cil, who had met in Brugge the day before. The brief ceremony, with presentations by the delegates, by the Director-General of ESO, Prof. L. Woltjer, and by Prof. C. de Loore, was followed by a well-attended Press Conference.

More than 100 large colour photos (including many beautiful exposures of nebulae, galaxies, etc.) illustrated the scientific and technical activities of ESO and were accompanied by comprehensive texts. Recent results were shown, including Comet Halley and, not the least, the bright supernova in the Large Magellanic Cloud. The exhibition also featured large-scale models of ESO's NTT and VLT projects.

This year marks the 25th anniversary of the European Southern Observatory, which was founded in 1962 to foster cooperation in astronomy and to provide European scientists with a major modern observatory.

OPTOPUS Observations of Quasar Candidates

S. CRISTIANI, ESO, and Istituto di Astronomia della Università di Padova

1. Introduction

OPTOPUS is a fiber-optic instrument for multiple-object spectroscopy with the Boller & Chivens spectrograph and a CCD detector at the 3.6-m telescope. The system has been described in detail by the Optical Instrumentation Group (1985, *The Messenger* **41,** 25). Its application for observing Halley's comet has been reported by Lund and Surdej (1986, *The Messenger* **43,** 1). Here another "classical" use of multiple-object spectroscopy is presented: follow-up observations of quasar candidates.

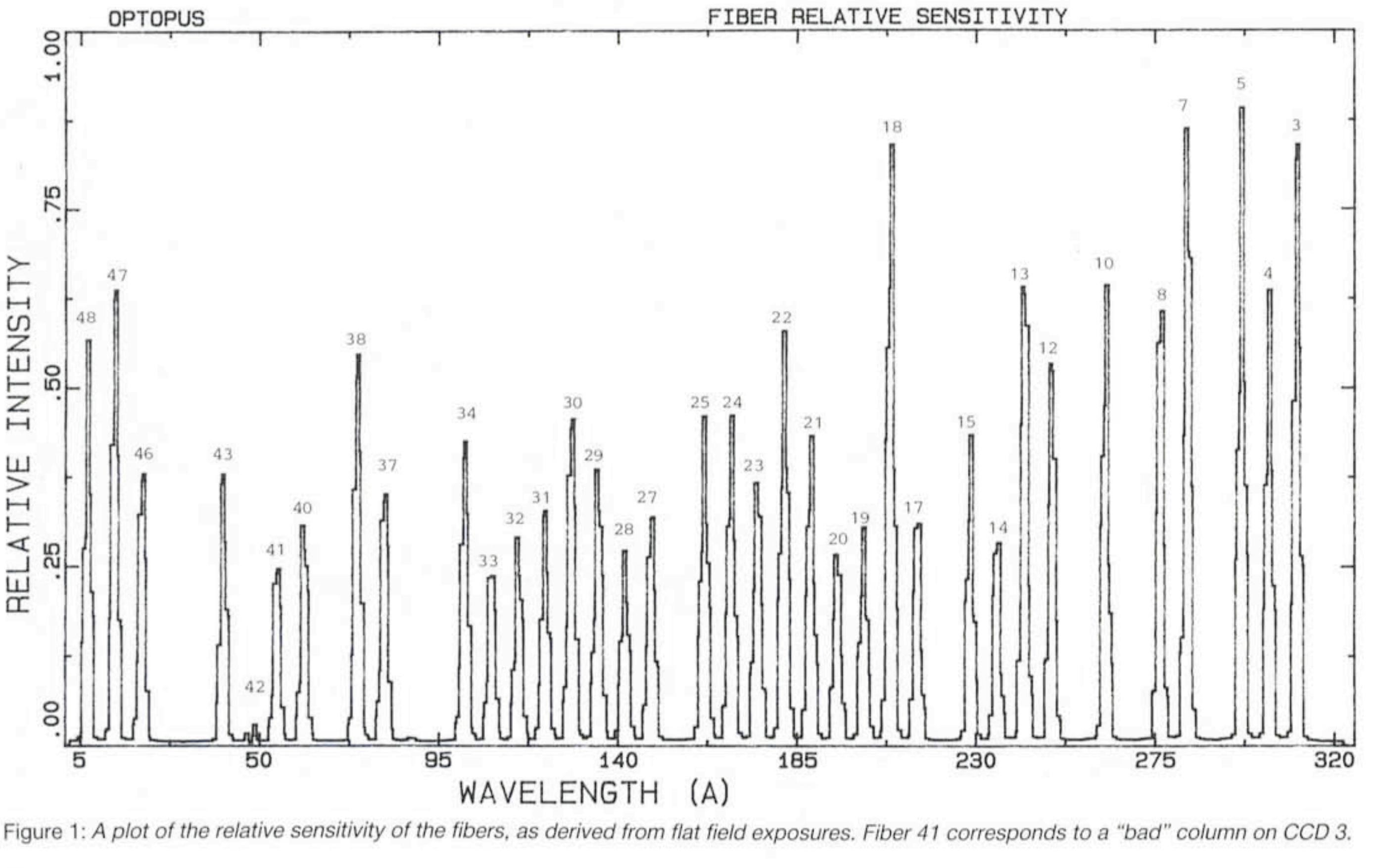

Figure 1: *A plot of the relative sensitivity of the fibers, as derived from flat field exposures. Fiber 41 corresponds to a "bad" column on CCD 3.*

2. Searching for Quasars

Colour anomalies (especially ultraviolet excess), variability and presence of strong emission lines in the spectrum are the optical criteria mostly used to distinguish quasar candidates from stars. Automated techniques, developed in the last years and applied to photographic plates or CCD transit surveys, yield a considerable number of quasar candidates, potentially providing the basic information to solve many questions about the universe. Slit spectroscopy, however, is required to confirm those candidates and obtain reliable measurements of their redshifts. This is the true bottle-neck of the process: the great discrepancy between the two hours at a Schmidt telescope needed to expose a good objective-prism plate, which will provide some hundreds of quasar candidates, and the about 100 hours required with a 4-m-class telescope, in order to check them spectroscopically one by one.

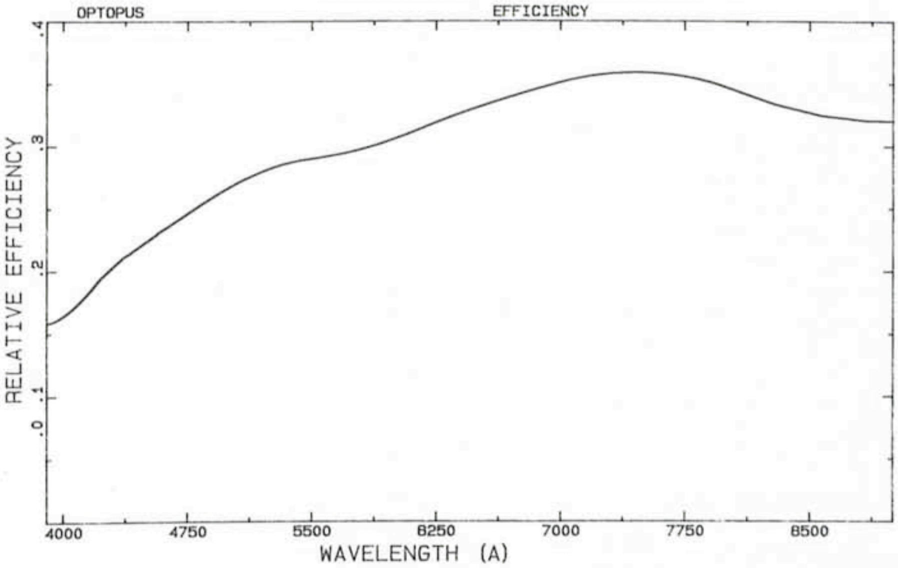

Figure 2: *The absolute efficiency of OPTOPUS. It takes into account losses due to fiber/object misalignment and material absorption in the fibers.*

3. Observing with OPTOPUS

The possibility of taking spectra of many objects at the same time may mitigate the problem. As a matter of fact, the advantage of using a multi-object spectrograph depends on the combination of two factors: efficiency (limiting magnitude) and size of the observable field. In other words, one needs a decent number of interesting objects in the observable field, in order to justify both the observing time spent in changing templates and plugging fibers and a careful preparation of the observations (measuring accurate positions of the targets, finding the guide stars, having ready the observing plan well in advance).

In the case of OPTOPUS the observable field is a circle of 33 arcmin diameter, in which a maximum number of 47 fibers can be plugged for spectroscopy with some topological restriction. The limiting magnitude is a function of the dispersion and will be discussed below.

