EUROPEAN SOUTHERN OBSERVATORY

ANNUAL REPORT 1969

Organisation Européenne pour des Recherches Astronomiques
dans l'Hémisphère Austral

EUROPEAN SOUTHERN OBSERVATORY

ANNUAL REPORT 1969

Hamburg-Bergedorf
1970

This Report was approved by the ESO Council in December 1970

CONTENTS

I. INTRODUCTION; SPECIAL EVENTS

A. Introduction

The present report is, in its general scope, still similar to those of preceding years, but differs from these somewhat in its arrangement. It has been prepared under the direction of the new Director General who took office on January 1, 1970, and thus covers a period during which his predecessor conducted the affairs of the Organization.

The year 1969 was marked by the dedication of the facilities in Chile erected under Prof. Heckmann's leadership. During his 8 years as the first director of ESO, he laid the foundation for the realization of the project, and he completed the first stage of this realization. It is through these efforts that the intermediate size instruments mentioned in the ESO Convention, the 1.52 m spectrographic telescope and the 1.00 m photometric telescope, as well as the radial velocity astrograph, have come to serve the astronomers of the ESO countries and provide them with observational data, which already are of great importance for the progress of astronomy in these countries; and also through these efforts the projects for the 3.6 m telescope and the Schmidt telescope are now well under way.

On June 1, Prof. B. E. Westerlund assumed the task of ESO Director in Chile and since then the research activity in Chile has gained considerable momentum. The more prominent place which the account on research has been given in this report as compared to those on preceding years reflects this change.

Of basic importance were also Council's deliberations concerning the way in which the large telescope project might be brought to expedient completion after regrettable delay. A new course was indicated by the Council Meeting of December 15 and 16, based on reports on the actual status of the project and on possible ways to proceed.

B. Dedication in Chile

On March 25, 1969, the ESO Observatory in Chile was dedicated by the President of the Republic of Chile, Don Eduardo Frei Montalva, and a series of special events were arranged in this connection. The dedication ceremony itself took place on La Silla in the dome destined for the Schmidt telescope and was attended by over 300 official representatives from Chile, the ESO countries, and other scientific organizations. After an introduction by the Director General of ESO, Prof. Heckmann, the speakers were, in chronological order, Dr. J. Sahade, La Plata, Vice President of the International Astronomical Union; Mr. Olof Palme, Minister of Education of Sweden; Dr. J. H. Bannier, President of the ESO Council; Don Gabriel Valdés S., Minister of Foreign Affairs of Chile, and Mr. Eduardo Frei M., President of the Republic of Chile, followed by the benediction by the Archbishop of La Serena, Msgr. Juan Francisco Fresno. At the

lunch following these ceremonies, the delegates were addressed by Mr. Jacques Trorial, Minister, Ministry of Education of France. The texts of these addresses are printed in ESO Bulletin No. 6. For authorities in Santiago a reception was held by the ESO Council and Directorate in the ESO Headquarters in Vitacura on March 21.

The ESO Council, on its way to Chile, visited the Kitt Peak National Observatory at Tucson, Arizona, U.S.A., on March 17 and 18, and visits to the Cerro Calán Observatory of the University of Chile and to Cerro Tololo Interamerican Observatory in Chile were paid, respectively, before and after the dedication ceremonies.

C. Symposium on the Magellanic Clouds

Following the dedication ceremonies, a Symposium on the Magellanic Clouds was held in the conference room of the Vitacura Headquarters in Santiago on March 28 and 29, 1969. More than 80 astronomers participated, from Argentina, Australia, Chile, Mexico, South Africa and the United States as well as from the ESO and other European countries, and 30 papers were presented. The proceedings of the symposium will appear in print. A summary was published by Prof. Westerlund in Sky and Telescope of July 1969.

D. Colloquium on Astronomical Spectroscopy

A colloquium on astronomical spectroscopy in the southern hemisphere was held at the Nice Observatory at the invitation of its Director, Prof. J.-C. Pecker, on June 3, 4 and 5, 1969, with about 70 participants, mostly from the ESO countries. The organization of the programme was mainly in the hands of astronomers of the observatories of Marseilles and Nice. The first sessions were devoted to instrumental problems; next, results on the Magellanic Clouds and other southern objects observed at La Silla were discussed as well as some current observing programmes, and finally future programmes in general. On June 6, participants joined in an inaugural ceremony of the new buildings of the Nice Observatory.

II. RESEARCH ACTIVITIES

A. Research Programmes

1. Astronomical Observations

a) The Prism Astrolabe

F. Noël, Departamento de Astronomía, Universidad de Chile, who is in charge of the joint project between ESO and Universidad de Chile, reports that the observations of standard series and catalogue series of fundamental stars have continued throughout the year. The reductions of the observations are carried out in the IBM 360/40 computer of the Facultad de Ciencias Físicas y Matemáticas of the Universidad de Chile.

Time and latitude results, obtained with the Astrolabe at Cerro Calán during 1968, were published by the Bureau International de l'Heure (BIH) in its "Annual Report for 1968" (p. 100, 101). The latitude results, sent monthly to the International Polar Motion Service (IPMS), were published in the "Monthly Notes" of the IPMS (Mizusawa, Japan), Nos. 1—7.

A paper which contains an investigation concerning systematic errors of the FK4, based on the astrolabe observations made during 1966 and 1967, was published in the Astronomical Journal, Vol. 74, No. 7, p. 954.

b) The 40 cm Objective Prism Astrograph

The astrograph was used by astronomers from Marseilles till the end of April. It was taken over by ESO on May 1. During May to September H. E. Schuster of the ESO Staff, who is in charge of the telescope, carried out all observations. They concerned the completion of the programmes of Miss Laval and Mrs. Georgelin, Leander McCormick fields (for A. Blaauw), fields in Scorpius (for A. Ardeberg) and spectral classification plates (for A. Ardeberg). The programme on the Leander McCormick fields continued throughout the year.

From October on, visiting astronomers have used the telescope frequently. A total of 377 plates have been taken during the year.

Table 1 summarizes the principal programmes by visiting astronomers.

c) The 1 m Photometric Telescope

During the year, 14 visiting astronomers used the telescope. Table 2 summarizes their observing periods and observing programmes. The remaining time of the year was used by the ESO staff for observations and for maintenance (including realuminization of the mirrors). A. Ardeberg was in charge of the telescope from end of May on. He carried out extensive observations in UBV of stars in Scorpius, in Selected Areas, in the Small Magellanic Cloud and in the Bar of the Large Magellanic Cloud. He did also polarimetry of selected objects in these fields. B. Westerlund observed faint stars in the Small Magellanic Cloud and some galaxies in a rich cluster of galaxies detected by him.

d) The 1.52 m Spectrographic Telescope

The telescope was used during a large part of the year by the Marseilles astronomers for observations with the "Chilicass" spectrograph in the Cassegrain focus. The coudé spectrograph arrived at La Silla at the end of March. The first test spectra were taken at the end of May. The preliminary adjustments were done in June—July, but extensive readjustments were carried out in September and in the beginning of October. The telescope and the coudé spectrograph were scheduled for regular use by visiting astronomers from the middle of October on. Table 3 summarizes their observing periods and observing programmes.

The ESO staff astronomers (Ardeberg, Dossin, Maurice, Westerlund) used the Chilicass spectrograph during two periods, November 4 to November 17 and December 2 to December 15, for work on stars and nebulae in the Magellanic Clouds.

A total number of 556 spectra were obtained with the Chilicass spectrograph and 928 with the coudé spectrograph.

e) The 15 cm Photometric Telescope

The telescope and its photometric equipment were improved and rebuilt during the latter part of the year, and it was not used for regular observations.

f) The National Telescopes

1) The 61 cm Bochum Telescope

Bochum observers used the telescope exclusively from January to September 1. From then on the telescope was used by visiting astronomers and by ESO staff astronomers. R. Schröder, Hamburg, observed stars on his polarimetry programme in UBV during a few nights in September; A. van Hoof used it during a few nights in November and between December 2 and December 22 for observations of variable stars; and Mrs. Grenier observed bright F5—K2 stars also in the UBV system between December 23 and December 31.

The ESO staff programmes concerned variable stars (Muller, Ardeberg, Middelburg, de Groot), four-colour photometry of stars in the South Galactic Pole region (Ardeberg, Middelburg), four-colour photometry of selected bright stars (Westerlund), and U B V photometry of selected supergiants in the Magellanic Clouds (Middelburg).

2) The 50 cm Danish Telescope

The telescope was mounted and ready for use at the end of February. It was used by Danish observers to the end of May and from October on except for the period March 18 — March 27 when Mauder, Bamberg, used it for observing the variable stars BV 513, BV 646 and BV 845. Readjustment of the photometric equipment was done in September.

Table 1

Visitors using the Objective Prism Astrograph during 1969

Dates	Observer	Observatory	Country	Programme and remarks
Jan. 1 — Febr. 25	A. Laval	Marseilles	France	Magellanic Clouds
March 11 — April 24	Y. Georgelin	Marseilles	France	Milky Way fields In March an interferometer was also mounted on the telescope.
Oct. 3 — Oct. 31	Petit	Marseilles	France	Large Magellanic Cloud
	Dubois	Strasbourg	France	Small Magellanic Cloud
Nov. 1 — Nov. 30	Petit	Marseilles	France	Large Magellanic Cloud
	Burnage	Marseilles	France	Large Magellanic Cloud
	Monnet	Marseilles	France	H II regions in the Large Magellanic Cloud; with interferometer.
Dec. 1 — Dec. 15	Burnage	Marseilles	France	Large Magellanic Cloud

Table 2

Visitors using the 1 m Telescope during 1969

Dates	Observer	Observatory	Country	Programme and remarks
— Jan. 9	Denoyelle	Uccle	Belgium	OB stars in Vela
Jan. 10 — Jan. 24	Perrin	Lyon	France	Magellanic Clouds (4-colour and 6-colour photometry)
Jan. 25 — Febr. 3 Febr. 28 — March 6	Mauder	Bamberg	Germany	Variable stars
Febr. 4 — Febr. 17	Havlen (Westerlund)	Tucson	USA	R. S. Puppis nebula and OB stars in Puppis
Febr. 18 — Febr. 27 March 7 — March 16	Seggewiss	Bonn	Germany	Sequences, T Tauri variables
March 17 — March 27 April 29 — May 1	Kristenson	Brorfelde	Denmark	Interstellar band; UBV+4430
March 28 — March 30	Koornneef	Roden	Holland	Infrared sources; K-photometer
April 1 — April 15	Perek	Prague	Czechoslov.	Planetary nebulae; special filters
April 16 — April 28	Lodén	Stockholm	Sweden	Loose clusterings of stars of similar spectral type
May 13 — May 26 June 10 — June 23	Terzan	Lyon	France	Globular clusters; cepheids UBV RI
Sept. 17 — Sept. 23 Oct. 8 — Oct. 21 Oct. 29 — Nov. 4	Schröder	Hamburg	Germany	Polarimetry
Nov. 18 — Dec. 1	Bigay	Lyon	France	Wide and narrow-band photometry of stars and clusters in the Magellanic Clouds
Dec. 9 — Dec. 22	Garnier	Lyon	France	Wide and narrow-band photometry of stars in H II regions

