tronomical technology. The principle of adaptive optics is of course also explained here. There are lots of radio astronomy, a section of a of real 15-metre submillimetre antenna, the latest X-ray results from ROSAT, gravitational lenses, missing mass, Big Bang revisited, the end of the Universe, image processing stations, etc.

The exhibition is grouped in a somewhat unusual way. Believing that the visitors come to have their curiosity satisfied, the "answers" to many "questions" are given, by extensive use of advanced didactical means. The public will not only see beautiful pictures and the sky and its objects; there is also a substantial number of interactive displays which serve to involve and attract even those who have no particular previous relations to our science. There are several very realistic experiments, e.g. aberration, photoelectric lightcurves of an eclipsing binary, the origin of spectral lines, etc.

Visit the exhibition, when you come to Munich – you will not regret it!

R. WEST, ESO

ICO-16 Satellite Conference*

on

Active and Adaptive Optics

Garching, Germany

August 2 to 5, 1993

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Astronomical Observations in 2001

D. ALLOIN and T. LE BERTRE, Observatoire de Paris, Meudon, France

A forum organized by INSU with the support of ESO was held in Paris on March 20, 1992. The motivation of this one-day meeting was to resume the discussions within the astronomical community about the future operating modes of telescopes in the VLT era. We enjoyed the visit of an important delegation from ESO Headquarters.

P. Shaver gave a review of the study made a few years ago by the "VLT Operation Working Group" and of the conclusions reached at that time. The operational modes were divided into three broad classes: classical observing, remote observing and service observing. The respective advantages and disadvantages were discussed and, at that time, the conclusion was reached that all three modes would be necessary. To allow this, it was important, in the conception of the VLT, that no essential options be designed out and that innovative ideas be incorporated. Now, it is more and more evident that flexible scheduling will be a central feature in the VLT operations, implying service observing. However, only the experience acquired with the NTT and then with the VLT will allow to select the most efficient ways of observing and, most probably, the VLT operations will start with classical modes.

M. Zolver reviewed the recent progresses made at ESO on the knowledge of seeing statistics and on the possibilities of seeing prediction. On the latter, three methods are presently investigated: statistical analysis, models of the atmospheric motions and warning from a station located ~ 30 km ahead of the observatory in the dominant-wind direction. Worries about the effect of levelling the Paranal summit on seeing quality were expressed in the audience; in fact, as seen through modelling of the atmospheric motions around the summit with its new profile, the effect should not be significative.

J. Breysacher described the present situation of time allocation at ESO. With 13 telescopes (including SEST) and 34 instrumental configurations, scheduling is a complex task. Many constraints of different nature (astronomical, logistic, human, etc.) have to be fulfilled. One simple change in the planning may lead to its complete revision. In these conditions, flexible scheduling cannot be introduced straightforwardly. Nevertheless, it is presently tested on a limited basis at the NTT so that experience might be acquired. It is already apparent that the changes of instrument must be done rapidly (in a few minutes) and reliably, that the standard procedures for calibration have to be revised and that expert systems which incorporate all the constraints have to be developed. Flexibility should not create inefficiency.

The following contribution, by Mrs. Becker (from the Institut National des Télécommunications), was along the line of expert systems. She reviewed the present situation of queue managing, a completely new topic for most of us, but with which we might have to get familiar if we are to observe in the years 2001 on large instruments.

C. Boisson reported on her experience with service observing at the British telescopes. She explained that this service requires from the potential users a very detailed preparation of the observations and from the organization which offers it, a corresponding staffing.

D. Baade reviewed the experience acquired at ESO in remote observing. From his talk, it was evident that remote control is already a reality, successfully managed at ESO. Several questions were raised by the audience, mainly on the actual performances of this mode of observations. In the case of the CAT+CES, the users are presently requesting more remote observing than can be handled at ESO Headquarters due to

various constraints (~50 % of the nights). This example illustrates that remote observing is a competitive and successful mode of observation.

D. Alloin discussed the coordination of programmes on an international basis. The nature of some astrophysical questions to which we are faced today is such that their handling requires the effort of a very large astronomical community. She insisted on the potentiality offered by the new electronic devices and on the fact that their optimal use allows nowadays world-wide collaboration in an easy way.

More specifically, J. Clavel described an example of an internationally coordinated observing programme with IUE. This coordination allowed the proposers to perform observations that they would not have been able to conduct individually through standard procedures. These two talks stimulated various reactions from the audience. The main point of both speakers was that, in some cases, there is no other means to tackle fundamental problems that can be solved today thanks to the technological progresses. Later in the day, stellar seismology was quoted as a field in which an international collaboration is essential for obtaining the necessary continuous time-coverage.

Through several examples, M. Crézé demonstrated the necessity of archiving data. His talk was followed by a vivid discussion about the nature of what should be archived. Everybody agreed that we should save the scientific outputs aimed at originally. The CORAVEL experiment was mentioned in that respect; its condensed output is considered as a key to its renowned efficiency. But should we also keep what we might, in the light of new developments, need in the future? ... At that time the spectre of Sk –69°202 was haunting the auditorium ...

