of the isovelocity lines with $|v| \leq 20$ km/s is similar to that expected for the family of long axial orbits moving within the bars.

A geometrical model which can reproduce the shape of the isophotes has also been attempted, as described in the previous paragraph, by interpolation of the galaxy isophotes. From it results that (see Fig. 4 and Table 1): (1) The disk is probably oblate in shape. Despite the lack of kinematical information, its P.A. remains constant even if the flattening changes slightly, a feature typical of axisymmetric systems. (2) The bar is almost prolate, having similar axial ratios ($\underline{q} = 0.44$, $\underline{p} = 0.45$). (3) The ring cannot be circular, since it appears rounder than the disk and slightly misaligned. Its flattening and orientation are consistent with an elliptic structure aligned with the bar axis and with axial ratio 0.847. (4) According to the kinematics, the bulge could be triaxial. From the analysis of the possible solutions, excluding shapes as flat as the disk, we found a possible axial ratio of $\underline{q} = 0.817$, $\underline{p} = 0.824$, almost prolate, and elongated on the plane of the disk at 57° from the bar axis. But the roundness of its isophotes makes this last result quite uncertain.

A more complete analysis of the data is now in progress and will be compared with the data for the other SB0 systems included in the programme.

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IDS Spectroscopy of Planetary Nebulae

A. ACKER, Observatoire de Strasbourg, Centre de Données Stellaires, France

B. STENHOLM, Lund Observatory, Sweden

I. Introduction

From 1982 to 1984, Lundström and Stenholm conducted low-resolution spectroscopy of faint emission-line objects in the southern Milky Way (see Lundström, Stenholm, 1984). Their experience showed that the IDS is very efficient for spectroscopy of faint emission-line objects. They established that a mean exposure time of 10 minutes permits a clear classification of the observed objects, and a study of their most intense lines. Based on this study, we have undertaken, since 1984, a spectroscopic survey of the planetary nebulae. This study has been conducted with a double aim:

- realization of an atlas of calibrated spectra, within the framework of the forthcoming *Strasbourg-ESO Catalogue of Galactic Planetary Nebulae;*
- a statistical study of properties of the nebulae, in relation with problems of stellar evolution.

That means that most of the 1,500 objects known (1,100 in the southern sky) should be observed, essentially at La Silla, and at the Observatoire de Haute-Provence for the northern objects.

Status reports showing the earlier situation were given by Stenholm (1986), and Stenholm, Acker (1987).

II. The Observations and Reductions

In Table 1, some instrumental and observational parameters are summarized.

The apertures used are very small; most objects are, however, stellar-like, and this majority of objects is also the less observed part of the whole group. On the other hand, extended objects, particularly those of low surface brightness, are difficult to observe in this manner (10 minutes per object, in order to execute the programme during a reasonable period of time).

Table 2 presents the number of objects observed within each allocated observing run.

Here, we will report only about the observations done at La Silla. The status of the project is shown in the diagram in Figure 1. The reductions are carried out with the IHAP programme, working on the HP 1000 computer at La Silla, in Garching, at the Observatoire de Haute-Provence, and at the Institut de Physique du Globe de Strasbourg. Up to now, we have reduced all 723 spectra obtained at La Silla and measured line intensities for 220 of them.

III. Analysis of the Quality of the IDS Data

1. Reliability

To estimate the reliability of the whole system through different observing periods, we have compared the reduced fluxes obtained for independent spectra of spectrophotometric standard stars. We have obtained the following values of the spread $\Delta\varphi$ to the mean value φ of the flux calculated over the whole spectra:

star W 485 A (3 spectra)
$$<\Delta\varphi/\varphi> = 4{,}5\,\%$$
L TT 9239 (6 spectra)
$$<\Delta\varphi/\varphi> = 4{,}5\,\%$$
L 970–30 (6 spectra)
$$<\Delta\varphi/\varphi> = 7\ \ \%$$

2. Measurement of Blends

The measurement of line areas is done by using the *Multiple-Gaussian-Fit* procedure of IHAP for the blends of [N II]

Table 1: *Instrument Configurations*

	European Southern Observatory (ESO)	Observatoire Haute-Provence (OHP)
Telescope	1.52 m	1.93 m
Spectrograph	Boller & Chivens	CARELEC
Detector	IDS	CCD
Number of useful pixels	2053	511
Aperture	4 × 4″	2.5 × 4″
Approximate wavelength range	400–740 nm	385–740 nm
Dispersion	17 nm/mm	26 nm/mm
Approximate resolution	1 : nm	1 : nm
Normal exposure time	10 min	10 min

Table 2:

LA SILLA		Observatoire de HAUTE-PROVENCE	
Telescope time	Number of observed objects	Telescope time	Number of observed objects
1983 (05) and 1984 (04) (9 nights)	127	1986-07-28 – 1986-08-5 (8 nights)	74 (12 southern)
1985-07-15 – 1985-07-21 (6 nights)	112	1986-12-19 – 1986-12-24 (5 nights)	61
1985-07-27 – 1985-08-05 (8.5 nights)	100	1987-03-06 – 1987-03-12 (6 nights)	5 (very bad weather)
1986-01-18 – 1986-01-25 (7 nights)	146		
1986-07-08 – 1986-07-14 (6 nights)	167		
1986-12-10 – 1986-12-16 (6 nights)	71		
	723		140
Time given for period 39: 1987-07-12 – 1987-07-16 1987-07-20 – 1987-07-25 (9 nights)			

lines with H α, the sulfur doublet around 672 nm, and the green [OIII] doublet. As the instrumental profile is not gaussian, the total area A of the observed lines is larger than the sum S of the calculated gaussian components. We have found the following mean value of the ratio $A/S = 1.038 \pm 0.05$.

We have corrected the calculated blended area for this effect.

3. The Nonlinearity of the IDS System

M. Rosa (1985) and E.J. Wampler (1985) pointed out that the response of the IDS system shows a dependence with the value of the input-intensity.

Our measurements (Table 3) show that the observed and theoretical line ratios are equal for the [NII] lines, but differ for the [OIII] doublet, in an identical way as that given by Rosa. However, this author proposed that the theoretical ratio is likely to be around 3.03. On the other hand, for a few very bright nebulae (NGC 5315, 6210, 6891, IC 4997), the very intense lines of [OIII] flux $> 2.10^{-13}$ W/m^2/nm) show a ratio equal to 2.9 ± 0.2.

We have also compared our results with those of Gutierrez-Moreno et al. (1985). The ratio of our intensities to those of Gutierrez-Moreno has the following values:

NGC 5873 (16 lines): 0.91 ± 0.21
NGC 5882 (17 lines): 1.21 ± 0.32
IC 1297 (14 lines): 1.03 ± 0.24

In conclusion, we calculate the line intensities relative to I (Hβ) = 100, without correction in a first step. Later we will refine this study with a larger number of reduced spectra.

IV. First Astronomical Results

1. Misclassified Planetary Nebulae

The qualitative analysis of the now 850 observed spectra permits, first of all, to separate "true" planetary nebulae from misclassified ones. In two recent papers (Stenholm and Acker, 1987; Acker, Chopinet, Pottasch, Stenholm, 1987) we have shown, through our survey and IRAS data, and following comments in the literature, that 196 are surely misclassified planetary nebulae, and 60 others are possibly not planetary nebulae. About one fourth of the misclassified planetary nebulae are in fact symbiotic or possible symbiotic stars;

