Station	76.99	+43.10	-312	-290
13230000 53230000	Perth Observatory, Bickley	116.14	-32.03	-362	+225
13300000	Purple Mountain Observatory, Nanking	118.82	+32.03	-362	-225
13720000	Geisei (Seki)	133.83	+33.50	-356	-234
13810000	Tokyo-Kiso	137.63	+35.81	-346	-248
14130000	Siding Spring Mountain Observatory	149.07	-31.25	-365	+220
14150000	Kambah (Herald)	149.06	+35.44	-348	+246
14740000	Mount John Observatory, Lake Tekapo	170.46	-44.05	-307	+295
14820000	St. Andrews	357.18	+56.30	-237	-353
54830000	Carter Observatory, Black Birch Station	173.80	-41.67	-319	+282
14930000	Calar Alto	357.45	+37.27	-340	-257
14940000	Stakenbridge (Manning)	357.84	+52.35	-261	-336
25680000	Mauna Kea	204.53	+19.87	-401	-144
76620101	Lick Observatory 3.5m	238.36	+37.34	-339	-257
16750000	Palomar Mountain	243.14	+33.31	-357	-233
16880000 56880000 76880101	Lowell Observatory, Mesa Station 1.8m	248.46	+35.14	-349	-244
76910101	Steward Observatory, Kitt Peak Station 2.3m	248.40	+31.96	-362	-224
46930101	Catalina Station, Tucson 1.5m	249.28	+32.40	-360	-227
16950000 26950000 46950501 76950101	Kitt Peak 0.9m, #1 4.0m	248.40	+31.92	-362	-224
17070000	Chamberlin Field Station (Everhart)	254.56	+39.48	-330	-270
47110101 77110101	McDonald Observatory, Fort Davis 2.7m	255.98	+30.65	-367	-216
18010000	Oak Ridge Observatory, Harvard	288.44	+42.53	-315	-287
18050000	Santiago-Cerro el Roble	288.97	-33.01	-358	+231
38070500	Cerro Tololo Observatory, La Serena Curtis Schmidt	289.19	-30.17	-369	+213
18080000	Yale-Columbia Station, El Leoncito	290.67	-31.73	-363	+223
18090000 28090000 38090400	European Southern Observatory, La Silla 1.0m Schmidt	289.27	-29.25	-372	+207
18110000 38110100	Maria Mitchell Observatory, Nantucket	289.90	+41.29	-321	-280

B. OBSERVATORIES WITH NO IAU-ASSIGNED CODES

System	Observatory	Long.	Lat.	Δxy	ΔZ
15001601	Fan Mountain	281.31	+37.84	-337	-260
25000501	Uttar Pradesh State Obs., Naini Tal 1.0m	79.46	+29.37	-372	-208
35000702	Catania Astrophysical Observatory	14.98	+37.69	-339	-258
55002100	Mount Megantic, Quebec 1.6m	288.85	+45.38	-300	-302
65000201	Itapetinga Radio Observatory, Atibaia 14m	313.44	-23.21	-392	+167

65000401	Nancay Radio Astronomy Station 200m x 40m	2.20	+47.38	-289	-312
65001607	Clark Lake Radio Obs., Borrego Springs Array	243.71	+33.31	-357	-233
65001610	Millimeter Wave Obs., Mount Locke 5m	255.97	+30.65	-367	-216
65001613	Nat'l Radio Astr. Obs., Green Bank 43m	280.16	+38.51	-334	-264
65001615	Five College Radio Astr. Obs., New Salem 14m	287.66	+42.43	-315	-286
65001617	Arecibo Observatory 305m	293.25	+18.29	-405	-133
65002102	Dominion Radio Astrophys. Obs., Penticton 26m	240.38	+49.38	-278	-322
65002403	Zelenchukskaya RATAN 600	41.59	+43.86	-308	-294
65002501	Max-Planck-Inst. Radio Astr., Effelsberg 100m	6.88	+50.52	-272	-328
65002601	Australian Nat'l. Radio Astr. Obs., Parkes 64m	148.26	-33.01	-358	+231

C. SPACEBORNE OBSERVATORIES

System	Observatory	Orbit	Perigee	Apogee	Incl.
75009901	International Ultra-violet Explorer	Geosynchronous	32,050	52,254	28.6

D. OBSERVING SITES OF AMATEUR OBSERVERS

Observer	OS	Long.	Lat.	Alt.
Bortle, J. E.	1	286.26	41.58	122
	2	286.25	41.82	
	3	286.33	42.00	
Bouma, R. J.	1	6.50	53.24	0
	2	6.27	53.35	0
	3	Site unknown		
Bus, E. P.	1	6.50	53.24	0
	2	6.27	53.35	0
	3	Site unknown		
Clark, M. L.	1	116.07	-32.12	273
	2	117.03	-31.90	333
De Assis Neto, V. F.	1	315.00	-20.78	920
	2	315.00	-20.72	997
DeYoung, J.	1	282.89	38.74	9
	2	282.94	38.92	13