Table 3

Visitors using the 1.52 m Telescope during 1969

Dates	Observer	Observatory	Country	Programme and remarks
Jan. — Febr.	Staff from	Marseilles	France	Cass. Rad. vel. of stars in the Magellanic Clouds
March 1 — March 17	Borgman	Roden	Holland	Cass. Photometer for infrared sources
March 18 — March 20 May 8 — May 22	Georgelin	Marseilles	France	Cass. Interferometer work
March 21 — April 7 April 25 — May 20	Staff from	Marseilles	France	Cass. Stars between Magellanic Clouds and Galaxy; OB stars in Galaxy
May 20 — July 28	Bardin, Petit	Marseilles	France	Coudé Adjustment of coudé
June — August Sept. — Oct. 13	Chu-Kit	Marseilles	France	Coudé Interstellar lines Work on telescope and coudé spectrograph by REOSC
Oct. 14 — Oct. 20 Oct. 28 — Nov. 3	Foy	Paris	France	Coudé K type giant stars
Nov. 10 — Nov. 24 Dec. 16 — Dec. 29	Koelbloed Takens van Hoof	Amsterdam Amsterdam Louvain	Holland Holland Belgium	Coudé Abundance analysis of peculiar stars RV-variation in B stars
Nov. 25 — Dec. 1	Fehrenbach Petit	Marseilles	France	Coudé Magellanic Cloud stars
Dec. 30 —	Prévot	Marseilles	France	Cass. Magellanic Cloud stars

2. Publications by ESO Staff

Ardeberg, A. Continuum Energy Distribution of O5 — G0 Stars in Terms of Spectral Gradients — Astron. and Astrophys., **3**, 257 — 269, 1969.
Photometry with the Jävan Reflector — Ark. f. Astr., **5**, 297 — 301, 1969 (with K. Särg and S. Wramdemark).

Maurice, E. Flexions d'un spectrographe — ESO Bulletin No. 7, 5—10, 1969 (with A. Baranne).
Le Spectrographe Cassegrain du Télescope de 1.52 mètre — ESO Bulletin No. 7, 11 — 18, 1969
(with A. Baranne and L. Prévot).
Two Stars of the Large Magellanic Cloud Showing Emission Lines of Fe II and [Fe II] — Astron. and Astrophys., **3**, 323 — 326, 1969
(with Ch. Fehrenbach and L. Prévot).

Rickard, J. J. A Study of High- and Intermediate-Velocity HI Clouds with 12 ! 5 Spatial Resolution — Bull. Amer. Astr. Soc., **1**, 259, 1969.

Westerlund, B. E. Three-color Photometry of Southern QSO's, Radio Galaxies and Normal-Galaxies — A. J., **74**, 335—351, 1969 (with J. V. Wall).
OB Stars near the Supernova Remnant RCW 86 — A. J., **74**, 879 — 881, 1969.
OB Stars near the Supernova Remnant RCW 103 and the Galactic Structure in Norma — A. J., **74**, 882 — 890, 1969.
European Southern Observatory Dedicated in Chile — Sky and Telescope, **37**, 340 — 347, 1969.
Report on the Magellanic Clouds — Sky and Telescope, **38**, 23 — 27, 1969.

3. Publications based on Observations made at the ESO Observatory

Noël, F. Systematic Errors $\Delta\alpha_\delta$ in the FK4 Fundamental Catalogue as Deduced from Astrolabe and Meridian Observations in the Southern Hemisphere — A. J., **74**, 954 — 957, 1969 (with C. Anguita).

B. Scientific Programmes Committee

The Scientific Programmes Committee met twice, in Copenhagen on May 6, and in Marseilles on November 10. At these occasions visits were paid to the Brorfelde Observatory and to the Observatoire de Haute Provence for the information of committee members on local instrumental developments.

At both meetings, the applications for observing time in Chile were discussed in detail und allocations proposed to the Directorate. Particular mentioning deserves the intended infrared survey to be carried out in 1971 by observers of the Roden Observatory.

Of further suggestions and recommendations of the SPC we mention:

a) The study of the choice of additional objective prisms to be acquired for the Schmidt telescope.
b) The desirability of reaching agreements with the governments of certain ESO member states to create possibilities for astronomers from these states to accept 3 years appointments in Chile without losing the guarantee to return subsequently to their original positions at their home institutes.
c) Distribution of ESO observing schedules among interested institutes and organizations.
d) Coordination of programmes proposed by different institutes for observation in Chile; establishment of priorities within each member state by a national committee.
e) Discussion of proposals for extensive observing programmes by the applicants with the SPC.

C. Meteorology

The meteorological conditions were not as good as during the preceding three years. In the following table is given the total number of clear hours as well as the total number of photometric nights in 1966, 1967, 1968 and 1969. A photometric night is defined as a night with six or more hours of uninterrupted clear sky.