A talk centred on the interferometric mode of the VLT (VLTI) was presented by J.-M. Mariotti. It is clear that this very complex mode of observation will require a coordination in the observing programmes to obtain an optimal and efficient use of the VLTI. Before the 4 T8m can be coupled for interferometry, the 2 to 3 auxiliary movable telescopes (VISA) will be used on Paranal. Already, this mode will require on the site a very competent scientific staff specialized in interferometry.

A. Omont discussed some scientific projects which need the full dedication of a telescope, in general now considered as small ($D \leq 2$ m), and which have a strategical interest for the development of astronomy. As an example the 2-μm survey of the southern sky was described (DENIS). This programme has been accepted recently as an ESO Key Programme by the OPC and requires the use of the existing 1-m telescope on La Silla more than 50 % of the time during at least three years. DENIS will produce a complete coverage of the southern hemisphere with a spatial resolution of 3" down to $I \sim 18$, $J \sim 16$ and $K \sim 14$. In continuation, A. Omont advocated the construction on Paranal of a modern-technology small-size telescope dedicated to deep wide-field imagery in the near-infrared range (1–2.5 μm) as has already been proposed by some members of the DENIS team.

A. Blanchard discussed possible uses of the future medium-size telescopes ($D \sim 2$ to 4 m). He demonstrated the need of wide-field multi-object spectroscopy for cosmological programmes. In this respect, the already existing 4-m-class telescopes are well suited and will stay competitive in the era of the T8m.

Then, a panel discussion chaired by P. Léna was held. Intervenors were J. Beckers, R. Cayrel, J. Clavel, J. Lequeux and L. Woltjer. P. Léna himself opened the discussion. He recalled the cost of the new equipments and the volume of data that they will produce. He urged astronomers to rationalize their programmes and to increase the productivity of the instruments they use by a proper distribution of the outputs.

J. Beckers talked about the complexity of future telescopes and especially of the VLT which will be different from all other existing telescopes including the NTT. In addition, the VLT may evolve in the direction of even more complexity. For instance, adaptive optics is foreseen today only at the primary coudé, but we cannot afford in the future not to have it at the other foci; furthermore, artificial reference stars appear now available, so that they will certainly be requested. In short, it means that we will be dealing with a "whole new age of telescopes" that must be operated differently from before. From this follows the requirement to have on the Paranal site a very competent and dedicated staff. Solid programmes of maintenance and check-up will also be required. The conditions are necessary to assure that the systems are working at best when they are used by or for scientists. Of course, similar conditions are also necessary to maintain the competitivity of the other, conventional, ESO telescopes and hence to allow for the justification of activities on La Silla till or even beyond 2001.

R. Cayrel called for a revolution in the astronomers' habits, in their relations with the data-acquisition procedures. The ever-increasing complexity of modern instruments and telescopes is intractable for a scientist observing 3 or 4 nights each year, and sometimes less. For example, the introduction of adaptive optics which will produce a considerable gain in the performances of modern telescopes or the development of the interferometric mode will require the permanent presence of specialists on the Paranal site. All these specialists will have to interact strongly with the users. Some must be themselves scientists with an instrumental speciality. Also, a standardization of the observing procedures will be necessary to avoid duplication of the calibrations and to improve their quality. Finally, R. Cayrel called for an effort towards a more solid conversion of astronomical units into physical ones!

J. Clavel brought the assistance back to space. He cautioned us to be very careful at organizing well in advance the management of observatories in their routine phase and at setting on time proper media for data processing. Finally, he spoke about the development of ESIS whose mission is to archive and distribute scientific data in Europe.

J. Lequeux intervened at that time and reminded the audience that publication in scientific journals is a way of saving data of importance for the future. Paper is still the most permanent support for archiving. On the other hand, access to the relevant data is not always easy as they are not stored digitally. He advocated the evolution of printed journals towards digitally-supported and electronically-distributed journals (see also *The Messenger* **67**, p. 58).

As a conclusion, L. Woltjer summarized some of his ideas. He insisted

H.-W. Marck 1914–1992

We received the sad news that Mr. Hans-Werner Marck, accountant at ESO from 1963 to 1976, died on 25.1.1992.

Mr. Marck was in the early days of ESO a close collaborator to the Manager, Mr. J. Bloemkolk, and was in charge of all financial and accounting matters at the beginning of the Organization until the relocation from Hamburg to Munich in 1976.

on the importance of professionalism. State-of-the-art equipment might be better operated by experts in astronomical observations, rather than by astronomers visiting on short stays. Also, he stressed that the major cost in running an observatory is not due to the telescopes and the instruments, but rather to maintaining the infrastructure. Therefore for the year 2001, he advised to move (or replace) the La Silla telescopes to Paranal. Finally, on the subject of data archival, although agreeing with its necessity, he cautioned the community against doing like these scholars who, for centuries, only studied "archives" from the Antiquity...

