

# CERN

**PUBLISHED MONTHLY FOR CERN STAFF MEMBERS**  
(European Organization for Nuclear Research)

**No 3**  
**October 1959**

In September the big Conference on Accelerators and their Instrumentation turned CERN once more into a forum of international high energy physics.

The initial success obtained with the proton synchrotron was one of the main subjects of conversation during the meeting : on 16 September, shortly after midnight, a proton beam went round the 200 m diameter ring for the first time.

Since then, testing of the big particle accelerator has been going on without respite. Systematic checking of the magnets, the radio frequency system, the injection scheme and the poleface windings of the magnets has been proceeding apace.

On 13 October the radio frequency system was switched on for beam trapping studies. The beam was successfully trapped on the 15th. At the same time an accelerated beam was observed for several milliseconds. However, the first acceleration tests did not take place

## *Last month at CERN*

until October 22nd. That evening a good intensity proton beam was accelerated for 25 milliseconds. The beam energy reached 400 MeV viz 8 times the injection energy. Occasionally a low intensity beam of up to about 1 GeV — one thousand million electronvolt — was observed.

Among other apparatus, closed circuit television is used to monitor the particle beam in the vacuum tank. The use of such modern methods does not, however, exclude the possibility of technical hitches, such as voltage variations in the network, which cannot always be corrected by the voltage regulators. At the end of September, one of these voltage drops combined with a faulty circuit breaker, caused the water supply to be cut off, which involved a stoppage

of an hour in the work of the laboratories.

In the SC Division, it is planned to stop using the 600 MeV accelerator for a time at the end of the year. Further information on this subject is given on page 4.

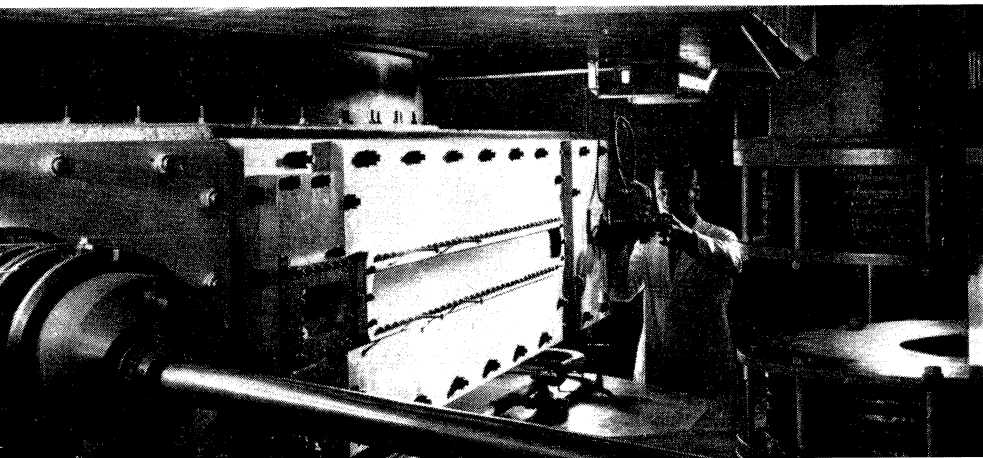
On the CERN site, the bulldozers are again at work. A deep trench scores the site from North to South : this is for a conduit to drain off the water infiltration from the ground on the French side of the site. A tunnel to connect the power house and new PS experimental buildings is also going to be excavated. Between the proton synchrotron and the old canteen, the concrete testing building for the second bubble chamber is being completed.

The transfer of physicists from the synchro-cyclotron to the proton synchrotron, as well as the gradual running in of the big accelerator, are responsible for some re-allocation of buildings. One of the brown barracks occupied by the construction workers near the new entrance, has been taken down and re-erected in the centre of the PS ring. It will house the Survey team. Another of these barracks is for the physicists working with the pulsed magnets ; others will be housing the staff of the Architect's Office by the time this article is printed.

Finally, two important events marked the last two weeks of October : the meetings of the Finance Committee and the Scientific Policy Committee. Ed.

The CERN synchro-cyclotron is going to be modified. The glittering plate in front of Ivo Antoni will be redesigned to take a larger "window" for extracting mesons (see article on page 4).

CERN Photo



# Contents

## of No 3

Last month at CERN . . . . .	1
Ch. Mallet . . . . .	2
CERN Visitors . . . . .	2
The CERN Conference . . . . .	3
SC to be shut down . . . . .	4
Behind the scenes . . . . .	5
Scientists tell you . . . . .	6
Books for Brazil . . . . .	8
Unifying the Units . . . . .	8
Social events . . . . .	9
Do you know that . . . . .	10

### « CERN COURIER »

is published monthly for the staff of the European Organization for Nuclear Research. It is distributed free of charge to members of the Organization, to scientific correspondents and to anyone interested in problems connected with the construction and operation of particle accelerators or in the progress of nuclear physics in general.

Editor :

Roger ANTHOINE  
Public Information Office  
CERN, GENEVA 23, Switzerland  
Tel. : (022) 34 20 50, ext. 788  
Postal cheque A-C : 1.1098

Printed in Switzerland

## CERN VISITORS

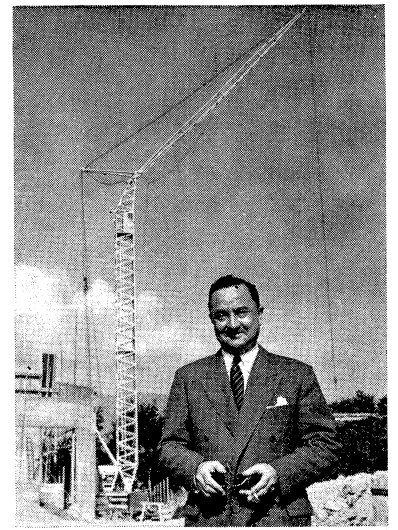
Among the visitors to CERN since our last issue, were the following :

- Professor Jaeckel and 40 students from the "Phtsikalisches Institut", Bonn, on September 8th.
- His Excellency Mr. Jean Etienne, Permanent Delegate to the United Nations and Belgian Consul, accompanied by his assistant Mr. de la Barre d'Erquelinnes, Mr. Brigode, Counsellor of the delegation and Mr. de Wever, of the Belgian Ministry of the Congo, on September 11th.
- M. Jules Moch, former President of the Council of Ministers of France, and Mr. F.E. Myers, Associate Director of the Argonne National Laboratory, on September 14th.
- Professor Ackeret, of the Zurich Polytechnicum, and Mr. W. Morawiecki who is writing a book about international organizations, on September 29th.
- A delegation from the cantonal and municipal authorities of Zurich, led by Mr. E. Landolt, Chairman of the Town Council on a visit to the Conseil d'Etat and Conseil Administratif of Geneva,

## Who's Who in CERN

### C. MALLET,

**Director  
of the SB Division**



CERN Photo

Mr. Charles Mallet became Director of the CERN „Site and Buildings” Division on 1 September.

Born on 26 February 1915, at Chasse-sur-Rhône, in the Department of the Isère, France, Mr. Mallet joined the Government "Public works" Service as a civil engineer on 1 October 1938.

In the meantime, as a student at the Ecole Polytechnique Charles Mallet had received the Rivot Prize of the Académie des Sciences for a mathematical thesis and been 4th out of 230 students in the passing-out examination of the Ecole Polytechnique, in 1936.

September 1939 found him in North Africa, as assistant to the director of the service constructing the railway to the coal mines in the Colomb-Béchar area.

But the career of Charles Mallet, builder of dams and big civil engineering works really began in Oran in 1940. Working for the Irrigation Service of the Department of Oran, he planned and built the Beni-Bahdel, Bou-Hanifia and Bakhada dams and hydro-electric power stations. Then he made a study of the Oran drinking water supply; the result was an 11 km underground water main connected to a 150 km main under pressure, 1 m in diameter.

Before the Anglo-American landings in North-Africa, Charles Mallet developed a series of irrigation systems, notably the Relizane pumping station at the foot of the Ouarsenis Mountains, which required great skill.

From 1943 to 1945, Charles Mallet successively occupied the positions of Secretary-General of the Reconstruction Service in Tunisia and Chief Engineer of the Service des Etudes et Travaux. During this period he was responsible for rebuilding some 70 bridges, in particular Djedeida bridge north of Tunis, the first large pre-stressed concrete bridge in the world. These years were also spent in rebuilding towns and ports. After Sousse and Tunis, Charles Mallet brought back to life the port of Sfax from which Liberty ships transported 1 400 000 tons of phosphate from 1946 onwards, to a Europe desperately in need of fertilizers.

In 1945, Charles Mallet was back in Algeria. As Chief Engineer of the "Service des Etudes Générales et Grands Travaux" he remained in Algiers until 1950.

His work was divided between hydraulic development, from the Bône area to the High Plateaux of the Chott ech Chergui, and dam construction. He was responsible for a new world record : the Fergoug siphon which spills 31 m<sup>3</sup> of water per metre per second, i.e. a third more than the maximum output at the time.