Dixon, I.	1	151.43	-32.56	
Ferrin, I.	1	70.87	8.79	3600
	2	71.12	8.63	1880
Machholz, D.	1	238.1	37.07	1021
	2	237.9	37.25	638
	3	238.1	37.30	21
McBride, P. V.	1	266.61	36.33	378
Merlin, J.-C.	1	355.57	46.83	350
	2	355.61	46.82	455
Morris, C. S.	1	241.70	34.27	486
	2	242.01	34.28	1520
	3	241.28	34.57	1000
	4	240.91	34.75	1566
Morrison, W.	1	281.66	44.29	195
	2	281.56	44.23	240
	3	281.60	44.22	200
Newman, R.	1	151.17	-33.3	2
Pearce, A.	1	115.79	-31.92	20
	2	115.76	-32.92	35
	3	116.16	-31.96	120
	4	116.19	-31.80	290
Poitevin, P.	1	5.13	50.95	10
Price, R. T.	1	148.01	-34.65	340
Seargent, D. A. J.	1	151.49	-33.33	30
Shanklin, J. D.	1	0.01	52.21	10
	2	0.17	52.03	70
	3	357.05	53.14	20
Spratt, C. E.	1	236.82	48.25	9
	2	236.78	48.30	9
	3	236.83	48.26	6
	4	236.81	48.28	21
Wood, J.	Observing sites unknown			

INDEX BY DATE

Listed below are the dates on which the individual networks were active: 1 = Astrometry; 2 = Infrared Studies; 3 = Large Scale Phenomena; 4 = Near Nucleus Studies; 5 = Photometry and Polarimetry; 6 = Radio Studies; 7 = Spectroscopy and Spectrophotometry; 8 = Amateur Observations.

1983 Aug.	9	1
	10	1
	13	1
	18	1
	30	1
	31	1
Sep.	4	1
	27	1
Oct.	27	1
Nov.	12	7
Dec.	29	8
	30	8
1984 Jan.	1	1
	3	1
	4	1
	6	1
	20	1, 8
	21	8
	22	1
	23	1, 8
	24	1
	25	8
	26	1
	27	1, 6, 8
	28	8
	29	1, 8
	30	1, 8
	31	1, 6, 8
Feb.	1	1, 5, 8
	2	1, 8
	3	1, 8
	4	1, 5, 7, 8
	5	1, 5, 8
	6	1
	7	1, 5, 6
	8	1, 6, 8
	9	1, 6, 8
	10	1, 6, 8
	11	1
	12	1, 8
	13	1, 6, 8
	14	1, 8
1984 Feb.	15	1, 6, 8
	16	1, 6
	17	1, 8
	18	1, 8
	19	1, 8
	20	1, 8
	21	1, 5, 6, 8
	22	1, 5, 6, 8
	23	1, 5, 6, 8
	24	1, 6, 7, 8
	25	1, 7, 8
	26	1, 8
	27	1, 5, 8
	28	1, 5, 6, 8
	29	1, 6, 7, 8
Mar.	1	1, 8
	2	1, 5, 8
	3	1, 7, 8
	4	1, 5, 8
	5	1, 5, 8
	6	1, 2, 6, 8
	7	1, 2, 8
	8	1, 8
	9	1, 8
	10	1, 8
	11	1, 8
	12	1, 8
	13	1
	14	1, 6
	15	6
	18	1
	19	2, 8
	20	1, 3, 5, 8
	21	1, 2, 8
	22	1, 8
	23	1, 3, 5, 6, 8
	24	1, 3, 5, 6, 8
	25	1, 3, 5, 6, 8
	26	1, 4, 5, 7, 8
	27	1, 2, 3, 8
	28	1, 2, 3, 4, 8
	29	1, 2, 3, 4, 5, 6, 7, 8

	31	1, 3, 5, 6, 7, 8
Apr.	1	1, 2, 8
	2	1, 2, 3, 8
	3	1, 8
	4	1, 5, 8
		1, 5, 8
	5	1
	6	1
	8	1
	9	1

1984 Apr.	18	1
	21	1, 8
	23	1
	26	1
	27	1
May	3	1
	7	1
	26	1
	27	1

INDEX BY DISCIPLINE

Listed below is the number of observations reported by each network on the various dates, and their total.

