EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

FIFTH SESSION OF COUNCIL

Geneva

1st June, 1956

REPORT OF THE DIRECTOR-GENERAL AND DIVISIONAL DIRECTORS
During the period December 1955 - May 1956, the work of CERN went on quite smoothly, although there were some difficulties due to the exceptionally severe frost during the month of February. At the site, construction work had to be interrupted for some weeks and several thousand man/hours of work were lost. The Site and Buildings Division, however, took measures to make up for this delay as far as possible.

Details of the work of the various Divisions of CERN are given in the reports of the Divisional Directors. It is gratifying to see that we are gradually getting nearer the moment when, in 1957, the first machine, our 600 MeV Synchro-cyclotron, will come into operation, and research with this machine will start. The preparation of an experimental programme is well under way in the SC Division.

In the middle of February, the Director-General of CERN visited Copenhagen, in order to sign, on behalf of the Council, the agreement between Denmark and CERN, approved by the Council at its Fourth Session on 19-20 December, 1955. A ceremony for the signature of the agreement was held in the office of his Excellency H.C. Hansen, Prime Minister of Denmark. The Director-General was also entertained by his Excellency the Minister of Education, and he took advantage of his stay in Copenhagen to examine the work going on in the CERN Theoretical Study Division.
A draft agreement between CERN and UNESCO was approved on 12th April, 1956, at a meeting of the forty-third session of the Executive Board of UNESCO held in Madrid. Authorization was given to the Director-General of UNESCO to sign this agreement.

The draft agreement had already been approved by the Council of CERN at its Fourth Session, on December 19-20, 1955.

The Director-General and three members of the CERN staff took part in the Sixth Annual Conference on High Energy Nuclear Physics in Rochester (N.Y.) in April. During this visit to the United States, the Director-General continued informal discussions with the Ford Foundation in New York about a possible grant from this Foundation to CERN.

The CERN Symposium on High Energy Accelerators and Pion Physics, which is to be held in Geneva in June, has attracted great interest from scientists from all over the world. Already 217 scientists from 17 countries accepted CERN's invitation to take part in the discussions at the Symposium.

1. Cosmic Ray Research
a) Geneva Group

The main effort of this section, comprising at present 3 physicists, 3 technicians and 1 mechanic, was directed towards the development of the apparatus for the experiment involving the combination of visual and fast electronics techniques described in CERN/GD/Memo/3 of 1.11.1954. This activity was carried out in close collaboration with the STS Division.

Extensive tests were carried out on the first of the two multiplate cloud chambers. The operation proved satisfactory, following closely the expected performance. Counter-controlled photographs of cosmic ray particles were obtained with practically no displacements and little distortion. A few modifications appeared necessary, especially for the mirror surface of the multiple plates, and for the holding coils of the magnetic valves. These changes are incorporated in the construction of the second chamber. Some difficulties were encountered in the procurement of the flash lamps. The two chambers are now nearing completion in their final form, together with their servo-mechanisms for control alarm.

The Cerenkov and scintillation counter are also nearly ready. They will be connected to the fast electronic circuits which have been subjected to preliminary tests and appear to work satisfactorily.
b) Jungfraujoch Group

This group now consists of eight people - six physicists, one electronics engineer and one laboratory assistant. Of these eight, four have only started work with the group during the last six months.

The cloud chamber has been used, since November, 1955, to study V-particles produced in a material of low atomic weight - carbon. About 15,000 photographs have been taken and the number of V-particles observed that originate in nuclear interactions in carbon is about 40. This yield agrees well with the estimate made before the experiment was started.

These 40 events are now being measured and the sample should be large enough to detect any large difference between the V-particles produced in heavy and light materials. Whether or not the experiment should be continued will be decided this summer when the first results have been analysed.

In addition to this work, a paper on charged V-particles has been prepared and is being published. This paper reports observations of cosmic-ray K-mesons and compares them with the observations of machine-made particles.

2. Theoretical Group in Geneva

The Theoretical group in Geneva has mainly studied the Theory of the new particles, hyperons and heavy mesons.

a) Concerning the strong interactions (production) and the electromagnetic interactions, some consequences of a recent theory (1), (2) have been investigated. A general relation connecting the charge operator and the operator inducing reflections with respect to the (1,2) plane in isotopic space has been found (3).

b) As regards weak interactions (decays) a formation has been suggested by which processes involving only particles with a well defined isotopic spin can be studied. The basic hypothesis is that the Hamiltonian is a component of isospinor. This gives the rules \( \Delta I = \frac{1}{2}, \Delta U = 1 \) and leads further to some relations between observable quantities (4), (5).

c) Weak interaction involving leptons are now being studied.

