

the terrestrial ratio of 89 and further substantiates theories of the enrichment of  $^{13}\text{C}$  in the interstellar medium through evolution of the galaxy since the formation of the solar system. This value also agrees with other recent determinations of the  $^{12}\text{C}/^{13}\text{C}$  ratio from the molecules

$^{12}\text{CH}^+ / ^{13}\text{CH}^+$  and  $^{12}\text{CO} / ^{13}\text{CO}$ . Since it had been speculated that  $^{13}\text{C}$  might preferentially form CO compared to  $^{12}\text{C}$ , the agreement between the CO, CN, and  $\text{CH}^+$  abundances indicates that this effect is not very important.

The detection and measurement of

weak features requiring high precision and high spectral resolution such as those reported here are a typical example of the way in which the new generation of very large telescopes which should become available early in the next decade can be exploited.

## The Work of the ESO Observing Programmes Committee

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ESO astronomers devote considerable time to preparing, and put obvious care into writing Applications for Observing Time at La Silla. Many take justifiable pride in the presentation of their ideas. Yet, given the heavy oversubscription of telescope time, inevitably a selection of the proposed observing programmes must be made. And often this selection is drastic: in each Observing Period, the applied-for number of observing nights for the various telescopes exceeds the number of available nights by factors of two, at telescopes of intermediate size, to four, at the 2.2-m and 3.6-m telescopes!

It is the task of the Observing Programmes Committee (OPC) to evaluate the scientific merit of the submitted Applications. Based on the OPC's recommendations, ESO then prepares an Observing Schedule – employing the available telescope nights for the best-rated proposals. In the following we will describe the refereeing system of the OPC and explain the steps that lead to the final Observing Schedule on the ESO telescopes.

The history and procedures of the OPC have already been described by the previous OPC chairman, B. Westerland, in 1982 (*Messenger* No. 28). In the meantime, the working procedures of the Committee have evolved considerably, so that an updated description is warranted.

The OPC in its current form exists since 1971: there is one Member and one Substitute member from each of the eight ESO countries\*, they are designated by the National ESO Committees and serve for five-year terms.

\* This year's composition of the OPC is (with Substitute Members in parentheses): J.-M. Vreux (and E.L. van Dessel), Belgium; E.H. Olsen (and P.E. Nissen), Denmark; G. Monnet (and J. Boulesteix), France; K. Fricke (and I. Appenzeller), Federal Republic of Germany; A. Renzini (and F. Bertola), Italy; P.C. van der Kruit (and K.A. van der Hucht), The Netherlands; G. Lynga (and L. Nordh), Sweden; and M.C.E. Huber (and B. Hauck), Switzerland. The OPC Members (and their terms) are listed regularly in the ESO Annual Report.

### Refereeing the Applications

The eight OPC Members, together with one ESO staff member (usually the Head of the Scientific Group, J. Danziger) referee the 300 to 350 Applications for Observing Time that are currently submitted for every six-month Observing Period (cf. Fig. 1).

Each Application is evaluated by three referees. As a result, each OPC Member has to read and rate over 100 Applications twice a year: he must decide on a mark for each proposed programme and recommend the number of nights that – in his judgement – should be made available to the applicant(s), if the programme actually receives telescope time. The rating scale comprises nine grades (extending from "outstanding" to "useless") that are expressed by numbers 1 to 5 with half-integer steps.

Rating over one hundred individual

Applications is not only a demanding, but also a very time-consuming undertaking. This is the reason why so much emphasis is put on concise Applications! OPC Members spend more than the equivalent of one working week in fulfilling this task. A new Member (or a Substitute Member replacing the regular Member) may find that up to two weeks full-time are needed to arrive at a consistent judgement of all the Applications he has to referee. Furthermore, the handling of Applications – from receipt by ESO until the moment when applicants are informed on whether observing time for their proposal(s) can be granted or not – follows a rather tight schedule, giving the OPC Members only about three weeks to evaluate the proposals.

In order to avoid any bias in judgement, some of the referees assigned to a given applicant (or group of appli-

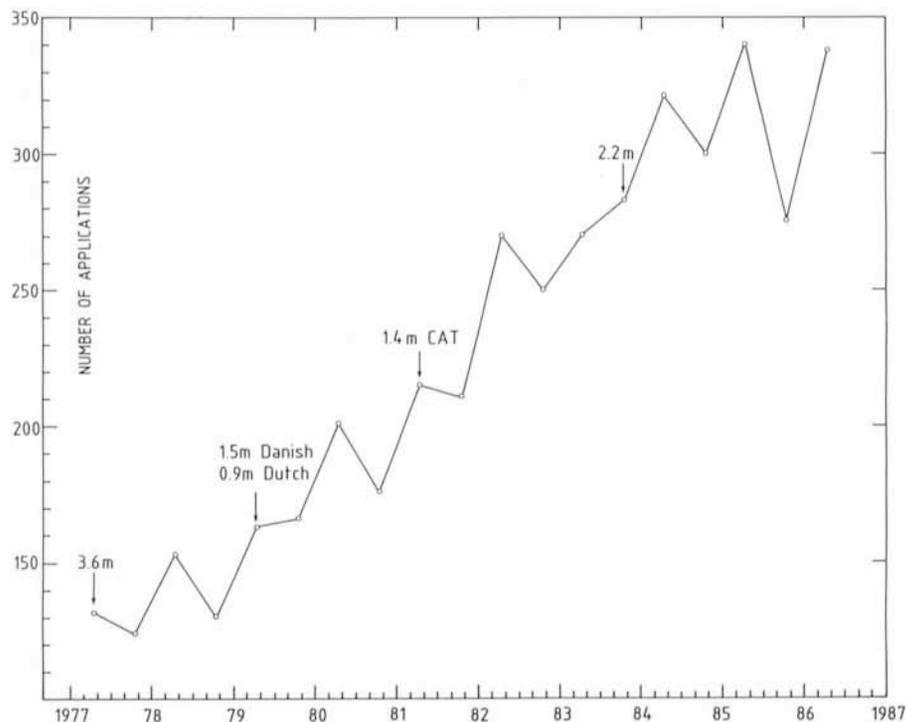


Figure 1: Number of Applications submitted to ESO during the past nine years. Arrows indicate when new telescopes became available.

cants) are changed from one Observing Period to the next. Given the limited number of OPC Members, a particular Application is thus evaluated by specialist as well as non-specialist referees. Accordingly, applicants have to make their proposed observations appealing to specialists and non-specialists alike. They must both, demonstrate their competence within a specific area and show the importance of the proposed work in the broader context. Since any large discrepancy in the ratings will be discussed at the semi-annual OPC Meetings, faulty judgements on the side of the non-specialist (or specialist!) will be eliminated.

### Preliminary Observing Schedule

When the ratings and recommended numbers of nights from the referees are available, ESO produces a list of the Observing Applications for each telescope, with the Applications being ranked according to the average ratings of the three referees. The average recommended number of nights is used to sum up the observing time required as one goes down the list, and a cutoff line is drawn, when the number of nights available for astronomy (technical time being considered separately) is reached. (Applications where doubt about the feasibility was expressed by at least one referee are listed apart.) The information contained in this list is also used to generate a set of tables which shows the distribution of the programmes above the cutoff line over the months and the moon phases for each telescope. This set of tables also shows the resulting change-overs of instruments for each telescope. These working documents, which actually represent preliminary observing schedules for the various telescopes, are sent to the members a few days before they get together in the OPC Meeting.

### OPC Meetings

The OPC meets twice a year (i.e., once for each Observing Period) during two days. Most of the meeting time is spent in clarifying discrepancies in the judgement of Applications. The deliberations take place in the presence of the Director General and the Head of the Section Visiting Astronomers. The record of the meeting is kept by Mrs. Chr. Euler. Thus, a dozen people attend the OPC Meetings. The size of this group permits a frank and uninhibited discussion. It is important to note that this discussion is based on the scientific merit of the Applications alone: the national origin of an applicant is of no concern to the OPC.

Obviously, not all Applications can be discussed at a two-day meeting.

Nevertheless, the preliminary schedule for each telescope is closely inspected.

First, those few Applications where doubt about feasibility had been expressed are scrutinized, one by one – and, if justified, are reinstated into the main list.

Next, Applications where the referees disagree in their ratings, are discussed in detail. The three OPC Members who had evaluated the Application in question are asked to explain why and how they arrived at their mark; and in the ensuing discussion, which usually involves the other OPC Members too, an effort is made to arrive at a more uniform judgement. In some cases, nevertheless, discrepant marks are left unaltered; this then reflects an honest difference of opinion between peers!

The influence of these discussions on the scientific judgement of the OPC Members (and, in the end, this *is* the scientific policy of the OPC!) cannot be overestimated. For these frank and spontaneous interchanges, the limited size and confidential nature of OPC Meetings is essential.

To further foster a "unité de doctrine" in the OPC, the Members may ask for discussion of any Application. In fact, referees will often earmark long-term observing programmes for a joint review of progress. Referees will also point out similar proposals with the same goal; the OPC will then seek to avoid unneeded duplication.