In the present report, it is not possible to reproduce even coarsely the lively discussions that we had throughout the whole day. Enough to say that it was very difficult to keep on schedule! After all, these vivid exchanges were demonstrating the interest and motivation of the participants. The proceedings of this forum have been edited and are available on request to the organizers. They contain the contributions of all speakers and a complete transcription of the panel discussion.

The Sonneberg Plate Archive

H.-J. BRÄUER and B. FUHRMANN, Sternwarte Sonneberg, Germany

Sonneberg, until recently behind, and only a stone's throw away from the Iron Curtain, is no longer shut off from the outside world. Its observatory is restored to the international astronomical community, and the community ought to know what it has gained. Above all it now has access to the world's second largest plate archive and an intact photographic Sky Patrol. Its series of recordings reach back into the past as far as 1926. Sonneberg (240,000 plates) excels the Harvard collection (400,000 plates) in the continuity of its recordings and in the machine-readability of the archival data.

There is, however, a drop of bitterness. In the face of a present uncertainty about the future of Sonneberg Observatory, the IAU felt compelled to recommend, in a resolution of Commissions 27 and 42, that "all efforts be undertaken to continue these important measurements and to ensure the appropriate maintenance and availability of the data archives" (*IAU Inf. Bull.* **67**, 39–40 (1992)). In accordance with this recommendation, the Sonneberg team leaves no stone unturned in avoiding any gap and preventing a premature discontinuation, and is grateful for every support in its endeavour.

CCDs are advancing on patrols, and in the near future they will be big enough to take over after the photographic plates. But on no account must photography be discarded before a smooth transition is achieved. Then, once the CCDs can be used, patrols can be automated, and it is necessary to run them in a climate better than that in Central Europe. A new responsibility might then accrue to ESO, too.

Sky Patrols aim at providing a continuous record of the sky. Not only do they lead to discoveries of time-variable objects, but they allow the investigation of objects retrospectively. The first time the Sonneberg collection became a talking point was when, in 1937, the Minor Planet Hermes came extremely near to the earth and the Sonneberg patrol provided data for the orbital determination. Other instances, just to

Table 1: *List of fields regularly covered by the Sonneberg Field Patrol routine. R.A. and Decl. give the position of the field centres, N the number of plates archived.*

Coordinates (1950)			Coordinates (1950)			Coordinates (1950)		
R.A.	Decl.	N	R.A.	Decl.	N	R.A.	Decl.	N
$0^h06.5^m$	+58°52′	415	$6^h41.0^m$	+ 3°59′	344	$17^h66.8^m$	+29°15′	340
0 47.0	+40 48	409	6 51.8	+13 15	298	17 58.1	+ 2 56	373
1 06.9	+35 21	372	6 53.9	−16 59	260	18 18.1	+36 02	473
1 16.9	+57 58	403	6 59.5	− 5 39	226	18 41.5	+ 8 34	265
1 38.8	+29 48	325	7 31.5	−14 25	240	18 52.2	+27 51	243
1 57.8	+70 40	258	7 36.7	+ 5 31	240	18 53.8	+43 53	574
2 04.3	+23 14	159	8 05.4	−24 10	144	19 15.9	+53 17	298
2 06.6	+34 45	356	8 52.8	+ 6 08	413	19 23.0	+ 3 01	550
2 21.7	+56 23	313	9 29.5	+51 54	124	19 37.4	+30 02	424
3 02.0	+38 39	413	10 05.7	+12 13	184	19 43.9	+10 29	376
3 20.7	+49 41	349	11 06.9	+44 46	409	19 56.6	+19 21	432
3 51.0	+31 44	110	11 21.3	+10 48	470	20 01.8	+ 0 51	388
4 11.2	+48 17	259	11 38.2	+21 38	168	20 12.2	+56 25	371
4 24.3	+22 53	128	11 45.4	+20 30	353	20 19.5	+30 26	243
4 36.7	+39 42	271	12 09.6	+20 49	286	20 20.4	+40 06	346
4 52.1	+10 04	98	12 30.5	+10 34	315	20 35.2	+14 25	391
5 05.4	− 5 09	197	12 36.6	+21 20	289	20 56.5	+44 17	346
5 13.0	+34 15	233	12 51.0	+19 45	92	21 28.0	+70 20	130
5 34.2	+ 9 16	381	13 38.3	+20 12	292	21 32.1	+45 22	368
5 44.5	+17 43	301	16 28.1	+21 36	383	22 19.0	+46 17	495
5 50.2	+27 36	274	16 42.0	+34 08	736	22 21.6	+51 59	189
5 55.9	+44 57	440	16 55.3	+ 9 27	269	22 47.9	+65 05	221
6 03.9	−14 56	89	17 10.2	+45 23	199	23 08.9	+52 47	303
6 13.6	+12 17	233	17 22.0	+23 00	356			
6 26.0	+20 15	371	17 32.6	+12 36	318			Total: 22704