Publications - B. d'Espagnat et J. Prentki

1) CERN Report CERN 55.11
2) Nuclear Physics I (1956), 33
3) Physical Review (to be published June 15, 1956)
4) Comptes rendus Acad. Sc. 242 (1956), 740
5) Nuovo Cimento (to be published May 1st, 1956)
3. Colloquia

During this period, many distinguished scientists lectured at the weekly Joint Colloquium organized by CERN and the Institute of Physics of the University of Geneva. A list of the topics presented and discussed at these gatherings is attached.
# LIST OF COLLOQUIA

Institute of Physics  
Geneva  
1956

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DIVISIONAL DIRECTORS PROGRESS REPORTS

PROTON SYNCHROTRON DIVISION
1. Summary

During the first half of 1956 the P.S. Division have started to place the orders for the main component parts of the machine. Specifications for the magnet, the magnet power generating equipment, and the substation have been written and tenders have been asked from several firms for the first two components. We are in the process of assessing the merits of the tenders received for the magnet power generating equipment and we will advise the Finance Committee of our choice shortly.

The staff of the Division has increased from 120 at the end of 1955 to 133 (May 1st, 1956) and we have 5 offers for jobs not yet accepted which, if they are accepted, make 138 total for mid-1956. Our staff target for the end of 1956 still stands at 150.

There are no changes in the parameters of the machine. The scientific and technical work has been concerned with the detailed design of the machine.

Since the last progress report (Dec, 1955) an experiment using the electron analogue model at Brookhaven has shown that the transition energy problem is capable of solution and should not present an impassable barrier.

2. Theory and Analogue models

Theoretical work in the Division has enabled us to prescribe permissible and yet attainable tolerances for the non-linearities in the magnet guiding and focusing fields in our proton synchrotron.

The mechanical analogue model for the motion of particles in non-linear systems continues to be used for investigating stability phenomena in such systems.
Various theoretical studies have been made on the effects of the inevitable errors likely to occur in the magnet units e.g. focusing field errors, errors due to using straight blocks instead of curved blocks for the magnet units, etc. The results of these studies have been used in deciding the final magnet design.

3. Magnet

Specifications for the magnet blocks have been written and sent to various possible manufacturers. The search for the best available steel in Europe for our magnet continues. Tenders for the magnet blocks are due to be handed in to P.S. Division by the end of May 1956.

We expect to have sufficient blocks to make the first complete magnet unit in June 1956. Experiments on this unit will determine the final specifications for the 100 magnet units forming the complete magnet of the proton synchrotron.

Experimental work on the pole face windings has led to possible designs which are now being considered. The design of the quadrupole and multipole correcting lenses is under way.

4. Radio Frequency

Experiments on the first full-scale model of the accelerating cavity have been most encouraging. The final design of this cavity together with the R.F. power amplifiers is sufficiently complete for us to write the specifications for the complete equipment. We plan to write the final specifications by the middle of May and send them to possible manufacturers.

Preliminary experiments with the complete computer for the frequency programmer show that there is a good possibility of achieving the required accuracy of better than 1 part in $10^3$ between the computed frequency and the correct frequency.

Further studies have been made on the possibilities of using the proton beam itself to determine the accelerating voltage frequency and phase.

5. Injection Linear Accelerator

The manufacture of the accelerating structure of the Linac is proceeding at Metropolitan-Vickers.
Tests on the 2 MW amplifying triodes at C.F.T.H. for supplying the R.F. power to the Linac have so far only given a power of 0.7 MW. The triodes themselves seem to be satisfactory but considerable difficulties have been experienced by the firm in designing the cavities. Work is proceeding to find a satisfactory solution.

The 500 KV set ordered from Haefely has undergone acceptance tests at the firm and is being shipped to Geneva. The tests showed that the equipment behaved according to the specification.

Other detailed work on the component parts of the Linac has proceeded according to the programme.

6. Engineering

The mechanical design of the magnet, coils and trolleys has been completed. An optical aligning system for setting up the blocks to form units has been designed for tests on the first magnet unit.

Specifications for the magnet power supply generating equipment have been written and sent to possible manufacturers. Five tenders have been received and are being studied in the Division.

The specifications for the P.S. substation are nearly complete and will be sent to manufacturers shortly.

Regular triangulation of the site by the Survey section has shown that the movement of the surface layers has not been very large during the first half of 1956. However, we are now approaching the period in the year when the movements last year reached a maximum. Several devices have been set up on the site to determine the relative movement of the underlying rock on which our machine will be founded and the surface layers. Preliminary results show definite relative movement which suggests that the large surface movements measured last year may be confined to the surface layers. All measurements will continue until the end of 1956 to find out the exact rock movements to be expected during the operation of the machine.

The general planning of the control system for our machine has proceeded.

A decision has yet to be reached for the vacuum system of the proton synchrotron, whether to use the well tried but complicated oil diffusion pump system or to adopt the simple but untried getter pump system.
7. Buildings and Foundations

The design of the buildings and foundations of the proton synchrotron has been completed for all the main components. Tests on the elastic support system for the foundations carried out in the Trial Section of the ring were very successful and this system has been adopted. A damping system to avoid undesirable resonances has been tried out satisfactorily and will be used in the ring.

The constructing of the buildings is progressing according to our programme and at the end of the year we hope to move most of the P.S. Division up to the Meyrin site.

8. Liaison with other Groups

Liaison with other groups has been maintained mainly by correspondence during the first half of 1956. Dr. F. Courant from Brookhaven has visited us to discuss non-linear problems but no members of the P.S. Division have visited the American projects. In June during the Symposium we will have the opportunity to exchange ideas with the many visitors attending the sessions. Most of the senior staff of the Brookhaven project will be visiting us for discussions during this period.
DIVISIONAL DIRECTORS PROGRESS REPORTS

SYNCHRO-CYCLOTRON DIVISION
1. General remarks

Now the chief constructional problems connected with the machine are mostly solved, particular attention will be given to the research work which will be carried out in the future.

Several meetings to discuss these problems with physicists were held during the past six months. Some of these physicists will shortly become members of the SC Division, others will join the group later.

As in the past, collaboration with Liverpool was especially close, and an intensive exchange of ideas took place between members of Professor Skinner's Institute and the SC Division. In addition, Professors Amaldi and Bernardini participated in these discussions.

As a result of more recent calculations by Dr. Lo Coutour, important progress was made in the design of the magnetic deflection of the proton beam. It is hoped to obtain a strong external proton beam.

Another group is occupied with the preparation of the track chambers. In this field Peyrou is acting as consultant.

Efforts will be concentrated on the construction of a bubble chamber in order to achieve rapid progress in this field.

The development of an over-compression chamber has been postponed until the research work in Professor Blackett's Institute reaches a more advanced stage.

It is intended that a fairly large group should study methods of detecting particles.
Some physicists are interested in the problem of obtaining a beam of µ-mesons. If the results are encouraging this group will be expanded to carry out experiments with this beam.

Furthermore, a laboratory for the determination of Tritium has been set up in order to examining spallation problems which will occur later.

Discussion took place with other laboratories on the question of the possible use of the CERN Synchro-cyclotron by visiting research teams from Member States.

An electronic workshop is being set up for the experimental group and will be ready at Meyrin in July.

Various engineering groups moved to Meyrin in the spring and are temporarily installed in the experimental halls.

Only the physicists will remain in the barracks at Cointrin and, until completion of the building at Meyrin, the first counters will be built at Cointrin in the barracks and hangars.

It is considered that the number of vacancies for physicists this year is insufficient for operations to be carried out according to schedule. The development of all the counting methods with their very specialized technique requires more and more groups of physicists. Therefore, it would be very desirable if the number of vacancies provided for physicists, especially for young ones, could be increased as soon as possible. The provision of a large number of fellowships would enable many young physicists from all the Member States to gain experience in the High Energy field.

We continue to hope that it will be possible to start the first trial runs of the machine in the summer of 1957. As the time required for refinements of techniques always takes longer than anticipated, it is important to commence preparations of the experiments this year.

2. Construction progress

a) General

The large parts of the machine have been ordered, but, with the exception of the coils, there have been delays in the delivery of all those items. The designs of several of the bending magnets and focusing devices have been completed.
b) Lay-out and building

The control building of the Synchro-cyclotron is now completed, as is the corridor leading to the Control room. Laying of cables has commenced. The small lifting platform is re-assembled with the new lifting screws and is under test. The screws for the larger lifting platform have been tested at the works and found to be satisfactory, assembly at site will take place in the near future.

c) Magnet

All the lower horizontal yoke members, the vertical members and seven of the eight pole discs are assembled. The remainder of the magnet steel is finished and in the process of being transported to the site.