OPC Members are aware of the danger that they may (as committee members usually do) give preferential

## Tentative Time-table of Council Sessions and Committee Meetings in 1986

October 3	Scientific Technical Committee, Venice
November 17–18	Finance Committee
November 18	Scientific Technical Committee
December 8–9	Observing Programmes Committee
December 11–12	Committee of Council
All meetings will take place at ESO in Garching unless stated otherwise.	

marks to "safe" Applications, which promise minor, but almost guaranteed progress. Such an attitude would be to the detriment of bolder Applications that can lead to less predictable, but potentially much more rewarding findings – or it may even "prevent" discoveries. This tendency is being fought. In the past, the OPC has indeed given time to novel, but risky projects, even if they occupied one of the large telescopes for about a week (as, for example, for an astroseismology investigation on  $\alpha$  Cen A). Moreover, the OPC has given several months of observing time on a small telescope for an optical monitoring of the 1979 March 5  $\gamma$ -ray burst error box. On the other hand, the OPC has also recommended extensive time for more routine studies. Thus, the small telescopes have been made available for an

In conjunction with the ESO-CERN Symposia on Cosmology and Fundamental Physics, CERN and ESO are organizing an

## INTERNATIONAL SCHOOL ON ASTRO-PARTICLE PHYSICS

to be held at the "Ettore Majorana Centre for Scientific Culture", **Erice, Sicily, in the period 5–25 January 1987**. Co-sponsors are the Italian Ministry of Education, the Italian Ministry of Scientific and Technological Research, and the Sicilian Regional Government.

Recent progress in particle physics, cosmology and astrophysics has given birth to a new discipline that encompasses them all. These embryonic developments are not often covered in an interdisciplinary way. The purpose of this school is to fill this gap.

Lecturers will include J. Barrow, R. Brandenberger, B. Cabrera, A. de Rujula, L. Dilella, J. Ellis, J. S. Gallagher, G. Gelmini, D. C. Koo, L. Maiani, F. Melchiorri, D. V. Nanopoulos, K. A. Olive, B. E. J. Pagel, M. Rowan-Robinson, A. Sandage, R. Sanders, J. Silk, L. Stodolski, A. Szalay, F.-K. Thielemann, N. Turok, L. van Hove.

Persons wishing to attend the course should write to ASTROPARTICLE SCHOOL, TH Secretariat, CERN, 1211 Geneva 23, Switzerland, specifying date and place of birth, nationality, academic qualifications, list of publications, and present position. The total fee, including full board and lodging, is SF 1,400. Partial financial support can be provided in some cases, where the need is clearly justified. **The closing date for applications is 1 November 1986.**

efficiently organized, collective study of long-term photometric variables.

In summary then, the OPC only rarely specifically rejects an Application, and then only because of obvious faults. In general its procedures lead to selection by ranking: given the observing time available, only the best Applications can be accommodated. Furthermore, the OPC Members make a conscious effort to seriously consider innovative, but risky proposals – even if they are rather time-consuming. All the time, measures are taken to minimize bias, at least in the long run.

### Scheduling Observations

The actual scheduling of the best-ranked Applications on the various telescopes is done by ESO, immediately following the OPC Meeting. This is a complex task: many observing Applications propose the use of more than one telescope and focal-plane instrument, and other Applications have time constraints. Many multi-frequency investigations, for example, require the simultaneous use of other observatories on the ground or in space. And there are also single opportunities – stellar occultations, by planets or their moons, for example – that can only be observed in a single, predetermined night.

In addition, the schedule must be optimized, to avoid all-too frequent changes of focal-plane instruments on any one of the telescopes. This is a much more severe constraint than one would at first assume: in some cases it may result in no time being allocated to a well-rated programme.

The wide choice of auxiliary equipment that ESO offers on most of its telescopes requires grouping programmes that make use of the same instrumentation. This is necessary for efficient scheduling, because any exchange of focal-plane instruments brings a loss of observing time. In the case of infrared equipment at the 3.6 m telescope, for example, one loses a minimum of two nights: a special top end has to be installed and later on removed, both operations requiring delicate mechanical and optical adjustments. Consequently, such an instrument will not be mounted for one short observation, because the associated loss of telescope time to the community is of the same order as that gained for a single user.

Finally, the use of some detectors requires special technical assistance during the observations – and for infrared work this means night- and day-time assistance. Proper scheduling of the needed staff specialists then becomes an additional limiting factor. One will

thus understand that, given all these limitations, the allotment of observing time can be a best compromise only.

The final Observing Schedule is approved by the Director General; he may occasionally make minor changes in order to redress extreme national imbalances. About two weeks after the OPC meeting, the applicants are informed about the outcome of their Applications and the observing Schedule is published.

Starting with Observing Period 38, negative replies to applicants may contain an indication on the OPC judgement of their observing proposals. There are three categories: "near", "below" and "far below the cutoff line". This scheme was introduced as the OPC's response to a wish expressed by many astronomers through the Users Committee.\*

\* The OPC, unfortunately, does not see a possibility to fulfill the repeatedly expressed wishes for a detailed justification of the ranking of all Applications. The OPC Members will, however, follow up inquiries by applicants from their country on a case-by-case basis.