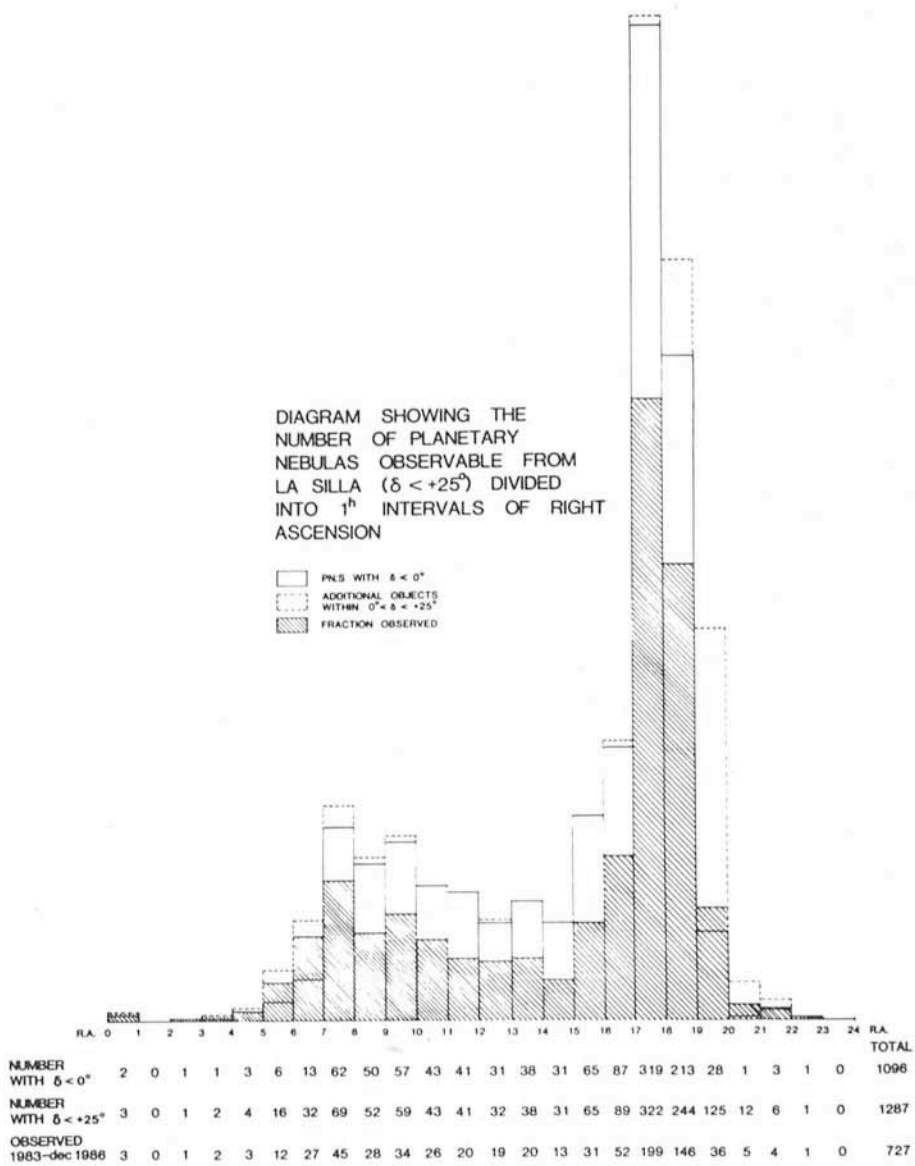

Figure 1.