Assembly of the magnet has been done in a very cautious manner; a sound and precise job has been carried out.

d) Vacuum chamber and pumping lay-out

The vacuum tank is nearing completion and shipment is scheduled to take place in the near future. The high-vacuum pumps have been tested at the manufacturers works where they appear to function satisfactorily. These pumps will not be finally accepted until they are installed at the site.

e) High Frequency System

Tests on the full-scale model tuning fork are continuing but are not yet complete. Fabrication of the prototype tuning fork parts is somewhat delayed and some theoretical problems in its construction have yet to be solved.

f) Control System

The control system got away to a late start but is now progressing satisfactorily and no serious delays are being encountered.

g) Power Supply

The transformer sub-station is now completed and working satisfactorily.
h) Cooling

The cooling system is progressing according to plan. Parts of the system are completed and preliminary tests are being carried out.

i) Motor Generator Set

There has been a few months delay in the manufacturing of this machine due to the makers being unable to obtain the correct steel supplies. Assembly at the factory is now almost completed.

j) Staff

Present staff: 43.
DIVISIONAL DIRECTORS PROGRESS REPORTS

SCIENTIFIC AND TECHNICAL SERVICES DIVISION
DIVISION DIRECTORS PROGRESS REPORTS

SCIENTIFIC AND TECHNICAL SERVICES DIVISION PROGRESS REPORT

(1st November 1955 – 30th April 1956)

by L. Kowarski

1. Direction

Day-to-day administration, recruitment, administration of the Cosmic-ray Research Group on behalf of the Director-General.

The Director of the Division conducted several studies connected with the launching of new sections: Electronic Computation and Liquefied Gases (see below); he took part in the first studies of Chemistry in CERN and represented CERN at the Round Table of the Council of Europe (March 1956).

2. Non-electronic instrumentation (Y. Goldschmidt-Clermont)

2.1 Design and workshop

The design of cloud chambers having been completed, the section concentrated on other apparatus needed for the K-meson experiment. Flash boxes and cameras were studied with regard to the requirements of reprojection and measurements. The shells for the Cerenkov and scintillation counters were built to the specification of the electronic group.

In December 1955 STS was given the task of organizing the future main workshop of Meyrin, to be started in early 1957. In the meantime collaboration with the SC Division continued within the provisional workshop operated jointly at Cointrin. The facilities of this workshop increasingly have to be eked out by recourse to the services of outside firms. One STS engineer devotes a large fraction of his time to the organization and maintenance of the necessary contacts. The Geneva market was prospected first; more distant sources of supply for these services are being investigated with due regard to customs problems, etc.
A Workshop Committee, on which all technical Divisions are represented, is responsible for the detailed design of the workshop building, specification of machine tools and other special installations. Construction and purchasing are in progress.

The staff of this section, including the mechanics on the STS payroll, numbers 11.

2.2 Track chambers and apparatus for the K-meson experiment

Assembly and testing of the two multiplate cloud chambers (see the Director-General's report on Cosmic-ray research) is proceeding. Final tests were made on the models for flashes and mirrors. The flash lamps exhibited a very irregular behaviour; investigation of its causes and consultations with the manufacturer as to its cure are in progress.

Preliminary studies were made on the problems of reprojection and measurement connected with the track-chamber photography. We expect these questions to become one of our main subjects of study in the near future.

One of the physicists of this section is at present staying with Prof. Steinberger (Columbia University) where he studies the instrumentation problems (cryogenics, optics, controls, etc.) relating to bubble chambers. To this effect he also made a tour of American laboratories interested in this technique.

Staff: 2 physicists and 2 technicians; close collaboration with the Design and Workshop section and with the Cosmic-ray group (Geneva).

2.3 Liquid hydrogen (See the paper FC/121)

After a series of visits to leading laboratories (Cambridge, Grenoble, Leyden, Oxford, Malvern), considered in conjunction with reports from America, it was decided to build the liquefier for a yield of about 20 litres per hour, with an easy extension to 40. Prof. Taconis of Leyden was appointed as chief consultant; the liquefier is being built at Leyden and other equipment is being purchased under Prof. Taconis' guidance. Design of the building is in progress; assembly in situ of the whole plant is scheduled to start in the Spring of 1957.

The market for liquid nitrogen and bottled hydrogen gas was investigated. Sources of supply adequate for the immediate beginnings were found in Switzerland and France; the construction of a nitrogen plant in Geneva by one of the leading suppliers is being envisaged.
3. **Electronic Group (G. von Dardel)**

3.1 **Electronic Instrumentation**

The main activity continued to take place in connection with the K-meson experiment. An increasing effort was given to the planning and organization of the future instrumentation activities, in particular for the Synchro-cyclotron. When the preparation of the Cosmic-ray experiment comes to an end, an increasing fraction of the electronic workshop will be diverted to the development and production of electronic instruments for the SC.

The electronic instrumentation for the K-experiment in its final shape is nearing conclusion. Considerable work has however gone into instruments needed for the testing of the cloud chambers. The big Cerenkov counter is ready for testing. Procedures and facilities for the current production of large scintillation counters for cosmic-ray and accelerator work are nearing completion.

A close cooperation between AERE, CEA, Liverpool and CERN for the standardisation of certain features of nucleonic instruments and for an exchange of information and experience has been initiated. CERN serves as the convening and secretarial body; meetings will be held in rotation at the participating laboratories (two have taken place, Geneva in January and Saclay in April).