Around Christmas 1986 OPTOPUS was used to observe some quasar candidates in the SA 94 field (see Barbieri and Christiani, 1986, *Astron. Astrophys. Suppl. Ser.* **63,** 1; and Barbieri, Cristiani, Iovino, Nota, 1987, *Astron. Astrophys. Suppl. Ser.* **67,** 551). In order to max-

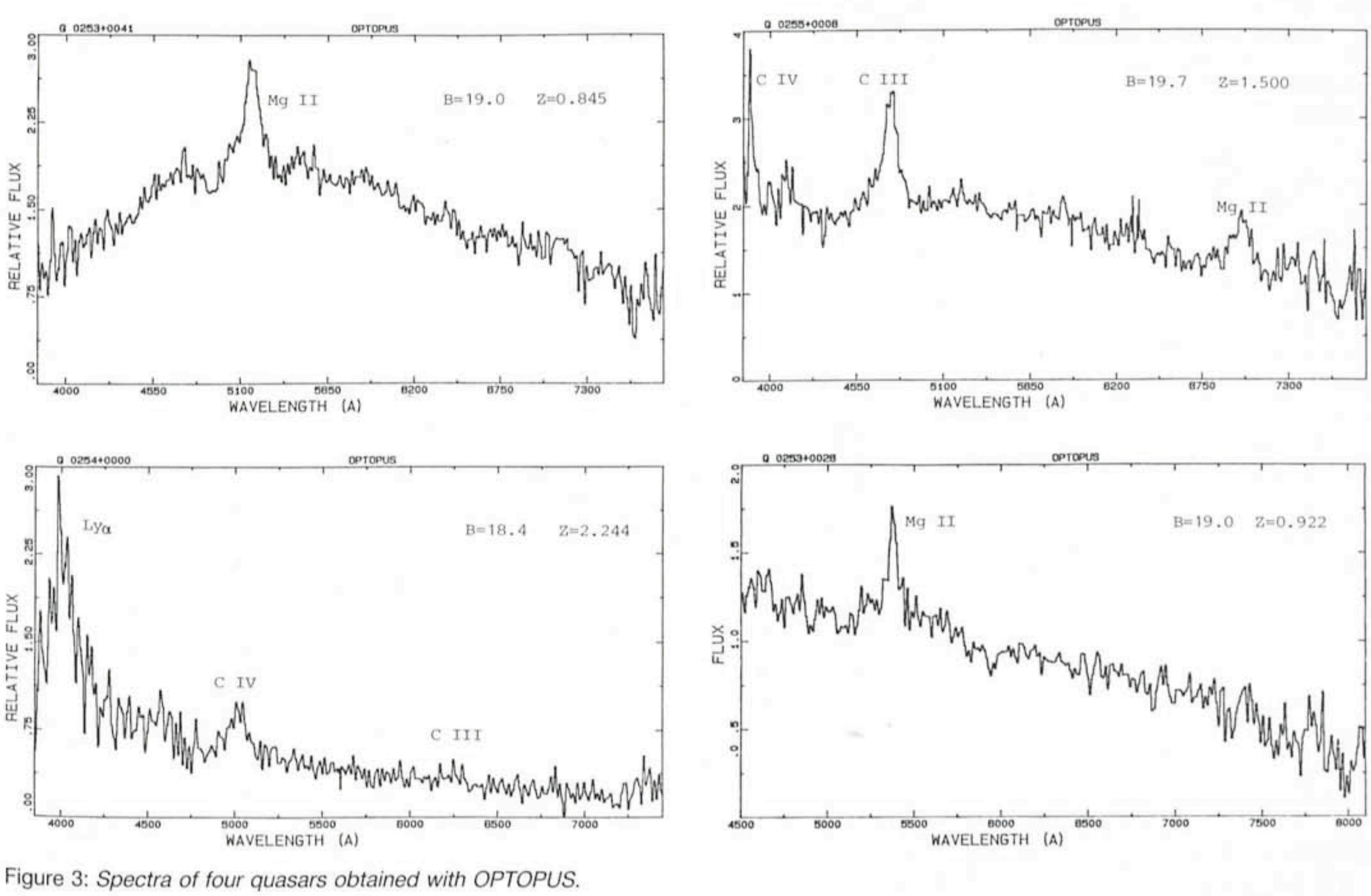

Figure 3: *Spectra of four quasars obtained with OPTOPUS.*

imize the efficiency of the system, a dispersion of 450 Å/mm was chosen. Not all the fibers have the same sensitivity, as shown in Figure 1, therefore fainter objects were assigned better fibers.