In 1950, Mr. Mallet applied for leave from the government service. The French Government "Public works" Service thus allows its officials to relinquish their appointment and work for private concerns. Appointed to a series of important managerial positions in French civil engineering firms, Mr. Mallet took part in the planning and construction of airports, reservoirs, dams, bridges and irrigation projects which took him from the Rhône to Tripolitania. One of these schemes still represents a record : the 32 m diameter tanks constructed at Genoa, each holding 9 700 m<sup>3</sup> of crude mineral oil, are the biggest pre-stressed concrete tanks in the world.

Mr. Mallet's third period of leave ended on 1 July last. On his return to the Government "Public works" Service, he was allowed to join CERN, where he has for several weeks been Director of the SB Division.

Besides other publications, Mr. Mallet is the author of two books : "La Reconstruction des Ouvrages d'Art en Tunisie" published by Editions Science et Industrie, and "Les Barrages en Terre" published by Editions Eyrolles.

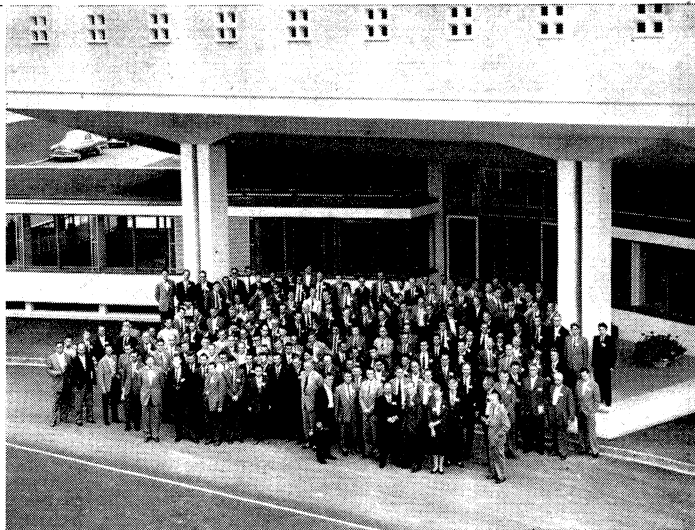
accompanied by Mr. A. Tombet, Chancellor of the Republic and Canton of Geneva, on September 30th.

- Mr. Simola, of the Finnish Electrical Equipment Suppliers' Association, on October 1st.
- Messrs. Young Nok Kim, Dong Un Suh and Bup Rin Kim, nuclear experts from North Korea, and Messrs. Young-Son Jin and Jo Wun Suk, North Korean Dele-

gates to the United Nations, on October 6th.

- Mr. Petrig, Conseiller d'Etat from Brigue, on October 8th.
- Professor Habermann and 34 students from the Staatstechnikum of Constance and the Mission of the Council for Science and Technology of Japan, consisting of directors of the main Japanese scientific bodies and industrial concerns, on October 12th.

# The CERN Conference on Accelerators



CERN Photo

September is the favourite month for big international gatherings. Scientific conferences are no exception: at CERN, the week of the 14-19 September was an important interlude in the life of the Organization.

A few hours before the conference opened, a Russian rocket reached the moon, a dramatic achievement to which Professor C. J. Bakker, Director-General of CERN, paid tribute on the following day by asking the Russian scientists present to convey to the USSR Academy of Science the warmest congratulations of those participating in the Conference. A burst of applause expressed the feelings of the audience.

This enthusiasm was re-echoed at the end of the Conference when Professor V. I. Veksler, leader of the Soviet Delegation, congratulated CERN on a capital event in the world of accelerators. A few days earlier, a beam of particles had gone for the first time round the 628 m circumference of the 25 000 million electronvolt proton synchrotron which is nearing completion at the European centre.

In this setting, the CERN Conference was bound to be fruitful for those who had travelled from places as far apart as Australia and Austria, the USSR and the USA, in order to attend.

Two hundred and forty-five scientists from twenty eight countries joined the CERN scientists in this highly intellectual gathering.

The agenda of the meeting was subdivided into the discussion of problems concerning the construction of large particle accelerators, the description of a dozen machines now being designed or constructed and an exchange of views on the subject of instrumentation for use with the large "atom smashers".

Finally, the personal contacts and the fruitful discussions to which they gave rise were unscheduled features of the Conference.

Moreover, the fact that the "International Conference on High Energy Accelerators and Instrumentation" was held at CERN gave all the participants a chance of basing many discussions on concrete examples: the two accelerators and the equipment of the European Organization for Nuclear Research.

## The Second Conference held in Geneva

The Conference held at CERN in September was the second of its kind to be held in Geneva. However, un-

like the 1956 Conference which lasted a fortnight and included a conference on accelerators and another on high energy physics, the September 1959 meeting was confined to the first subject.

"The philosophy behind the two week's meeting held here in June 1956" said Professor C. J. Bakker in his opening speech "was to provide an opportunity for those more particularly concerned with the technical side of the development of high energy physics, to attend not only the first half of the Conference — the one dealing with high energy accelerators — but also the second half mainly devoted to the

results of pure research."

Since then, this scheme has been discarded, the conference on **high energy physics** being held annually since 1950\*, while the conference on **accelerators**, is to be held only every two or three years.



CERN Photo

A scene at the Conference on accelerators held at CERN in September.

The High Energy Committee of the International Union of Pure and Applied Physics (IUPAP) is responsible

\* The last of these conferences was held at Kiev in July, and a report appeared in the September issue of "CERN COURIER".

for fixing the dates of these conferences. This Committee consists of six members: Professors Bakker and Peirls for Western Europe, Tamm and Veksler for the Soviet Union and Marshak and Panofsky for the United States. This tripartite structure reflects the spirit of international co-operation so typical of high energy physics, in which there are no direct technical objectives.

Professor Bakker ended his introduction to the Conference by stress-



CERN Photo

About 30 Russian scientists attended the Conference.

ing both the need for a spirit of co-operation and that for fundamental research.

"In my opinion it is of the utmost importance that pure science should receive everywhere the support it needs" he said, continuing "It would not be difficult in any case to demonstrate the great dividends it has paid mankind in the past. Let me finish by welcoming you once again to CERN where I know you will find this spirit of freedom in research which is so dear to all of us."

The 10th Conference on accelerators was open. Ninety-six speakers were to address the Conference in the large Auditorium. Stimulated by Professor Panofsky's views concerning "The future of high energy accelerators in physics", they gave 105 talks on subjects of vital importance to fundamental science.

## Civil engineering monsters

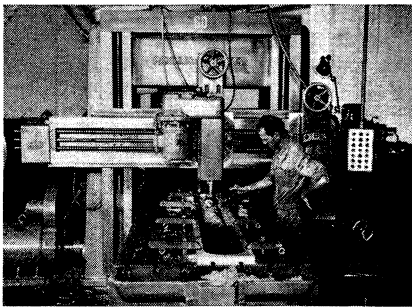
After the 1956 Conference, it might have been thought that high energy accelerators were turning into civil engineering monsters. The diameter of the large accelerators was sufficient proof of this — 200 m for the CERN synchrotron, 256 m for the new Brookhaven machine and 334 m for the 50-70 GeV synchro-phasotron under construction south of Moscow.

The general trend now seems to be

(continued on page 5)

# Synchro-cyclotron to be shut down

The 600 MeV accelerator now operating 24 hours a day, six days a week in the Synchro-cyclotron Division, will be shut down for a period of at least two months. The "small machine", as it is known at CERN, will be stopped on November 15. Work will be resumed towards the beginning of February, after several modifications have been made on the machine and its surroundings.



CERN Photo

In the Main Workshop Ernest Kuntz machines part of the new rear plate of the synchro-cyclotron vacuum tank.

Of course, the shut-down of the SC has been timed with the completion of the experiments conducted with it by different research groups. It also coincides with the transition period brought about by the assignment of some of the staff to research with the proton synchrotron now nearing completion.

"It is like a car having run for 30 000 mile or so", says one of those responsible for the work to be carried on the machine. "A time comes when, even without having encountered major trouble while running the equipment, you have to service it somewhat extensively."

What may be very generally designated as the "SC changes" comprises 3 broad divisions :

- a general check-up of all circuits,
- a rearrangement of experimental apparatus,
- preparing the mounting of a stochastic system of acceleration in the existing accelerator.

Under these broad outlines, the collaboration of several departments and services will be required. Their work will actually begin on November 16th and be carried on two shifts, seven days a week, with interruptions for Christmas and New Year.

Dr. Hedin has, together with Dr. Berger, been busy with the changes to be made in the *radiofrequency system*. New ceramic capacitors will be installed and a new tuning fork drive tested. Dr. Hedin has also planned changes in the *power supplies and cabling*. The rearrangement of the beams will eventually allow two experiments to be run simultaneously.

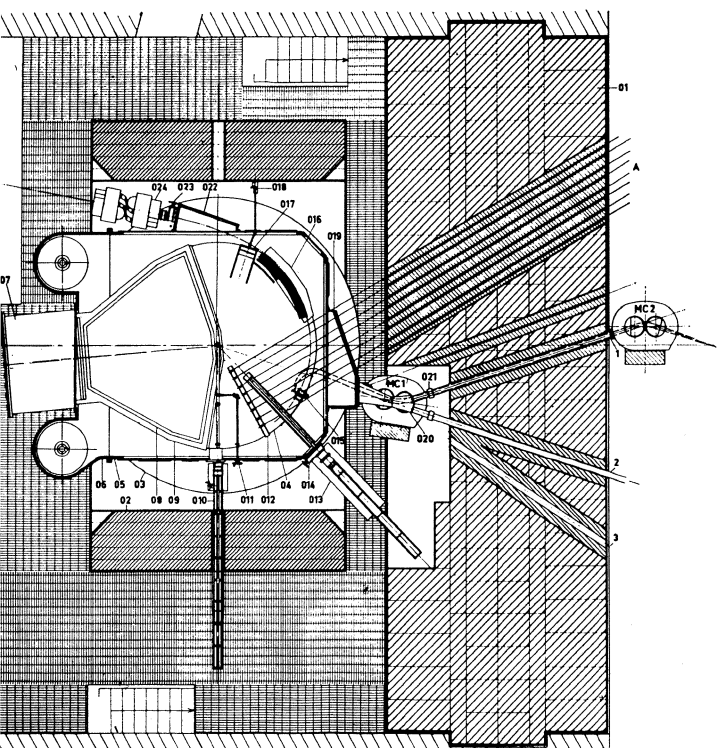
More generators will be required to supply bending magnets and magnetic lenses. They will be installed in an extension of the existing equipment room.

Among O. Fredriksson's duties is the *water cooling* system now serving the magnet coils, radiofrequency parts of the machine and experimental apparatus. A supply of 4 litre/second under a 10 atmosphere pressure will be tapped from this installation to cool Dr. Citron's bending magnet in the "neutron" hall.



CERN Photo

The platform holding the SC shielding wall is moved by four hydraulic jacks, three of which can be seen on this photo.



Present lay-out of the synchro-cyclotron.

- |         |                                 |
|---------|---------------------------------|
| A       | Neutron Channel                 |
| MC1     | Meson Deflection Magnets        |
| MC2     |                                 |
| 1, 2, 3 | Meson Channels                  |
| 01      | Lifting Platform                |
| 02      | Magnet Steel                    |
| 03      | Magnet Coil                     |
| 04      | Magnet Pole                     |
| 05      | Vacuum Tank                     |
| 06      | Pump Manifold                   |
| 07      | Stub Tank                       |
| 08      | Dee                             |
| 09      | Dummy Dee                       |
| 010     | Ion Source                      |
| 011     | Ion Source Adjustment Mechanism |
| 012     | Flip Target                     |
| 013     | Probe Target                    |
| 014     | Probe Target Air Lock           |
| 015     | Universal Target                |
| 016     | Magnetic Channel                |
| 017     | Beam Regenerator                |
| 018     | Beam Regenerator Drive          |
| 019     | Neutron Blister                 |
| 020     | Junction Box                    |
| 021     | Universal Joints                |
| 022     | Proton Blister                  |
| 023     | Vacuum Valve                    |
| 024     | Strong Focusing Lens            |

(Block courtesy of "Stichting Physica", Utrecht, The Netherlands)

In addition to this, a new system is to be installed, delivering 20 litre/second at 4 atmosphere to the experimental apparatus in the "SC", "neutron" and "proton" halls.

Mr. Fredriksson will also run the *ion source and the target arrangements*. As the foreseen stochastic methods of acceleration will increase the beam intensity, a simultaneous increase of residual radioactivity is expected inside the vacuum tank. This requires that the ion source and target — i.e. the apparatus emitting the protons to be accelerated and the one being hit by the beam of particles — be exchanged without an operator having to enter the tank. An ion source removable from the East side of the machine (top of drawing) will be mounted against the top pole face of the magnet. Later a reserve ion source will

(continued on page 9)

## The CERN Conference on Accelerators

(continued from page 3)

towards machines smaller in size though not in energy or intensity. This could be achieved by applying new principles of acceleration.

These principles were already known in 1956, and in this respect it may be said that the 1959 Conference did not bring to light any really new fundamental ideas. « We are still too busy constructing our new machines to think of new developments », said G. K. Green, chief designer of the Brookhaven proton synchrotron, "further ideas may perhaps come to light by 1961". Creative thought seems to follow an alternating curve: a host of new ideas are born and a det period of ailed designing and development follows while these ideas are put into practice.

One of the scientific secretaries of the Conference attributes this alternation to the difficulty of putting new ideas into practice both from a technological and a financial point of view. He considers that "physicists are reluctant to undertake the responsibility of building new machines before they have carried out extensive theoretical research and constructed many experimental models, in order to get a clear idea of the performance and usefulness of these machines".

Several papers revealed the many studies carried out concerning three principles of acceleration :

- beam stacking and beam collision ;
- ionized gases or "plasmas" ;
- stochastic accelerating methods.

**Beam stacking, intersection and collision** were the subject of a suggestion by the Midwestern Universities Research Association (M U R A) in 1956. It was therefore normal that F. T. Cole and K. R. Symon should give a summary of this institute's work at the first meeting of the Conference. The Russian speakers A. A. Kolomensky and A. N. Lebedev dealt with the same subject, while M. Pentz spoke about the studies carried out at CERN on an experimental electron accelerator, using a beam stacking device.

### Beam Collision

An American scientist, D. L. Judd, spoke about research carried out at MURA and Berkeley on future high energy proton accelerators. He mentioned a design with two rings externally tangential to each other, each containing a 12 GeV beam. The collision of the two beams circulating in opposite directions, would provide an equivalent single-beam energy of 300 GeV ! In this way, two machines with half the energy of the one under construction at CERN, would produce an equivalent single-beam energy 12 times as high. The application of this idea could considerably lengthen the useful life of the machines now being constructed.

In the course of a discussion, M.



CERN Photo

Dr. Pickavance, Director of the Rutherford High Energy Laboratory at Harwell, with Professor C.J. Bakker, Director-General of CERN.

Sands, of the California Institute of Technology, put forward the idea of a two stage machine the first consisting of a circular 10 GeV accelerator, feeding another one of 300 GeV ; the vacuum tank of the latter would have a cross section of 4 x 1 cm and a radius of ... 1 km. These plans for the future do not seem to take much account of dimensional contingencies.

Another interesting point was mentioned, namely the use of exciting coils at very low temperatures.



Dr. Kim Chi In, North-Korean scientist at Dubna, delivering the last Soviet paper at the Conference on accelerators.

Dr. Deutsch, of the Massachusetts Institute of Technology, speaking about Cerenkov counters.



CERN Photos

It has been noticed that for a given material there is an optimum temperature at which a minimum of excitation energy can produce the desired magnetic field. Cryogenics — this technique of deep refrigeration — raises difficult problems which might well be solved by the use of high purity metals and gas cooling.

Another idea presented by G. K. O'Neill, of Princeton, was that of constructing two superimposed rings, intersecting each other at six points. One characteristic of this machine

(continued on page 6)



CERN Photo

The new CERN canteen proved to be an ideal spot for the exchange of views. From left to right : B. Leonfic, from CERN, Prof. V.P. Dzhelepov and Dr. A.N. Lebedev, Soviet delegates.

## BEHIND THE SCENES AT THE CONFERENCE

- The Conference meetings were fully recorded on 92 spools of magnetic tape which would cover the distance by road from Geneva to Coppet.
- In connection with the 250 Conference visitors staying in the Geneva area, the CERN Transport Service drivers covered 5490 km and carried a total of 1147 passengers.
- The CERN photographers took about 200 photographs, representing 1 m<sup>2</sup> of film. Six sq. m. of sensitive paper were processed to print 274 pictures as souvenirs of the Conference for the delegates.
- For 29 hours during the first five days of the Conference, proceedings were televised on a closed circuit between the Auditorium and the Council Chamber.
- In the Main Auditorium, 350 pairs of head-phones connected to small receivers enabled the participants to listen to the delivery of the papers either in English or in Russian.
- The Chairman of the Organizing Committee and the two members of his secretariat began preparing the Conference six months in advance. During the conference the secretariat distributed some 1600 items of mail to the delegates and cheerfully helped to iron out their difficulties.
- Accommodation for 217 people for periods varying from 2 to 10 days was found by the Housing Section for the foreign delegates. The Travel Service booked 53 tickets for them.
- The Scientific Information Service used nearly a ton of paper for printing programmes and reports. It reproduced 400 slides and made 234 originals.
- Two official interpreters and two others, less official but more specialized, performed the arduous task of interpreting from English into Russian and vice versa the often highly abstract papers given.
- 1100 copies of two press releases announced the opening of the Conference to the main news editors and summarized the outstanding features of the sessions.

## The CERN Conference on Accelerators

(continued from page 5)

would be a vacuum of 10<sup>-10</sup> mm of mercury, 10 000 times higher than the 10<sup>-6</sup> vacuum in the CERN PS, which would allow the observation of a large number of events due to the collision of particles. This number could reach an average of 1.5 for every photograph taken with a bubble chamber.

The idea of using plasma for accelerating particles was first put forward by Russian scientists. This technique uses laboratory produced ionized gases similar to those found in the earth's upper atmosphere. One form of plasma is moreover familiar: that found in a fluorescent tube and in the sun, where the fusion of ionized hydrogen atoms gives off an enormous amount of radiation of which heat and light are the easiest for us to perceive.

Since 1956, the use of plasmas for accelerating particles has been studied in various countries. At CERN in particular, the Linhart-Maisonnier-Harrison team has produced an experimental device; their "plasma betatron" was the subject of a report at the start of the second meeting of the Conference.



CERN Photo

One American, one Japanese and four Russian scientists also spoke about plasmas.

The Russians too are proceeding with the study of *stochastic accelerating methods*, originally proposed by their compatriot Vladimir Veksler in 1955. A. A. Kolomensky gave a paper on the "Theory of stochastic methods of particle acceleration and beam-stacking".

On the practical side, R. Keller gave a description of the experiments which have so far been made at CERN on stochastic acceleration. As will be recalled Robert Keller and his team have developed a small cyclotron which has supplied 5 MeV protons accelerated according to this principle.

The fundamental limitations imposed on the construction of large accelerators were described by ten speakers who considered this problem from the triple point of view of the space charge, radiation and damping, and plasma problems.

Tuesday ended with a visit to the

In the next column: Russo-American co-operation: Mrs. M.H. Blewett, Brookhaven physicist, exchanging views with Prof. S.J. Nikitin of the Moscow Academy of Science.

Above left: Prof. V.V. Vladimirski of the Moscow Academy of Science talking to Dr. N.M. Hintz of the University of Minnesota.

CERN proton synchrotron, after which many visitors said how impressed they were by the neatness of the PS and the meticulous care bestowed on even the smallest details. "It is a beautifully neat machine" said Professor Nikitin the following day.

### Twelve among many

The afternoon of 16 September was devoted to the big accelerators under construction in the world and witnessed several of the most factual reports of the whole week.

Progress reviews were made on the twelve accelerators at present being constructed or designed in the world.

M. S. Livingston made a report on the Cambridge electron accelerator (Harvard University). Two features of this machine designed to produce 6 GeV are the complicated shape of its exciting coils and the plastic lining of the vacuum tank.

In spite of Dr. W. Jentschke's unassuming manner, great interest was aroused by his description of DESY, the 6 GeV electron synchrotron whose construction has just begun in Hamburg.

NIMROD is a 7 GeV proton synchrotron whose construction is proceeding rapidly under the direction of T. G. Pickavance, who presented a progress report. It is hoped to obtain a very strong proton current with this machine: about 10<sup>-12</sup> or one million million particles per second.

G. K. Green's report, like the previous one, was illustrated by colour slides. This talk aroused great interest because the Brookhaven machine is similar to the big proton synchrotron nearing completion at CERN. A detailed description of the machine constructed by Green and his colleagues at Brookhaven will be found in a forthcoming feature on "Other Peoples' Atoms".

A great deal has already been said about the 3200 m linear accelerator planned at Stanford University\*. R.B. Neal said that it would take six years for the project to be completed and that the machine would be aligned to within 1/8 inch (3.1 mm).

The Argonne National Laboratory, in the United States, is going to construct a "ZGS", zero gradient synchrotron, whose powerful magnetic field — 21 500 gauss-will make it possible to reduce its size and its

\* See "CERN COURIER" No 1, August 1959.



CERN Photo

## AFTER THE CONFERENCE ON ACCELERATORS

# Scientists give

### ... on the Conference

The Conference not only provides an opportunity of assessing present day techniques for the construction of machines and detecting equipment, but also of foreseeing the progress likely over the next two years. »

Professor E. Amaldi,  
Chairman of the CERN,  
Scientific Policy Committee,  
and of IUPAP.

"It is encouraging to hear visitors say 'What a lot one learns at CERN!', meaning not only that the Organization is a focal point of scientific thought, but above all that its own work is worthy of attention."

Professor Leprince-Ringuet  
Vice-Chairman of the CERN  
Scientific Policy Committee.

"A Conference such as this is in itself a step forward in nuclear physics, thanks to the comprehensive exchange of new ideas and experimental results to which it gives rise."

Professor V.P. Dzhelepov,  
Dubna Centre - U.S.S.R.

### ... on Accelerators

"It is still too early to say which of the new methods of accelerating particles at present being studied is the most promising."

Professor C.J. Bakker  
Director-General of CERN

"We should like to congratulate CERN on the first success obtained with the proton synchrotron during the Conference, the excellent organization of which we have also very much appreciated."

Professors Veksler  
Nikitin  
Dzhelepov  
U.S.S.R. Delegation.

"Circular accelerators at present in use may in future be used as injectors for still more powerful machines. In the field of counters it is interesting to note the many uses to which the storing of information can be put."