	1966	1967	1968	1969
Possible number of observing hours	3681	3681	3690	3681
Actual number of clear hours	2481	2412	2197	1996
Possible number of observing nights	365	365	366	365
Actual number of photometric nights	252	239	223	199

The complete meteorological results for 1969 will be published in a forthcoming number of the ESO Bulletin.

III. THE 3.6 m TELESCOPE PROJECT

A. Telescope

1. Optics

After a new, about 10 cm thick, high-quality top layer had been melted on the big silica blank for the 3.6 m telescope (cf. Ann. Rep. 1968, p. 10), the improved blank was inspected by ESO officials in the works of Corning Glass International, Canton, U.S.A., on June 13. The blank proved to be good apart from a limited flaw area near its central hole. This imperfection will, however, be of no importance for the optical quality of the finished mirror: according to an agreement reached between Corning, REOSC and ESO it was to be filled with a silica inlay, which will be ground to fit with an accuracy of about 1/100 mm. The number of bubbles in the new top layer proved to be considerably smaller than in the old one. Also the internal tension in the blank proved to have diminished.

The improved blank was shipped back to Europe in August and arrived in the middle of September at the works of REOSC where it immediately was again put on the grinding machine.

Reports on the problem of centering of the mirrors were prepared by A. Baranne and A. Behr. The optical laboratory of Marseilles prepared a design for the apparatus for the centering.

2. Mirror Cells

The manufacture of the mirror cells was well on its way at the end of the year.

3. Mounting, Mechanical Parts

The first part of Dr. Strewinski's predesign drawings, delivered on November 6, 1968, was discussed by the Instrumentation Committee on January 15 and 16; the second part of the predesign drawings, delivered on May 8, was discussed by the Instrumentation Committee on June 2. The drawings thus presented by Dr. Strewinski give a general conception of the mounting of the 3.6 m telescope. In the course of the year it became more and more clear that, in order to realize the 3.6 m telescope project within a reasonable time, the design work would have to be considerably accelerated.

4. Electric and Electronic Components

The task originally given to Dr. Strewinski comprised the complete mounting of the telescope, i.e. not only its mechanical parts but also its electric and electronic components. Due to the delay in the design work it has been deemed best to unburden Dr. Strewinski from the design of the electrical and electronic components of the telescope. To this end a small group of engineers has during the year been set up at the ESO Office in Hamburg-Bergedorf. At the end of the year this group had already made considerable progress.

B. Building

The consulting engineers proceeded with the technical design of the building. Due to the delay in the design of the telescope, this firm had to make a 3 months' pause in their work during the spring.

C. Dome

After the consulting engineers had finished the predesign of the dome, firms in the 6 ESO countries were approached for the construction.

D. Reports on the Project

At the 14th Meeting of the Council on December 15 and 16, 1969, the following two reports were presented and discussed: J. Ramberg, "The Present State of the 3.6 m Telescope Project" and A. Blaauw, "Memorandum on Further Development of the 3.6 m Telescope Project and on Possible Collaboration with CERN or/and ESRO".

IV. SCHMIDT TELESCOPE PROJECT

A. Optics

At the end of the year the optics for the Schmidt telescope were not yet finished.

B. Mounting

The construction of the mounting for the Schmidt telescope was continued but at the end of the year the complete drawings of all mechanical parts were not yet available.

V. INSTRUMENTS AND AUXILIARY EQUIPMENT

A. Instrumentation in Chile

1. The Prism Astrolabe

The instrument worked well throughout the year.

2. The Objective Prism Astrograph

Some trouble has been caused by worn parts in the drive and guiding system.

3. 1 m Photometric Telescope

The telescope performed well throughout the year. Considerable trouble has been experienced with parts of the photometric equipment. The flexowriters, in particular, have broken down frequently. Heavy-duty equipment is obviously a necessity under the circumstances that the Observatory operates.

4. 1.52 m Spectrographic Telescope

The telescope itself and the Cassegrain spectrograph have been working well throughout the year. The rotatable plate at the Cassegrain focus will be replaced by one with a more rigid mounting. The adjustments and improvements of the coudé spectrograph continue. Excellent spectra have been obtained with all three cameras. The principal work concerned increasing the stability of the cameras, selecting the optimal spectral ranges of the gratings, and improving the performance of the exposuremeter.

5. 15 cm Telescope

The 15 cm telescope was put into working order at the end of December. The telescope is now firmly mounted, its polar axis adjusted, and the electronic equipment works well. The worn gear wheels still cause some trouble but this was easy to control by the observer.

6. Measuring Equipment and Calculators

At the end of the year the following measuring equipment was in use:

a) In Santiago Headquarters:
   1. One Zeiss spectrum-projector
   2. One Zeiss Abbe comparator
   3. One spectrum-comparator for GPO plates

4. One Zeiss Universal Measuring Microscope (x, y)
5. One Askania Iris Photometer
6. Two binocular microscopes
7. One desk calculator Hewlett-Packard 9100 A
8. Two Friden desk calculators 1151.

The Hilger-Watts-Ferranti comparator, the Grant measuring machine and the Zeiss spectro-photometer had arrived but were not yet ready for use.

b) On La Silla:

1. One Zeiss spectrum-projector
2. One Zeiss Abbe comparator
3. One projector for GPO plates
4. One Zeiss rapid photometer (Schnell-Photometer)
5. Two binocular microscopes.