As a by-product of the observations, the absolute efficiency of OPTOPUS was derived. From the spectrophotometric calibration of some objects in the observed SA 94 fields it was possible to obtain the system response curve, which, compared with the one previously derived for the Boller & Chivens spectrograph in the normal slit configuration with the same grating and detector, provides the result of Figure 2.

4. Data Reduction

The reduction of OPTOPUS data is carried out very much in the same way used for slit spectra. Only the sky subtraction requires some additional care, especially at magnitudes fainter than B = 18.

An evaluation of the sky background corresponding to each fiber can be accomplished by offsetting the telescope about one arcmin away from the actual field (at high galactic latitudes the probability of getting another object in the aperture corresponding to the fiber is negligible) and exposing for a convenient time. However, it is well known that the sky emission is neither constant during the night, nor uniform all over the sky. A better estimate can then be obtained by combining different sky exposures taken during the night, say one at the middle and one at the end of the night, and using a few fibers to monitor the sky during the "object-exposure".

5. Results and Final Considerations

Sixty objects, down to B = 19.7 were observed in two fields during the December 1986 run. Seven of them turned out to be quasars; four are shown in Figure 3. The result is not at all disappointing, since the experiment mainly aimed at checking that no low-redshift quasars are missed by the usual UV excess criteria.

The performances of the instrument turned out to be better than expected: from these observations it appears possible to reach B = 20 with a spectral resolution of 25 Å and a S/N > 5, by taking two exposures of one hour for each field (in order to filter out cosmic rays) and properly subtracting the sky background as described above. At this limit, about ten quasars per template are expected. Using an efficient slit spectrograph like EFOSC, assuming a success rate of 50 per cent (required for an honest completeness) and 15 minutes exposure time per candidate, it would require about 5 hours of frantic work to do what can be accomplished in 3 hours of more relaxed OPTOPUS observations. Of course EFOSC allows much greater flexibility and OPTOPUS observations have to be carefully planned with large advance, nevertheless, the fiber-optics spectrograph offers a valuable possibility which should not be neglected by the observers.

An efficient aid in preparing observing proposals and runs, as well as the papers which follow:

SIMBAD, the CDS Database

A. HECK and D. EGRET, C.D.S., Observatoire Astronomique, Strasbourg, France

Preparing an Observing Proposal ...

... has become an increasingly challenging exercise. With an ever higher pressure on space experiments and on large ground-based telescopes (and in particular those of ESO), it has become imperative to present extremely well-prepared documents to selection committees to get the observing time sought for.

In fact, scientists are now complaining that writing a good observing proposal requires as much time, care and energy as a paper for a refereed journal. The rationale has not only to be scientifically justified, but often a description of previous related work and of the methodology that shall be used for reducing and exploiting the data, have to be included. Reasons for additional and/or repeated observations have also to be explained. More and more frequently, combined or simultaneous (ground/space or multi-wavelength) observations are solicited and must be appropriately requested and subsequently organized.

These tasks are made much easier by a tool such as SIMBAD, a database providing all basic astronomical data available on the proposed targets, as well as the corresponding bibliography. More and more proposal writers are using it, as well as an increasing number of selection committee members.

The usefulness of SIMBAD does not stop at the writing of the proposals for observing time. The preparation of the observing runs themselves can also be greatly facilitated. Once these are completed, the reduction of the observations, their comparison with already published results and eventually the writing of new papers is significantly helped by getting the fundamental astronomical data and the relevant bibliography from SIMBAD. Never again should referees reject manuscripts for the reason of overlooked published papers!

Astronomical Quiz

It is no secret for the readers of this journal that practically every astronomical catalogue uses a different notation to designate the objects it gathers. In the past, this has already led a few times to the situation where two astronomers studied the same object under different identifiers without ever noticing it!

Most of us also remember the great difficulty of searching for various data spread over different catalogues for a sample of stars or even for a single star. The only common point between these catalogues was generally the appearance of the coordinates, often imprecise and relative to different epochs. Subsequently, how was an exhaustive survey of the papers relevant to the objects under study obtained? The available compilations were subject oriented, and when object designations were used as key words, generally no synonymity relations were provided.

The situation began to improve by the pioneering work undertaken in France at the beginning of the seventies by the astronomers of the Strasbourg Data Centre (CDS) and of a few collaborating institutions who started to establish, as modern Benedictines armed with computers, correspondences between the various catalogues. Since its founda-