## Visiting Astronomers

(October 1, 1986 – April 1, 1987)

Observing time has now been allocated for Period 38 (October 1, 1986 – April 1, 1987). As usual, the demand for telescope time was again much greater than the time actually available.

The following list gives the names of the visiting astronomers, by telescope and in chronological order. The complete list, with dates, equipment and programme titles, is available from ESO-Garching.

### 3.6-m Telescope

*October 1986:* Shaver/Clowes/Iovino, Mighell/Butcher/Buonanno/Gathier, Jörsäter/Bergvall, Bergeron/D'Odorico, Magain, Spitze F./Spitze M./François, Heber/Hunger, Véron, Pickles/van der Kruit.

*November 1986:* Pickles/van der Kruit, Fort/Mathez/Mellier/Picat/Soucaïl, Chinca-rini/Manousoyannaki, Moorwood/Oliva, Danziger/Oliva/Moorwood, Rodriguez/Moorwood/Stanga, Israel/Koornneef, Reipurth/Le Bertre, Natta/Hunt/Vietri, Schulte-Ladbeck/Becker/Appenzeller/Leitherer, Marano/Zitelli/Zamorani, Nesci/Perola, Colina/Fricke/Kollatschny/Pérez-Fournon.

*December 1986:* Colina/Fricke/Kollatschny/Pérez-Fournon, Danziger/Rosa/Matteucci, Lequeux/Azzopardi/Comte, Lequeux/Azzopardi/Maeder/Mathys, Kudritzki/Humphreys/Groth/Butler/Steenbock, de Loore/David/Hensberge/Verschueren/Blaauw, Cristiani/Barbieri/Iovino/Nota, Krauter/Baade, Martinet/Jarvis/Pfenniger/Bacon.

*January 1987:* Martinet/Jarvis/Pfenniger/Bacon, Pakull/Angebault/Bianchi/Beuer-

It is hoped that prospective telescope users can see from the above description that considerable peer-pressure – becoming manifest in the OPC Meetings – forces the Members to do their homework conscientiously, judiciously and honestly; and that the OPC concentrates on scientific issues exclusively. In fact, this is probably the most striking aspect of the OPC Meetings. It certainly does impress new Members.

Undoubtedly, the OPC bears a heavy responsibility towards the community and, accordingly, the work of the OPC Members is very challenging and interesting. The present workload of the Members is close to the acceptable limit, though: if the semiannual two-day meetings are included, the time a Member spends on OPC work easily reaches three weeks or even a full month every year!

The OPC will always aim to maintain a standard of excellence in Observing Programmes. But ultimately, the OPC's success only manifests itself in a healthy, vigorous and successful research in all parts of the ESO community.

mann/Motch, Tanzi/Bouchet/Falomo/Marascchi/Treves, Westerlund/Petterson, Moneti/Natta/Stanga, Zadrozny/Leggett/Perrier, Léna/Leger/Mariotti/Perrier, Meisenheimer/Röser, Meisenheimer/Fugmann, Cristiani/Barbieri/Iovino/Nota, Röser/Meisenheimer, Grosbøl/Brosch/Greenberg, Bignami/Caraveo/Vigroux.

*February 1987:* Bignami/Caraveo/Vigroux, D'Odorico/Pettini, di Serego Alighieri/Tadhunter, Rodonò/Cutispoto/Ambruster/Haisch/Butler/Scaltriti/Vittone, Hessman/Mundt, Gratton/Ortolani, Wampler, Danziger/Fosbury/Gathier, Danziger/Dalgarno, Danziger/Fusbury/Tadhunter, Danziger/Binette/Matteucci.

*March 1987:* Danziger/Binette/Matteucci, Jarvis/Martinet, Schmutz/Hamann/Hunger/Wessolowski, Deneffeld/Désert, Israel/van Dishoeck, Stanga/Garay/Moorwood/Oliva/Rodriguez, Pottasch/Mampaso/Manchado, Röser/Meisenheimer, Bergeron/Boissé.

### 2.2-m Telescope

*October 1986:* Mighell/Butcher/Gathier/Buonanno, Franx/Illingworth, di Serego Alighieri/Shaver/Cristiani/Perryman/Bergeron/Macchetto, Perryman/Jakobsen, Schulz/Rafanelli/di Serego Alighieri.

*November 1986:* Surdej/Swings/Magain/Courvoisier/Kühr/Djorgovski, Grewing/Barnstedt/Nerri/Bianchi/Lenhard, Prangé/Gérard/Paresce/Vidal-Madjar, Paresce/Burrows/Vidal-Madjar/Lamers/Waters, Jakobsen/Perryman.