7. Aluminizing Plant

During August the Technical Department finished the work in the aluminizing room. In the beginning of September the 1.52 m and the 1 m mirrors were successfully realuminized under the direction of F. Dossin.

8. Electronic and Technical Laboratories

The electronic and technical laboratories in Santiago Headquarters have received much of the ordered equipment during the year.

B. Development Work at Hamburg

1. A Grant Instruments Series 800 Comparator-Microdensitometer for the measuring of spectrographic plates was delivered to Santiago from Grant Instruments, Inc., Berkeley, California. A data system for this instrument has been designed and an order for the construction been given to Aktiebolaget Transintro, Stockholm. The control unit of the data system will be a Hewlett-Packard 2114 B computer and the data output media will be paper tape and magnetic tape.

2. A design study for a General Purpose Data Acquisition System for the telescopes at La Silla was made. Also this system will as central unit apply a Hewlett-Packard computer.

3. A study of the optical, mechanical and electronic layout of an automatic Iris Photometer has been taken up in collaboration with the Göttingen Observatory.

C. Development Work at Marseilles

1. Echelle Spectrograph for 1.52 m Telescope

The basic design was formulated by Brückner, Walraven and Baranne. The responsibility of the realization remained with the Marseilles Group under leadership of Baranne. The mechanical and optical parts have been ordered from different firms (CERCO in Paris, Observatoire de Paris, Sud Optique in Manosque, ERATEC in Alès), but assembling and adjustment of the instrument remains the task of the group.

2. RV Cass Spectrograph No. 2

Upon request of the ESO astronomers in Chile a new optical system allowing the application of image tubes ITT 4708 was studied (plain field catadioptric chamber). It was intended for replacement of the RV Cass No. 1 optics.

3. Calibration Spectrograph

The calibration spectrograph was designed for the coudé spectrograph of the 1.52 m telescope.

4. Miscellaneous

Predesign studies were made for spectrographs intended for the 3.6 m telescope.

The Marseilles group regularly checked the figuring of the 3.6 m mirror.

In collaboration with D. Malaise, Institut d'Astrophysique, Liège, the method of the control of the mirror by an interferometer of Jamin was under development.

D. Danish National 1.5 m Telescope Proposal; Uppsala Schmidt Telescope

The Danish proposal for a national 1.5 m telescope, presented at the 11th Council Meeting in 1968, was discussed at Council Meetings in 1969 with particular reference to the general question of the erection of national telescopes and the limitation set by the ESO Convention (see also chapter X). This led to Council's authorizing the General Director to sign the contract with the University of Copenhagen, taking into account Council's general desire for ESO to keep a certain control on the programmes to be carried out with national instruments, and the application of rules for such instruments the formulation of which is still pending.

With respect to the offer of the University of Uppsala to transfer its Schmidt telescope from Canberra to Chile, also submitted already to the 11th Council Meeting, no definite arrangement was reached yet.

VI. BUILDINGS AND GROUNDS

The following has been abstracted from the much more extensive report for 1969 which was prepared by the Technical Department of ESO in Chile and is available to Council on request.

A. La Silla

On July 23, representatives of ESO, of the Consulting Engineers and of the contractor met in connection with the acceptance formalities of the construction works on La Silla delivered by these firms. As a result of the joint inspection of all parts of the project, a list of defects was drawn up which TECSA undertook to repair, and two months later the final document of acceptance was signed by ESO. Other construction projects were carried out or started, extensive maintenance jobs were done and the

official dedication gave rise to some extra finishing touches or brushes of paint.

The building of two dormitories of the prefabricated type with 10 bedrooms each was finished; they are located about 100 m north from the Hostel. These dormitories provide comfortable but sober living quarters for astronomical and other staff. A disadvantage of this prefabricated type, however, proved to be the insufficient sound insulation. Foundation and sewage works were carried out by ESO personnel under ESO supervision, whereas all work connected with the erection like water lines, heating system, electric installation etc. was carried out by ESO personnel under the supervision of the firm of Polynorm who delivered the prefabs. Two 3-bedroom prefabricated bungalows were also delivered by this firm and have been almost completed by the end of the year.

Many improvements were made in the Hostel, among them an acoustic ceiling in the dining room. Space in the basement was used for setting up one room as office for the Director and one for administrative staff, and recreation facilities were also provided for.

Telephone cables between La Silla and Camp Pelícano were put underground; all electric aerial lines on La Silla were removed and cables placed in the cable tray. Electrical cables in Camp Pelícano were put underground. Regular maintenance of the generator plant was disturbed for a considerable period due to long delivery time of spare parts for one of the generators. The cleaning of all water tanks was terminated: the tanks were cement coated at the inside. Two spare water tanks were mounted in the quebrada Pelícano near the water pit in order to provide raw water for the road maintenance, thus eliminating the use of purified water for such purposes.

The 14 km public road was reshaped during January with our road maintenance equipment. Improvements of the road on the observatory site included pavement of about 2 km with compacted natural soil for the inauguration day. For dust control, after various trials, a satisfactory method was found consisting of applying a film of asphalt; about 2.5 km near the top of La Silla were treated this way. For further preservation a speed limit of 35 km/hr was introduced. The road maintenance equipment was used for 50 % of the time on the observatory roads, for 40 % on the public roads, and was 10 % under repair. A wide variety of improvements were made in and around the telescope buildings, especially in the 1.52 m telescope building. The building for the GPO was extended by a small office of prefabricated type.