Present strength of the section: 3 electronic engineers, 5 technicians.

3.2 **Electronic computation**

As a result of an extensive study of the market (paper GD/45), the proposal to buy a Ferranti Mercury was approved by the Finance Committee in December 1955. Delivery on site is expected in the early Spring of 1957.

An experienced mathematical physicist was recruited to head the future computer service. He will arrive in Geneva in July 1956 and proceed with the recruitment and training of a small initial staff.

3.3 **Health Physics**

At the PS Group's request, certain preparations were made in order to survey and monitor the irradiation risks at the injection set of the Linac (One technician, half-time).
The recruitment of a qualified health physicist is in its initial stages. It appears that this position will be difficult to fill.

4. Information (H. Coblans)

4.1 Library

Current activities at Cointrin and the Institute (purchasing, cataloguing, loans, etc.) continue under the guidance of the Library Committee. Detailed plans for the accommodation of the Library at Meyrin were drawn up in cooperation with the Committee and the SB Division.

4.2 Publications and documentary reproduction

Staff and equipment for specialized typewriting are now available and enable the Service to handle CERN scientific reports on an efficient basis. It was decided to use these facilities for the publication of the final proceedings of the CERN Symposium of June 1956.

A Rotaprint offset machine was installed, the smaller Multilith previously used having been taken over by the Administration. A chief photographer and an offset operator have been recruited. These new facilities were used in order to print photographically, in an edition of 400 copies, the pre-prints of the Symposium.

The commemorative booklet (June 1955 ceremonies and a facsimile of the Convention) was published in two editions (French and English) of 1500 copies each.

4.3 Translation

An administrative translator having been appointed, the Information Service's translator had more time to concentrate on work of a scientific and technical nature, involving special terminological knowledge (also in German).

4.4 External relations

An Assistant-in-charge has been appointed in April 1956 in time to get acquainted with his range of activities before the seasonal influx of visitors, and the increase of press relations in connection with the Symposium.

Staff of the Information Service on April 30th: 13 full-time, 1 half-time. Miscellaneous services for the Direction and the Administration continued to be performed (document reproduction, translation, participation in the preparation of the Annual Report, etc.)
DIVISIONAL DIRECTORS PROGRESS REPORTS

SITE AND BUILDINGS DIVISION
DIVISIONAL DIRECTORS PROGRESS REPORTS

SITE & BUILDINGS DIVISION PROGRESS REPORT

Period December 1955 - April 1956

by P. Freiswerk

1. Common Services

Since the beginning of this year, SB Division has had to take over the responsibility for common services like transport and general maintenance. This section has been gradually built up and now comprises a staff of 24.

The transport section has handled a large amount of the goods delivered (over 2000 consignments during the last 4 months), and is running a regular bus service for passengers and goods between the site, Cointrin and the Institut de Physique in town.

A First Aid center has been set up on the site and a few members of the SB Division have been especially trained to deal with emergencies.

The fire risk for laboratories being relatively high and the site being rather distant from the town fire services, special attention has been given to fire prevention. Fire detectors are being installed in the buildings, special equipment has already been acquired and voluntary fire brigades are being formed among the staff. Watchmen look after the site and the barracks at Cointrin outside working hours.

2. Technical Services

With the progress of the technical installations (electricity, heating, water, etc.) operating and maintenance staff is being gradually recruited. Recruitment is being carried out prior to actual installation so that the staff becomes familiar with the system and equipment during its erection. The present strength of the staff (electricians, mechanics, etc) is 7.
3. Construction work

The period covered by this report included a very severe winter. Usually non-Swiss workers return to their countries during the winter months (December - March), but our intention to pursue work as much as possible during the winter led to a special agreement with the local authorities permitting these workers to stay in Geneva during these months. CERN guaranteed an indemnity to workers in case of inclement weather.

Until the end of January 1956, work was going on normally with 250 workmen, averaging about 10'000 man-hours per week. Weather conditions in February were exceptionally bad. The average temperature was about minus 10°C, the lowest figure registered in Geneva since temperature was first registered in 1828. Open air work had to be stopped completely. Many workmen chose to go home so that the number of workmen dropped to 110 and the weekly man-hours were reduced to about 3'000. In March, work was resumed, although still handicapped by the frozen ground and by frost. In spite of the unexpectedly hard winter, it is hoped that, with an all out effort, it will be possible to keep the greater part of the work up to schedule.

Proton Synchrotron building

The ring building is progressing steadily. Concrete work for the fourth octagonal section is under way.

In the trial section, measurements have been carried out with elastic steel supports for the concrete beam which will ultimately support the ring magnet. Satisfactory results have enabled us to place the order for these supports.

Excavations for the Linac building have been started.

The initial set-backs encountered in the construction work of the Experimental Hall and the annexed laboratory have been overcome, and work is now going on at full speed.

Synchro-cyclotron building

Both this building and the corridor connecting it to the Control Station have reached the stage at which the SC Division is able to go ahead with all their installations and cabling. The Cyclotron transformer station has been energized. The building is being completed as the equipment is installed.
Power House

Whilst concrete work for this building is going on, heating pipes are being laid in the underground galleries connecting the Power House with the various buildings.

Central buildings

The first laboratory wing adjoining the Control Station of the Synchro-cyclotron is most advanced. Excavations for the two other wings, the Library and the Main Workshop have been started. Laboratory furniture and equipment have been designed and specifications prepared for tenders.

A project for the Main Building (with offices for Director-General, Administration, conference and lecture rooms, canteen, etc.) was submitted to the Finance Committee in May. The detailed plans are now being worked out and it is expected to start building in the autumn.

Plans for a building to house the equipment for the production of liquid hydrogen, with a laboratory annexed, are under discussion with STS Division and the construction of this building has been put on the programme for this year.

Two barracks have been erected on the site (SB Division and SC & PS Divisions). SB transferred all its services to the site early in May.

4. Electricity

After prolonged negotiations between the Geneva authorities (Services industriels) and CERN, a satisfactory contract for the supply of electricity at Meyrin has been drafted. This agreement can now be signed, since it has been approved by the Finance Committee.
DIVISIONAL DIRECTORS PROGRESS REPORTS

THEORETICAL STUDY DIVISION
DIVISIONAL DIRECTORS PROGRESS REPORTS

THEORETICAL STUDY DIVISION PROGRESS REPORT
(1 January - 30 April 1956)
by C. Möller

The Theoretical Study Division general programme of activities is outlined in the previous reports.

Activities in Copenhagen

The following Fellows were with the Division in Copenhagen on April 30, 1956:

F.A. Corulus (Belgium)
M. Demour (Belgium)
I. Espc (Norway)
H.J. Groenewold (Netherlands)
B. Jouvet (France)
A. Kind (Italy)
S. Kurepa (Yugoslavia)
H. Lehmann (Germany)
P. Olsson (Sweden)
A.E. Petermann (Switzerland)
M. Scharff (Denmark)
A.R. Edmonds (U.K.) remained with the Division until March 31, 1956.

G. Eder from Austria continues to work with the Division on a stipend from Austria.

The following physicists from outside have visited the Division during the period January 1 - April 30, 1956, to give lectures and take part in discussions with members of the Division:

H. Alfvén
E. Amaldi
R.J. Eden
B.H. Flowers
W. Heisenberg
W. Heitler
R. Jost
W. Zimmermann
The following members of the staff and guests of the Institute for Theoretical Physics of the University of Copenhagen have also given lectures for the Division:

- P. Axel
- T. Bergström
- T. Huus
- O. Kofod-Hanson
- H.J. Lipkin
- P.C. Martin
- A. Sliv
- T. Tamura
- A. Winther

A complete list of lectures and colloquia held and papers published during the period in question is given in the Appendix to this Report.

In February the Director-General paid a visit to the Division. During his stay in Copenhagen, he and Mr. H.C. Hanson, Prime Minister and Minister for Foreign Affairs of Denmark, signed an Agreement between the Danish Government and CERN confirming the legal status of the Theoretical Study Division in Copenhagen.

Co-operation

At the Gustav Werner Institute for Nuclear Chemistry, Uppsala, A. Kjolberg, who had taken part in the work of A.C. Pappas, has been replaced by J. Alstad (Norway). J. Combe (France) is continuing his work there.

G. v. Ciorko and D. Harting have finished their work at the Nuclear Physics Research Laboratory of the University of Liverpool and have joined the SC Division in Genoa. At present, the following are with the CERN group in Liverpool:

- G. Fidecaro (Italy)
- S.G. Frank (U.K.)
- J.C. Kluyver (Netherlands) from April 1, 1956
- H.A. Michalowicz (France) from April 1, 1956
- R. Nordhagen (Norway) from April 1, 1956.

The Department of Natural Philosophy of Glasgow University has placed certain facilities at the disposal of CERN to enable some CERN Fellows to work with its new big accelerator. Thanks to this generous offer, B. Lalović (Yugoslavia) began working there on April 26, 1956.

In response to an invitation, G. Källén attended the Rochester Conference on High Energy Nuclear Physics.
List of lectures and Colloquia
from January 1 - April 30-1956

A. Mesons and the Field Theory of Nuclear Forces

W. Heisenberg (February 6): General remarks on the theory of elementary particles.

F. Cerulus (February 16): On the classification of fundamental particles.

H. Lohmann (February 27): Remarks on the causality problem in the interaction of elementary particles.

A. Potormann (March 5): Photoproduction of two π-mesons at low energies.

W. Heitler (March 16): Self-stress problems and the limit of validity of the field theories.

W. Zimmermann (April 9): Discussion on causality in field theories.

B. Quantum Electrodynamics

G. Källén: Weekly lectures on quantum electrodynamics.

C. Nuclear Constitution

A. Winther (January 21): Theory of the Coulomb excitation process.

T. Huus (January 21): Experimental methods and results.

A. Mähr (January 21): Rotational excitations.


H.J. Lipkin (February 9): Collective motion in the nuclear shell model.

L. Sliv (February 17): K-shell internal conversion coefficients.

T. Bergström (February 20): M4 transitions in the Pb-isotopes.

P. Axol (February 24): Summary of photonuclear reactions.


L. Sliv (March 9): Mono-energetic positrons.

L. Sliv (March 9): Some problems of α-decay.
DIVISIONAL DIRECTORS PROGRESS REPORTS

ADMINISTRATION DIVISION
DIVISIONAL DIRECTORS PROGRESS REPORTS

ADMINISTRATION DIVISION PROGRESS REPORT

(mid 1956)

by J. Richemond

General Remarks

During the period under review, the Administration Division completed two lengthy tasks, namely the drafting and the publication of the Council's annual report, and the preparation of the Regulations for the Staff Insurance Scheme, the establishment of which had been approved in principle by the Council at its session held in December 1955.

The work on that Scheme was carried out by the Finance Officer and is explained in the chapter on the Finance Office.

In addition to the preparation of those two documents, the Administration Division devoted particular attention to coordinating the general progress of CERN and to recruiting the Staff required.

It concentrated its efforts towards the rapid advance of building on the Site. In particular it had to settle the various problems which constantly arise in connection with foreign labour employed on the Site.

Negotiations with "Services industriels de Genève" for a contract for the supply of electric power were brought to a satisfactory conclusion. The tariffs agreed are favourable in comparison with those granted to other enterprises, and no depreciation charges will be made in respect of capital expenditure on connections with the mains by the Swiss authorities.

a) Finance Office

The Finance Office drew up the accounts for the year 1955, which were audited by the auditors. The auditors certified that the financial statements gave a true and accurate view of the financial situation of the Organization.

During the period under review the Finance Officer devoted a large part of his time to the preparation of draft regulations for the Pension Scheme, the establishment of which had previously been approved in principle by the Council. Two distinguished
actuaries were called upon to give assistance, and they ascertained that the contributions laid down by the Council would be sufficient to cover the proposed benefits. They expressed their formal approval of the draft regulations, which were submitted to the Finance Committee.

In preparing the regulations, consideration was given to the peculiar nature of CERN which consists of permanent and of temporary staff members, and an attempt was made to provide each category with equivalent benefits.

The proposed benefits do not only cover old-age and disability risks, but also provide pensions for widows and orphans.

The Scheme will be subdivided into two branches, namely a pension fund proper for staff members as a whole, whether permanent or temporary, and a savings fund for fellows and staff members ineligible for membership of the pension fund.

As regards the internal organization of the Finance Office, the plan of accounts was revised to ensure it was better adapted to the continued growth of the Organization. For the same reasons, adjustments were made to internal financial rules and their application.

The Office keeps in close touch with the "Office fédéral des contributions" to ensure the reimbursement of the Swiss sales tax.

The internal audit section examined 60 contracts and 3,200 purchasing orders.

The accountancy section paid 12,630 invoices including payments to staff members.

b) Personnel and Services Office

1. In spite of the increasing difficulties of recruitment reported to the Council at its fourth session, the rate of intake at all levels has been maintained and even slightly increased. The build-up envisaged in the 1956 budget has therefore so far been achieved. To some extent the continued ability of CERN to attract candidates must be ascribed to the substantial improvement in conditions recently agreed by the Council, and it may be expected that the adoption of the Pension and Insurance scheme now being proposed will assist also in this direction. Nevertheless it has required considerably more advertising effort recently to maintain the flow of applications, and much greater use is now being made of direct advertisement in the press and journals of various Member States.
2. During the period from 16th November, 1955 to 30th April, 1956 the following recruitment statistics were obtained:

<table>
<thead>
<tr>
<th>Category</th>
<th>No. of applications</th>
<th>Technical</th>
<th>Administrative</th>
<th>Ancillary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leading and Scientific</td>
<td>478 (1350)</td>
<td>683 (2633)</td>
<td>320 (2513)</td>
<td>267 (1293)</td>
</tr>
<tr>
<td>Total</td>
<td>1748 (7789)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The numbers in brackets are the grand totals received to 30.4.56).

- No. of selection boards: 52
- No. of candidates boarded: 316

No. of appointments made:
- Geneva: 70
  - Copenhagen: 1
  - Liverpool: 2
  - T.S. Division: (Uppsala: 1, Glasgow: 1)
- Total: 75

No. of appointments terminated:
- Geneva: 6
- T.S. Division: 3

The total number of staff in CERN at 30.4.56 was 349, distributed as shown in Table I.

3. An encouraging feature indicated by these figures is the greatly increased proportion of scientific and technical applications received. This is now far more commensurate with the requirements of the Organization, which has little further present need for additional administrative personnel. It is now possible to define the future staff needs of CERN with a fair degree of precision, and specified vacancies are circulated periodically to all Member States.

4. The Personnel Office has recently begun a careful examination into possible improvements in the present staff structure and grading system of CERN, with particular reference to the size and nature of the future Organization. Similar investigations are being made or are proposed in other international and European organizations and, in these, the Personnel Officer is collaborating as an observer only, but ensuring that CERN can in no way be committed to any common action not suited to the special position of the organization.
5. Collaboration on matters of interest to the staff within the Organization has been maintained through participation on the Common Services Committee, the Joint Committee with the Staff Association, and the newly-formed Canteen Committee, and by contacts with Divisional Administrative Officers and the Site and Buildings Division. Personal contact of all members of the Personnel Office with staff members, although the growing size of the Organization makes this increasingly difficult, is still considered to be of the greatest importance in preserving the good spirit of CERN.

6. The Health Insurance Scheme continues to function well and recently some small improvements in the scheme have been obtained without increase in the premium rates.

7. First aid services have been developed with particular reference to the gradual transfer of staff to Meyrin and emergency facilities are being arranged with the cantonal hospital.

8. The general services office has been strengthened to cope with increasing requirements in matters of travel, accommodation and installation in Geneva, and effective working contacts have been maintained by this office with the local Swiss and French customs authorities. The problems which will arise during the transfer to Meyrin in the next 12 months have been considered and some reorganization of the mail, typing and telephone services has already been made with a view to avoiding undue duplication of staff or equipment.

c) Purchasing Office

The total amount of orders and contracts placed during this period was approx. Sw.Fr. 3'400'000.- (2900 orders).

The contract for the electronic computer ordered from Ferranti has now been signed, as well as contracts for some of the bigger machines.

In the course of May and June 1956, the contract for the P.S. Power Supply will be negotiated and awarded. Tenders for the Magnet Blocks have been called for and the contract can probably be awarded during the months of July-August 1956.

Offers have already been received from a number of firms from all parts of Europe for the supply of equipment for the general store.
The Purchasing Office now operates on a well established system and the control of goods on delivery is well in hand - a system to follow up on all orders has also been put into operation.

The catalogue library is constantly increasing.

As during the previous periods, the Purchasing Office submitted numerous lists of possible suppliers and contractors to S.& B. Division for future contracts and works.

The number of enquiries made on behalf of Divisions is growing daily.

The work of standardization continues and will certainly help to obtain better quotations and to make purchasing easier.

Towards the end of the year, substantial discounts were granted by suppliers whose total deliveries had reached a sufficiently high figure.
CERN STAFF AT 30th APRIL, 1956  
Distribution by Functions and Divisions  

<table>
<thead>
<tr>
<th>Division</th>
<th>Leading and Scient.</th>
<th>Techn.</th>
<th>Admin.</th>
<th>Ancy.</th>
<th>Stipends and Fellowships</th>
<th>Totals</th>
<th>Consultants</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.G.</td>
<td>1</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>P.S.</td>
<td>41</td>
<td>72</td>
<td>7</td>
<td>11</td>
<td>-</td>
<td>131</td>
<td>2</td>
</tr>
<tr>
<td>S.C.</td>
<td>19</td>
<td>20</td>
<td>3</td>
<td>1</td>
<td>-</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>S.B.</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>22</td>
<td>-</td>
<td>31</td>
<td>-</td>
</tr>
<tr>
<td>S.T.S.</td>
<td>20</td>
<td>28</td>
<td>6</td>
<td>3</td>
<td>-</td>
<td>57</td>
<td>1</td>
</tr>
<tr>
<td>T.S.</td>
<td>7</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>19</td>
<td>29</td>
<td>-</td>
</tr>
<tr>
<td>ADM.</td>
<td>4</td>
<td>1</td>
<td>36</td>
<td>13</td>
<td>-</td>
<td>54</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>126</td>
<td>59</td>
<td>51</td>
<td>19</td>
<td>349</td>
<td>15</td>
</tr>
</tbody>
</table>