NETWORK: ASTROMETRY

1983 Aug.	9	2	1984 Feb.	12	2	1984 Mar.	20	5
	10	1		13	3		21	2
	13	1		14	3		22	4
	18	2		15	2		23	7
	30	1		16	1		24	2
	31	1		17	3		25	4
Sep.	4	3		18	12		26	10
	27	1		19	4		27	3
Oct.	27	1		20	3		28	6
1984 Jan.	1	1		21	7		29	6
	3	1		22	11		30	6
	4	1		23	14		31	4
	6	1		24	18	Apr.	1	3
	20	1		25	10		2	1
	22	4		26	3		3	3
	23	3		27	15		4	1
	24	1		28	7		5	1
	26	1		29	11		6	2
	27	5	Mar.	1	9		8	1
	29	2		2	8		9	1
	30	4		3	2		18	1
	31	1		4	5		21	1
Feb.	1	4		5	4		23	2
	2	11		6	14		26	1
	3	9		7	1		27	1
	4	2		8	1	May	3	1
	5	2		9	6		7	1
	6	7		10	2		26	1
	7	6		11	5		27	2
	8	7		12	2			
	9	2		13	3	Total		375
	10	4		14	1			
	11	6		18	1			

NETWORK: INFRARED STUDIES

1984 Mar.	6	1	1984 Mar.	27	1	1984 Apr.	1	1
	7	1		28	1			
	19	2		29	1	Total		10
	21	1		31	1			

NETWORK: LARGE SCALE PHENOMENA

1984 Mar.	20	1	1984 Mar.	27	4	1984 Apr.	1	2
	23	1		28	3			
	24	2		29	1	Total		19
	25	2		30	3			

NETWORK: NEAR NUCLEUS STUDIES

1984 Mar.	26	1	1984 Mar. 29	3	Total 5
	28	1			

NETWORK: PHOTOMETRY AND POLARIMETRY

1984 Feb.	1	1	1984 Feb.	28	1	1984 Mar.	26 1
	4	2	Mar.	2	1		29 1
	5	1		4	1		30 1
	7	1		5	1	Apr.	3 1
	21	1		20	1		4 1
	22	1		23	1		
	23	1		24	1	Total	22
	27	1		25	1		

NETWORK: RADIO STUDIES

1984 Jan.	27	2	1984 Feb.	21	1	1984 Mar.	23 1
	31	2		22	1		24 1
Feb.	7	1		23	1		25 1
	8	1		24	1		29 1
	9	1		28	1		30 1
	10	5		29	1		
	13	2	Mar.	6	8	Total	43
	15	2		14	1		
	16	4		15	1		

NETWORK: SPECTROSCOPY AND SPECTROPHOTOMETRY

1983 Nov.	12	1	1984 Feb.	29	1	1984 Mar.	30 1
1984 Feb.	4	1	Mar.	3	1		
	24	1		26	1	Total	9
	25	1		29	1		

NETWORK: AMATEUR OBSERVATIONS

1983 Dec.	29	1	1984 Feb.	17	2	1984 Mar.	11	1
	30	1		18	6		12	1
1984 Jan.	20	1		19	10		19	1
	21	2		20	4		20	5
	23	1		21	2		21	3
	25	6		22	1		22	1
	27	1		23	9		23	3
	28	2		24	5		24	5
	29	3		25	3		25	5
	30	1		26	6		26	3
	31	3		27	4		27	4
Feb.	1	1		28	1		28	5
	2	1		29	4		29	3
	3	1	Mar.	1	4		30	2
	4	1		2	2		31	1
	5	4		3	8	Apr.	1	2
	8	3		4	10		2	1
	9	1		5	8		3	1
	10	1		6	5		4	2
	12	2		7	3		21	1
	13	2		8	6			
	14	1		9	1	Total		197
	15	1		10	2			

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. 86-2	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Archive of Observations of Periodic Comet Crommelin Made During Its 1983-84 Apparition		5. Report Date December 15, 1985 6. Performing Organization Code
7. Author(s) Z. Sekanina (editor) and M. Aronsson (software specialist)		8. Performing Organization Report No.
9. Performing Organization Name and Address JET PROPULSION LABORATORY California Institute of Technology 4800 Oak Grove Drive Pasadena, California 91109		10. Work Unit No. 11. Contract or Grant No. NAS7-918 13. Type of Report and Period Covered External Report JPL Publication
12. Sponsoring Agency Name and Address NATIONAL AERONAUTICS AND SPACE ADMINISTRATION Washington, D.C. 20546		14. Sponsoring Agency Code RE4 BP-156-02-02-01-00

15. Supplementary Notes

16. Abstract

This is an archive of 680 reduced observations of Periodic Comet Crommelin made during its 1984 apparition. The archive integrates reports by members of the eight networks of the International Halley Watch (IHW) and presents the results of a trial run designed to test the preparedness of the IHW organization for the current apparition of Periodic Comet Halley.

17. Key Words (Selected by Author(s))	18. Distribution Statement
Astronomy; Astrophysics	Unclassified; unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified		