temperature vary throughout the nebula.

We interpret the object as follows. The "legs of the Crab" are bubbles formed by the red giant primary stellar wind which due to the presence of a dust torus cannot escape in the equatorial direction. The Herbig-Haro type blobs at either end are moving shocks due to a highly collimated wind from the hot secondary which is surrounded by a thick accretion disk. For more details on this kind of scenario, see Morris (1987).

High resolution spectra taken at the 2.2-m telescope at La Silla show that the radial velocity of the central object is −139 km per second. The blobs have velocities of −36 and −235 km per sec. indicating that they are moving away from the central star with at least 100 km per second. Since the object looks like being near the plane of the sky, the space velocities could be as high as 400 to 600 km per second.

Photometry in the visual and IR combined with the IRAS data have allowed us to determine the energy distribution of He2-104. From this curve the bolometric magnitude has been derived and when the fluxes are de-reddened with a measured A_v of 1.5 magnitude and assuming that the central star has a bolometric magnitude of −2 we arrive at a distance of 1 kpc. This places the object much nearer than previously thought and this is also borne out by using arguments on the size and mass limits of the ejected nebula by comparing with typical values for PNe.

Other independent estimates of the distance of He2-104 can be obtained by comparing the absorption with the 21-cm hydrogen flux in the same direction. A distance of more than about 1-2 kpc is also made unlikely by considering that with a galactic latitude of 10 degrees, the object would be out of the plane by about 1.2 kpc, assuming a distance of 7 kpc.

With our derived distance of 1 kpc the Herbig-Haro objects are at a distance from the central object of 0.2 pc giving, with the measured expansion velocity of 100 km per second, a dynamical age of the nebula of 2,000 years. Since we have ignored any projection effects on the radial velocity, this represents an upper limit to the age which could actually be as low as 300–500 years.

The Future

Clearly, more work needs to be done on this fascinating object: we have planned SEST observations to look for the presence of an SiO maser, high resolution spectroscopy to determine the velocity structure in detail and photometric imaging to find the temperature and density structure of the nebula.

IR spectrophotometry could tell us something more about the central star(s) since nothing is detected in the visual. Finally, IR imaging with the new ESO IR camera, IRAC, could provide information about the dust distribution and temperature in the object.

In the near future we hope to spend a lot more time with our southern Crab!

References

Allen, D.A.: *Mon. Not. R. Astr. Soc.* **204,** 113 (1983).

Allen, D.A.: *Proc. Astr. Soc. Austr.* **5,** 369 (1984).

Morris, M.: *Publ. Astr. Soc. Pac.* **99,** 1115 (1987).

Schwarz, H.E.: in IAU Coll. **103,** 123 (1988).

Whitelock, P.A.: in IAU Coll. **103,** 47 (1988).

Key Programmes on La Silla: First Allocations

H. VAN DER LAAN, Director General, ESO

Introduction

With the Observing Programmes Committee's recommendations in hand, early December last year, all information was available to allocate and plan the observations for Period 43 (normal programmes) and Periods 43 and 44 (Key Programmes). The scenario of preparations and decisions has precisely followed the intentions outlined in my original article in the *Messenger* of March 1988 (No. 51). Here the community is briefly informed about the procedures, the proposals and the allocations. Investigators of Key Programme Proposals successful in this first round will themselves describe their research plans in brief *Messenger* articles, starting with three such contributions in this issue and to be continued. Later in this article there is an overview of Key Programme time committed and time expected to be available for subsequent rounds, with the 15th of October 1989 as the next deadline.

Proposal Evaluation

There were 42 proposals submitted for the 15 October deadline last year. These were grouped according to the normal OPC classification (see Table 1).

The column "Comparison" in the table gives the relative numbers of proposals per class, normalized to the same total, received for periods 38 to 42 incl., more than 1,750 proposals in total. The difference, where significant, is interesting and is probably attributable to at least two factors. First, the Key Programmes concern primarily the use of the bigger telescopes (1.5-m and larger); secondly it has been emphasized, in written and verbal presentations and in discussions, that Key Programmes afford an opportunity to gently re-orient European astronomy towards fields now relatively underdeveloped in our community but obviously crucial for the VLT era. This emphasis appears to provide an appropriate stimulus, resulting in more proposals of class 1 + 2 and fewer of class 4 through 7.

For each class of programmes two referees external to the OPC, mostly but not exclusively from ESO member states, and one OPC member were asked to evaluate and grade the programmes as well as to rank them within their class. A special form designed for the purpose asked the referees to justify their grade and rank in prose. Without exception everyone approached to contribute their expertise and time towards

TABLE 1.

Class	Number of proposals	Comparison
1. Galaxies and clusters	14	8.8
2. Quasars, Seyferts, radio galaxies	8	6.2
3. Magellanic Clouds	3	3.4
4. Interstellar matter	3	5.9
5. Star clusters and galactic structure	4	3.8
6. X-ray sources	1	1.3
7. Stars	7	10.4
8. Solar system	1	1.8
9. Miscellaneous	1	0.4

TABLE 2.

Class 1:	**"A redshift survey of galaxies with z ≲ 0.6"**
Allocation:	60 nights at the 3.6 m plus NTT
Investigators:	**De Lapparent** (Inst. d'Astrophysique, Paris)/Mazure (Univ. du Languedoc)/Mathez, Mellier (Obs. du Pic du Midi et de Toulouse)
Class 1:	**"Towards a physical classification of early-type galaxies"**
Allocation:	28 nights at the 3.6 m and 34 nights at the 2.2 m or 1.5 m Danish
Investigators:	**Bender** (Landessternwarte Heidelberg)/Capaccioli (Oss. Astronom. Padova)/Nieto (Obs. de Toulouse)/Macchetto (STScI Baltimore)
Class 1:	***"A search for dark matter in elliptical galaxies"***
Allocation:	9 nights at the 3.6 m 16 nights at the 2.2 m
Investigators:	**Bertola** (Ist. di Astronomia, Padova)/Bertin (Scuola Normale Superiore, Pisa)/Buson (Oss. Astronom. Padova)/Danziger (ESO-HQ)/Dejonghe (Koninklijke Sterrenwacht Brussels)/Sadler (Anglo-Australian Obs.)/Saglia (Scuola Normale Superiore Pisa)/Vietri (Oss. Astrofisico Firenze)/de Zeeuw (Inst. for Advanced Studies Princeton)/Zeilinger (Ist. di Astronomia, Padova)
Class 1:	**"Identification of high redshift galaxies with very large gaseous halos"**
Allocation:	25 nights at the 3.6 m
Investigators:	**Bergeron** (Inst. d'Astrophysique, Paris)/Cristiani (Asiago Obs.)/Pierre, Shaver (ESO-HQ)
Class 1:	***"Structure and dynamical state of nearby clusters of galaxies"***
Investigators:	**Mazure** (Lab. d'Astronomie, Montpellier)/Katgert (Sterrewacht Leiden)/Dubath (Obs. de Genève)/Focardi (Dpto. Astron. Bologna)/Gerbal (Obs. de Meudon)/Giuicin (Dpto. Astron. Trieste)/Jones (NORDITA, Copenhagen)/Lefèvre (Canada-France-Hawaii Tel. Corp.)/Molès (Obs. Grenada)
Class 1:	**"Peculiar motions of rich clusters of galaxies"**
Investigators:	**Rhee,** Katgert (Sterrewacht Leiden)
Allocation:	35 nights at the 3.6 m and 5 nights at the 1.5 m Danish
for the combination of the above mentioned two Key Programmes.	
Class 2:	**"A study of the most distant radio galaxies"**
Allocation:	43 nights at the 3.6 m or the NTT and 34 nights at the 2.2 m
Investigators:	**Miley** (Sterrewacht Leiden)/Chambers (STScI, Baltimore), Hunstead (Univ. Sydney)/N.N. (La Silla Postdoc, beginning period 45)/Roland (Inst. d'Astrophysique, Paris)/Röttgering (Univ. Leiden)/Schilizzi (Radiosterrenwacht, Dwingeloo)/Macchetto (STScI Baltimore)/N.N. (Leiden Postdoc beginning Sept. 1, 1989)
Class 2:	**"Gravitational lensing: Quasars and radio galaxies"**
Allocation:	54 nights at the 3.6 m or the NTT and 48 nights at the 2.2 m and 9 nights at the 1.5 m Danish
Investigators:	**Surdej** (Inst. d'Astrophysique, Cointe-Ougrée)/Arnaud (Canada-France Hawaii Tel. Corp.)/Borgeest (Hamburger Sternwarte)/Djorgovski (CALTECH)/Fleischmann (Phys. Inst. der Univ. Erlangen-Nürnberg, Erlangen)/Hammer (Obs. de Meudon)/Hutsemékers (ESO-La Silla)/Kayser (CITA, Univ. of Toronto)/Lefèvre (Canada-France Hawaii Tel. Corp.)/Nottale (Obs. de Meudon)/Magain (Inst. d'Astrophysique, Cointe-Ougrée)/Meylan (ESO-HQ)/Refsdal (Hamburger Sternwarte)/Remy (ESO-La Silla)/Shaver (ESO-HQ)/Swings (Inst. d'Astrophysique, Cointe-Ougrée)/Vanderriest (Obs. de Meudon)/Van Drom (ESO-La Silla)/Véron-Cetty, Véron (Obs. de Haute-Provence)/Weigelt (MPI für Radioastronomie, Bonn)
Class 2:	**"A homogeneous bright quasar survey"**
Allocation:	40 nights at the 2.2 m 50 nights at the 1.5 m 40 nights at the 1.0 m and 40 nights at the Schmidt telescope
Investigators:	**Barbieri** (Oss. Astronomico, Padova)/Andreani (Physics Dept. Roma)/Clowes (ROE Edinburgh)/Cremonese (Oss. Astronomico, Padova)/Cristiani, Gemmo (Asiago Obs., Padova)/Gouiffes (ESO-La Silla)/Iovino (Obs. Merate)/La Franca (Asiago Obs., Padova)
Class 3:	**"Coordinated Investigation of selected regions in the Magellanic Clouds: Population, Structure, Evolution"**
Allocation:	36 nights at the 3.6 m 8 nights a the NTT and 37 nights at the 2.2 m
Investigators:	***De Boer*** (Sternwarte Univ. Bonn)/Azzopardi (Marseille)/Baschek (Landessternwarte Heidelberg)/Dennefeld (Inst. d'Astrophysique, Paris)/Israel (Sterrewacht Leiden)/Molaro (Trieste)/Seggewiss (Sternwarte Hoher List, Daun)/Spite (Obs. de Meudon)/Westerlund (Uppsala)
Class 5:	**"Radial velocities of southern late type HIPPARCOS stars"**
Allocation:	150 nights at the 1.5 m Danish
Investigators:	**Mayor,** Duquennoy, Burki, Grenon (Obs. de Genève)/Imbert, Maurice, Prévot (Marseille Obs.)/Andersen, Nordstrøm (Copenhagen Obs.)/Lindgren (ESO-La Silla)/Turon (Obs. de Meudon)
Class 5:	**"Astrophysical fundamental parameters of early-type stars of the HIPPARCOS survey"**
Allocation:	160 nights at the 1.5 m Danish
Investigators:	**Gerbaldi** (Inst. d'Astrophys.)/Gomez, Grenier (Obs. de Meudon)/Faraggiama (Univ. di Trieste)/Turon (Obs. de Meudon)

the refereeing effort responded positively. All reports were received in time for the OPC meeting. This participation is gratifying and ESO is pleased to acknowledge the referees' very substantial contribution to the quality of the programme evaluation.

The OPC spent one half day to discuss the Key Programmes and to complete its recommendations for the allocation of telescope time. As is well known, allocation of time on the 3.6-m, the 2.2-m and the Danish 1.5-m has long been a process of choosing between good and very good, with the cutoff line falling among the good. This was true for these proposals too. Reference to the special criteria I sketched in previous articles in this journal (Nos. 51 and 52), the prospects of some space-based telescopes and the distribution among the several programme classes all played their part in the final allocation.

TABLE 3. *Key Programme Commitments – January 1989*

	Period	43 + 44	45 + 46	47 + 48	49 + 50	51 + 52	53 + 54
Telescope	Number of nights						
3.6	K.P. Total	40 + 40	60 + 60	60 + 60	60 + 60	60 + 60	60 + 60
	Committed	15 + 31	39 + 44	14 + 22	4 + 4	0 0	0 0
	Available	–	21 + 16	46 + 38	56 + 56	60 + 60	60 + 60
NTT	K.P. Total	15 + 30	60 + 60	60 + 60	60 + 60	60 + 60	60 + 60
	Committed	14 + 19	20 + 13	16 + 13	10 + 0	10 + 0	10 + 0
	Available	–	40 + 47	44 + 47	50 + 60	50 + 60	50 + 60
2.2	K.P. Total	20 + 20	40 + 40	40 + 40	40 + 40	40 + 40	40 + 40
	Committed	21 + 43	30 + 40	17 + 28	4 + 4	4 + 4	0 0
	Available	–	10 + 0	23 + 12	36 + 36	36 + 36	40 + 40
1.5 E	K.P. Total	25 + 25	50 + 50	50 + 50	50 + 50	50 + 50	50 + 50
	Committed	16 + 24	21 + 24	21 + 24	21 + 22	21 + 22	0 0
	Available	–	29 + 26	29 + 26	29 + 28	29 + 28	50 + 50
1.5 D	K.P. Total	15 + 15	30 + 30	30 + 30	30 + 30	30 + 30	30 + 30
	Committed	19 + 25	19 + 20	16 + 18	15 + 16	15 + 15	0 0
	Available	–	11 + 10	14 + 12	15 + 14	15 + 15	30 + 30
CAT/1 m/Schmidt: Available as pressure requires.							

The First Key Programme Allocations

Table 2 gives the names and the institutional affiliation of all investigators for each successful proposal. The first name is that of the Principal Investigator/Coordinator. The class and the programme title are then given, followed by the allocation, specified according to telescope to which ESO is provisionally committed. Provisionally, because only for Periods 43 and 44 are the allocations definitive; the affirmation of the further allocations depends on the evaluation of progress reports to be submitted to the OPC each year in October.

Each one of these programmes will be introduced by one or more of the proposers in a brief *Messenger* article in the course of 1989. The authors have been asked to clearly sketch their strategy, goals and their programme's potential for opening new dimensions in European astronomy. I hope that these articles, together with the information in Table 2, will further extend existing collaborations as well as serve to inform new proposers as they prepare to compete in subsequent rounds.

The Scope of the Next Round

In late November this year the OPC will again assess Key Programme initiatives. The proposal deadline is the same as for the normal proposals that pertain to Period 45, viz. 15 October 1989. In Table 3 an overview is given of total time to be provided, time already committed, and the difference, that is the time available. The next round should fill the time for periods 45 and 46, leaving a wedge for later periods.

I have not included the CAT, the Schmidt and the 1.0-m telescope in the table. It has become clear that these instruments must also play a role in Key Programmes, often in conjunction with the use of bigger telescopes. Since the pressure on these smaller telescopes is relatively lower, they will be made available for Key Programmes as warranted by proposal pressure.

The first round was a heavy one and the allocations have been very substantial, in order to provide a flying start of the new service. Both the ESO 1.5-m and the Danish 1.5-m telescopes are heavily committed to programmes enriching the HIPPARCOS mission and new commitments in the next round that go beyond periods 45 and 46 will have to be light if there are to be opportunities in 1990 through '93. The 2.2-m MPG telescope proved very much in demand and is largely committed already for next year. For the 3.6-m and the NTT there are 124 nights available for Key Programmes initiatives in periods 45 and 46. Allocations beyond these periods have to be modest if the accumulation is not to pre-empt subsequent rounds.

In 1990 a steady state of sorts will have to be attained for the resources available each double period. Subsequent versions of Table 3 will monitor this development. They provide some guidance for users to weigh their ambitions against realistic expectations.

Some Fringe Benefits

It is obvious that the process of writing the rather extensive, often complex proposals by multinational teams, was a big chore and one that could hardly have been achieved without electronic mail networks. Even for the 70% of proposals that did not receive time in this round, that effort is not wasted and may well serve to guide collaborative research of a more modest scope in the near future. In any case, one disappointment need not deter another try. A conversation with the national representative in the OPC may also improve the next version as will a very critical look at the transparency of presentation and the balance between time requested and results hoped for.

Several successful Key Programmes have led to small workshops among the proposers, as they get their act together for the heavy observing schedules and reduction labour ahead. In one case I organized a two day get-together at ESO Headquarters to induce the teams of half a dozen responses to the preliminary enquiry one year ago, to work together. The major initiative for Magellanic Cloud research, coordinated by K.S. de Boer in Bonn and combining these teams' intentions, was the result. I hope this coordination will have a seminal effect upon investigations of the Clouds that will spill over even beyond the scope of this far ranging specific programme. Another example of a fringe benefit is the renewed interest in the ESO Schmidt telescope as a research tool, discussed in a Garching workshop in early February. The outcome will be reported in one of the next issues of the *Messenger*. One year after the Key Programme initiative it may be concluded that at least one goal: more European and more ambitious interaction, is being achieved.