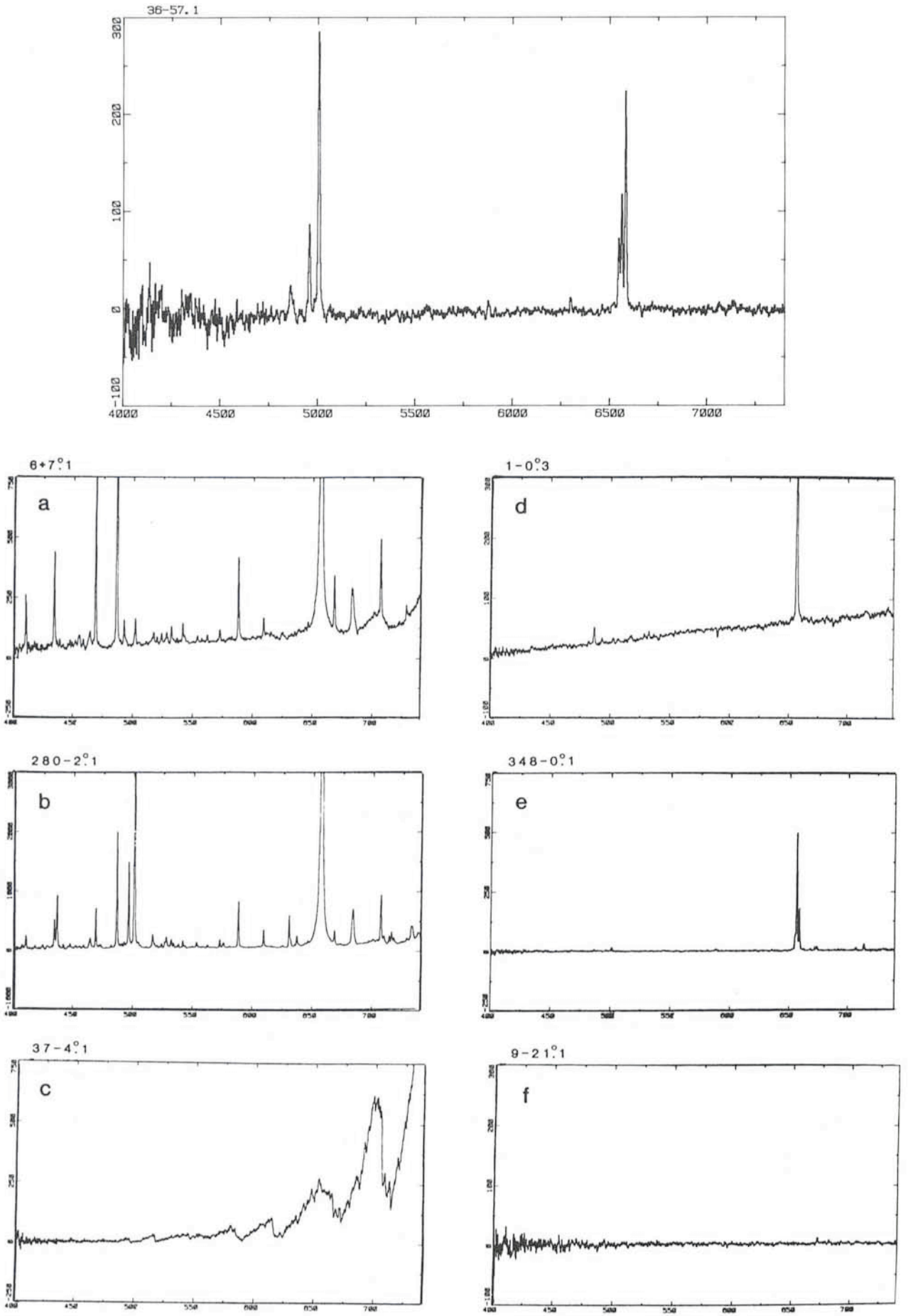

Figure 2: *As examples only we present here some objects, previously catalogued as planetary nebulae, but dismissed as such in this paper. (a) and (b) show symbiotic stars, the latter with [OIII] lines (as in planetary nebulae) but otherwise characteristic of a symbiotic star; (c) is a late-type star showing broad molecular absorption bands; (d) is a Hα emission star; (e) is a HII region; and (f) is a galaxy, only a faint, red-shifted Hα-line seen. Compare with the spectrum of a typical planetary nebula at the top.*

results concerning nine of these stars are given in Acker, Lundstrom, Stenholm (1987). Other objects are galaxies (19), HII regions (22), plate faults (10), reflexion nebulae, late-type stars, emission-line stars, etc.

The misclassified objects are found mainly in the following discovery lists: Kohoutek (43 objects), Henize (He –2: 31 objects), ESO (30 objects), Wray (23), Haro (H2: 15 objects).

Figure 2 presents some objects compared to a classical planetary nebula.

2. Determination of Physical Properties of the Planetary Nebulae
(in collaboration with J. Köppen and G. Jasniewicz)

Some of the measured line ratios allow, after reddening correction, the determination of the electronic temperature and density ([OIII] 4363/5007, [NII] 6583/5755, [SII] 6716/6731). In addition, if a sufficient number of lines are available, it is possible to estimate ionic abundances, computed through a theoretical model. J. Köppen has written a programme called "HOPPLA", used on the IBM 3081 K computer at the "Centre de Calcul de Strasbourg, CNRS".

Table 3:

Lines	Theoretical line ratio	Observed line ratio
[OIII] 5007/4959	2.88	3.04 ± 0.27 (185 PN)
[NII] 6583/6548	2.94	2.9 ± 0.5 (146 PN)

From the first sample of about 200 spectra, it seems that for 27 objects the abundances are well determined; for 46, the data could be better, and for the other spectra, the parameters are poorly determined. Say one third of all observed objects can be used for further work.

This very homogeneous and reliable material will be treated statistically, with the collaboration of G. Jasniewicz, regarding galactic gradients and problems of stellar evolution. The first results of this kind will be be presented at IAU Symposium 131, devoted to planetary nebulae, and held in Mexico in October 1987.

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ESO Exhibition in Brussels Visited by King Baudouin

An exhibition about the European Southern Observatory was organized in a collaboration between ESO, the Brussels Planetarium and the Belgian National ESO Committee. It was shown on television and was visited by a large public. The exhibition was originally scheduled to last from June 6 to 15, 1987, but due to the large interest (more than 1,500 visitors in two days!), it was prolongated until June 26.

It was a particular honour to receive a visit on June 9 by the Belgian Head of State, King Baudouin I, and by the Belgian Ministers of Education, Messrs. D. Coens and A. Duquesne. They were shown around by Prof. C. de Loore, President of the Belgian National ESO Committee. The King, who since long takes an active interest in astronomy, was informed about ESO and its future projects, especially about the Very Large Telescope, and expressed appreciation of the pictures and models on display. The King was presented with some large colour pictures of spectacular objects in the southern sky which had been specially prepared by ESO for this occasion. The King's visit was given wide coverage in the media.

The exhibition was opened by two delegates of the Belgium Ministry of Education on Friday, June 5, in the presence of the members of the ESO Coun-

Dr. J.-P. Swings and Prof. C. de Loore explain the ESO VLT model to King Baudouin and the Belgian Ministers of Education, Messrs. D. Coens and A. Duquesne.