Throughout the year, the total volume of water pumped and treated was 25.000 m^3. The average daily consumption diminished from 90 m^3 during the first months to 60 m^3 during the later ones. 116.000 lts of diesel oil were consumed for heating purposes and 205.000 lts for power generating. In La Serena, erection of 3 prefabricated bungalows was started in November.

B. Santiago

On September 17, in the presence of representatives from ESO, from the Consulting Engineers and from the contractors, formal acceptance took place of the Vitacura Headquarters Building.

The mechanical workshop was provided with most of its planned equipment which was mounted by our technical staff. Placing the heavy lathing machine required the construction of extra temporary supports under the floor pending the construction of a concrete pier.

For the garden around the Headquarters building an outlay for the landscaping was prepared, with the execution of which a beginning was made.

The Guesthouse at Gustavo Adolfo, especially in connection with the receptions and other events at the occasion of the dedication, underwent thorough inspection and repairs of various kinds.

At its December 1969 Meeting, Council decided to buy the house La Gloria No. 70 rented and occupied by Prof. Westerlund, and to make this the permanent house for the Director in Chile.

C. Legal Matters

The protection against and the elimination of claims for mining rights on the ESO territory was a matter of continued attention by our legal adviser in Santiago.

VII. LIBRARY

From June 1969, Mrs. M. Ardeberg was employed in the Santiago Library as part-time librarian. On several occasions the librarians of Observatorio Astronómico Nacional on Cerro Calán, AURA in La Serena, and ESO have met to discuss common problems. As a result, an exchange system among the observatory libraries has been established and has worked to the mutual satisfaction.

Several new periodicals were subscribed to. About 150 books were purchased for the libraries in Santiago and on La Silla. Four sets of BD and Córdoba star charts were bought. A Xerox machine was installed in the Santiago library in September.

VIII. PERSONNEL

Prof. Dr. B. E. Westerlund, formerly of the Steward Observatory, Tucson, Arizona, was per June 1, 1969, appointed ESO Director in Chile.

Per the same date, D. Vuyk, civil engineer, was appointed Director for Administration and Construction in Chile. (Mr. Vuyk resigned from this post per April 15, 1970.)

On the astronomical staff in Chile were appointed in grades 9 or higher:

per May 15, 1969, Dr. A. Ardeberg;
per October 1, 1969, Dr. J. Rickard.

Vacancies on the astronomical staff were widely advertised in the Astronomical Institutes of the ESO countries in the middle of the year; the response was somewhat disappointing.

On the technical staff connected with the 3.6 m telescope project in Hamburg were appointed in grades 9 or higher:

per May 1, 1969, B. Malm;
per December 1, 1969, M. Blichfeldt.

Other appointments in grades 8 or lower were made on the technical and administrative staff.

Dr. A. B. Muller, who, from their earliest stages, in an untiring effort and not without personal sacrifices, had supervised the ESO explorations and constructions in Chile, and prior to these conducted the site tests in South Africa, was at his own request transferred to the staff in Hamburg per October 15, 1969, to become associated with the work of the General Director and the Scientific Director.

In its meeting of December 15 and 16, 1969, the Council appointed per January 1, 1970, as new Director General Prof. Dr. A. Blaauw, formerly part-time Scientific Director. Prof. Dr. O. Heckmann retired from the general directorship per December 31, 1969. A dinner party in his honour offered by Council, at which also the staff of the Hamburg Office participated, took place on December 15. Council appointed Prof. Heckmann as consultant to ESO from January 1, 1970, especially for matters concerning the construction of the Schmidt telescope and for certain aspects of the large telescope project.

A list of personnel in grades 9 and higher per December 31, 1969, is given in Appendix A to this report.

IX. FINANCIAL MATTERS

A. Estimated and Actual Expenditure

The following tabulation presents the estimated and actual expenditure in the same way as they were presented in previous reports. The wish has been expressed for a modified form of reporting, allowing a more specific presentation of the actual running costs of the operations in Chile. Such a presentation will be possible in coming annual reports when the basis for the arrangement of the budget proposals will also be revised. The present report still corresponds to the arrangement as it was used for the 1969 budget proposal.

Budget Items	Budget 1969 (Amounts in US $ 1000)	Expenditure 1969
I. Capital Expenditure		
A. Land, Buildings, Roads	1.117	314
B. Instruments	570	491
C. Consultants	91	61
TOTAL CAPITAL EXPENDITURE	1.778	866
II. General and Overhead Expenses	1.546	1.276
III., IV. Astronomical and Meteorological Activity	180	128
V. Maintenance Roads, Buildings, Instruments and Installations	100	62
Unforeseen	40	41
	3.644	2.373

Expenditure in 1969 was much lower than estimated due to postponement of the construction of the 3.6 m telescope building and dome.

B. The accumulated expenditure up to December 31, 1969, can be summarized as follows:

Budget Items	Accumulated Expenditure up to December 31, 1969 (Amounts in US $ 1000)
I. Capital Expenditure	
A. Land, Buildings, Roads	5.942
B. Instruments	3.521
C. Consulting Engineers and Architects	1.372
TOTAL CAPITAL EXPENDITURE	10.835
II. General Overhead and General Expenses	4.242
III. Astronomical and Meteorological Activity, South Africa	501
IV. Astronomical and Meteorological Activity, Chile	318
V. Maintenance Roads, Buildings, Instruments and Installations	160
Unforeseen	81
TOTAL EXPENDITURE UP TO DECEMBER 31, 1969	16.137

C. The total Budget for 1970 was provisionally fixed at an amount of US $ 4.070.000, detailed as follows:

Budget Items	Budget 1970 (Amounts in US $ 1000)
I. Capital Expenditure	
A. Land, Buildings, Roads	1.050
B. Instruments	750
C. Consulting Engineers	100
TOTAL CAPITAL EXPENDITURE	1.900
II. General and Overhead Expenses	1.750
III., IV. Astronomical and Meteorological Activity	200
V. Maintenance Roads, Buildings, Installations and Instruments	180
Unforeseen	40
TOTAL BUDGET 1970	4.070

X. GENERAL ADMINISTRATIVE POLICY

An ad hoc Working Group set up by Council in its 12th Meeting reviewed the programme of the Organization and its administrative structure. It consisted of the Council Members Funke (Chairman), Alline and Scheidemann, and B. Samuelsson acted as secretary. The Group met at Geneva on September 11. Basis for the discussion was a memorandum prepared by A. Alline. The Group reported to the Council Meeting of December 15 and 16. Some of its recommendations had in the meantime already been followed up. An important item to be pursued further concerns the establishment of rules for the erection of national telescopes; for this the text of the Convention relating to supplementary programmes appears to be relevant.

An ad hoc Working Group set up by the Finance Committee for the study of the ESO Staff Regulations and Rules held its first Meeting on November 20 and 21. The recommendations in its first interim report concerned, among other items, the adoption by ESO of the CERN basic salary system with proper adjustment for the difference in the cost of living with respect to that at Geneva, and with annual reviewing according to certain principles also used by CERN; and, furthermore, the adoption of the CERN allowance system as far as the staff in Europe is concerned. These proposals were accepted by the Finance Committee and subsequently by Council in its December 1969 Meeting.

XI. COUNCIL, COMMITTEES AND WORKING GROUPS

a) The **Council** met on March 22 at Santiago (12th Meeting), on June 16 at Hamburg (13th Meeting), and on December 15, 16 at Hamburg (14th Meeting). President of Council was J. H. Bannier.

In the 12th Meeting the French delegates Poussard and Fehrenbach were succeeded by A. Alline and A. Lallemand, respectively.

In the 14th Meeting the German delegate K.-F. Scheidemann was succeeded by C. Zelle.

A **Committee of Council** was formed at the 14th Council Meeting with the membership Alline (France), Bannier (Netherlands, President), Deloz (Belgium), Fehrenbach (Chairman of the Instrumentation Committee), Funke (Sweden), Reiz (Denmark), Strömgren (Chairman of the Scientific Programmes Committee), and Zelle (Germany, Chairman of the Finance Committee).

In the 12th Council Meeting, a **Working Group** was formed for the review of the **administrative structure** of ESO. Members were Alline, Funke (Chairman) and Scheidemann. For the proceedings see chapter X.

b) The **Finance Committee** met on February 20 at Hamburg (14th Meeting), on October 3 at Hamburg (15th Meeting) and on December 15 at Hamburg (16th Meeting).

In the 14th Meeting, K.-F. Scheidemann succeeded J. H. Bannier as Chairman, and P. J. Fierst van Wijnandsbergen succeeded J. H. Bannier as Netherlands' delegate in the Committee.

In the 15th Meeting, C. Zelle succeeded W. Paulig as German delegate, and P. Berniard succeeded J. Bourreau for France.

In the same Meeting, a **Working Group** was formed for the study of the ESO **Staff Regulations and Rules** with the membership Berniard, Deloz, Zelle (Chairman), and Bloemkolk. Its proceedings are reported under chapter X.

A. Blaauw

Director General

XII. APPENDIX A.

EMPLOYEES ON CONTRACT WITH ESO IN GRADES 9 AND HIGHER PER DECEMBER 31, 1969

Hamburg Office:

O. Heckmann	Director General
J. Ramberg	Technical Director
A. Blaauw	Scientific Director
J. Bloemkolk	Manager
A. B. Muller	Senior Astronomer
S. Laustsen	Astronomer
B. Malm	Astronomical Technician
M. Blichfeldt	Electronics Engineer
J. Meuser	Chief Purchasing and Shipping

Chile:

B. Westerlund	Director of ESO in Chile
D. Vuyk	Director for Construction and Administration in Chile
R. Villena	Chief Engineer
H. Hyslop	Administrator I
F. Dossin	Astronomer
E. Schuster	Astronomer
J. Rickard	Astronomer
E. Maurice	Astronomer
A. Ardeberg	Astronomer
A. Siméon	Administrator II
P. Fjellerad	Maintenance Engineer

France:

R. Clop	Mechanical Engineer

XIII. APPENDIX B.

LIST OF MEMBERS OF COUNCIL AND COMMITTEES PER AUGUST 1, 1970

1. ESO Council

Belgium:	A. G. Velghe
	M. Deloz
Denmark:	A. Reiz
	O. Obling
France:	A. Lallemand
	A. Alline
Federal Republic of Germany:	H. H. Voigt
	C. Zelle

The Netherlands:	J. H. Oort
	J. H. Bannier (President)
Sweden:	E. B. Holmberg
	G. Funke

2. Committee of Council

A. Alline (France)
J. H. Bannier (Netherlands), President
M. Deloz (Belgium)
Ch. Fehrenbach (President of the Instrumentation Committee)
G. Funke (Sweden)
A. Reiz (Denmark)
B. Strömgren (President of the Scientific Programmes Committee)
C. Zelle (Federal Republic of Germany;
President of the Finance Committee)

3. ESO Finance Committee

Belgium:	M. Deloz
Denmark:	O. Obling
France:	A. Alline
	P. Berniard
Federal Republic of Germany:	C. Zelle (Chairman)
The Netherlands:	P. J. Fierst van Wijnandsbergen
Sweden:	B. Samuelsson

4. ESO Instrumentation Committee

K. Bahner
A. Behr
A. Couder
G. Courtès
R. Coutrez
Ch. Fehrenbach (Chairman)
M. V. Migeotte
L. Neven
A. Reiz
B. Strömgren
A. Wallenquist
Th. Walraven

5. ESO Sub-Committee for Spectrographs

K. Bahner
R. Bouigue
Ch. Fehrenbach (Chairman)
M. V. Migeotte

A. B. Underhill
P. Wellmann

Consultants

I. S. Bowen
B. Edlén
Y. Öhman

6. ESO Working Group for Buildings

A. Blaauw (Chairman)
J. Dommanget
E. B. Holmberg
P. Lacroute
A. Reiz

7. ESO Scientific Programmes Committee

	Substitute
J. Delhaye	J. Lequeux
E. B. Holmberg	A. Elvius
B. Strömgren (Chairman)	A. Reiz
P. Swings	P. Ledoux
G. Traving	B. Baschek
Th. Walraven	J. Borgman

8. ESO Working Group for Publication Matters

A. Blaauw (Chairman)
G. Funke
P. Lacroute
A. G. Velghe
H. H. Voigt

Fig. 1: The President of the Republic of Chile, Eduardo Frei M., dedicates the ESO Observatory on March 25, 1969.

Fig. 2: Congratulations are exchanged between the President of the Republic of Chile, Mr. Frei M., and the President of the ESO Council, Dr. J. H. Bannier. To the left, the Swedish Minister of Education, Mr. Olof Palme.

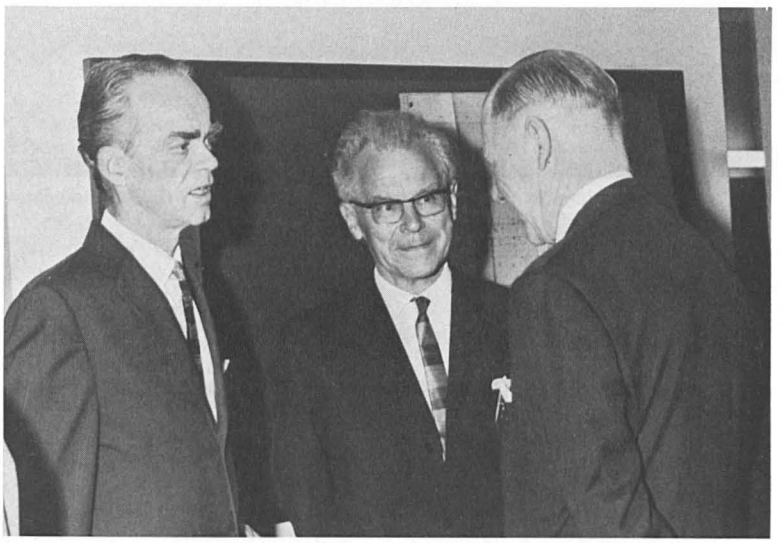

Fig. 3: During the reception at the ESO Headquarters in Vitacura, Santiago, from left to right: Mr. L. C. De Geer, Ambassador of Sweden in Chile, Professor J. M. Ramberg, Technical Director of ESO, and Dr. J. H. Bannier, President of the ESO Council.

Fig. 4: Mr. Jacques Trorial, Minister, Ministry of Education of France, addresses the inauguration audience during the lunch following the official dedication.

Fig. 5: Following the dedication ceremonies, the German Minister of Education, Dr. Gerhard Stoltenberg, visited the ESO establishments in Chile. The above photograph shows Dr. Stoltenberg (4th from the right) with Professor Heckmann, Director General of ESO (second from the right) in the ESO Library.

ADDRESSES

ESO Directorate	131 Bergedorfer Straße, 205 Hamburg 80, West Germany. Telephone: 7 21 30 01. Telex: 2 17 856. Telegrams: EURASTRO — Hamburg.
ESO TP Division	(Telescope Project Division), Ch 1211 Genève 23, Switzerland. Telephone: (022) 41 98 11. Telex: 23 698. Telegrams: CERNLAB — Genève.
ESO Headquarters Chile	Alonso de Córdova 3107, Vitacura. Casilla 11 P — Correo 9, Santiago de Chile. Telephone: 28 50 06. Telex: 3520048. Telegrams: ESOSER — Santiago de Chile.
ESO Guesthouse	Gustavo Adolfo 4634, Santiago de Chile. Telephone: 48 42 54 (near cross-roads Avenida Cristóbal Colón and Amerigo Vespucio, then through Félix de Amesti).
ESO Local Office La Serena	Casilla 27 D. Balmaceda 595, La Serena, Chile. Telephone: 11 67, 11 77. Telegrams: ESOSER — La Serena

The ESO Observatory on La Silla can best be reached by mail, telegrams etc. via Santiago Headquarters (address see above).