Professor Leprince-Ringuet

### ... on Instrumentation

"The degree of automation reached in ancillary apparatus is amazing."

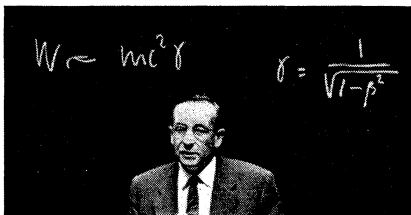
Professor N. Vylkov,  
Rumanian scientist at Dubna

"The fact that many new accelerators are reaching the operational stage is encouraging the development of ancillary apparatus. I expect great things in this field."

Professor C.J. Bakker

"Personally I am an accelerator designer, but I consider that it is time to think about the ancillary apparatus for the big machines. I am therefore all the more impressed by the scope of the second part of the Conference, devoted to instrumentation."

M.S. Livingston,  
Harvard, United States



R. Sterchi Photo

## e their views...

"Unlike the one held in 1956, the 1959 Conference brought forward no new ideas. However, I think that the contributions this year will prove to be of greater scientific value than those presented in 1956."

J.B. Adams, Director, CERN PS Division

"The CERN Conference is narrower in scope than the Kiev Conference on high energy physics. It is not so general but more constructive."

Professor W. K. M. Panofsky  
Stanford, United States.

"Of course, the Conference tends to go into a great deal of detail, but the general view is nevertheless good."

Wang Kan-Chang,  
Chinese scientist from Dubna.

"There are too many Conferences on nuclear physics succeeding each other too rapidly: Kiev, CERN, Germany... I think that they should be spread out a bit more."

W.Jentschke,  
DESY, Hamburg

"The outstanding features of the Conference? In my opinion these are the progress achieved in fixed field alternating gradient machines and then the two contributions by Panofsky on the usefulness of new machines and on the giant linear accelerator."

Professor V.P. Dzhelepov

"The Conference is by no means dull, but my attention has been mainly devoted to the big CERN accelerator."

Professor V.V. Vladimirov  
In charge of the 50 GeV accelerator  
for the Moscow Academy of Science.

"This Conference has given me the impression that strong focusing is a feature of nearly all the accelerator schemes."

Professor V.I. Veksler

"In 1935, when my career as an accelerator designer began, money was scarce. Physicists were then regarded as the slightly 'goofy' but quite harmless members of a special 'club'. Nowadays this club has grown, as this week's meetings testify."

G.K. Green,  
Brookhaven, USA

"Two things stand out: the size of the apparatus and the magnitude of the instruments for evaluating results. At Berkeley, for instance, it takes seven physicists between one and two years to prepare programmes for the computers processing data supplied by the bubble chambers."

Professor E. Amaldi.

cost... which is nevertheless estimated at \$ 29 million i.e. more or less the cost of our PS. Among the information given by A.V. Crewe who is in charge of the project, was a proposal to construct a long beam path similar to that envisaged at CERN.

The number of gigantic "atom smashers" planned or under construction in the world, is impressive. As J.B. Adams pointed out during an interview on the Swiss radio, some \$ 360 million have been made available to the scientists responsible for the machines mentioned at the CERN Conference alone. Considering the scant resources such men as Lawrence, Cockcroft and Walton had at their disposal around 1930 to carry out the first artificial acceleration of particles, the progress made towards the official recognition of scientific research can readily be appreciated.

Dr. Shoemaker spoke about the Princeton-Pennsylvania accelerator which is a 3 GeV proton synchrotron. The high current — 0.1 to 0.5 microamp — calls for powerful anti-radiation shielding for this machine.

The Oak Ridge Laboratory in the United States is going to construct a synchrotron capable of accelerating protons up to 12 GeV after injection by an 850 MeV fixed frequency cyclotron. J. A. Welton said that the design of this proton machine would be somewhat similar to that of the Cambridge electron accelerator.

Close attention was paid to V.V. Vladimirov's reports on the 7 and 50 GeV alternating gradient synchrotrons, which were kindly interpreted by S.J. Nikitin. It was already known that the first of these two machines — about which some information was given in «CERN COURIER» No 2 — was being assembled in Moscow. It was announced at the Conference that the foundations of the 50 to 70 GeV machine are almost completed at Sepukhov, south of the town. The magnet is to consist of 120 units totalling 22 000 tons of steel and the injector might be a 100 MeV linear accelerator. There should be 5 accelerating pulses per second. Completion of the machine is scheduled for 1963 or 1964.

After the Russian scientist L.P. Zinovjev had spoken about the 30 and 90 MeV linear accelerators at Kharkov and his compatriot Bolgjev had reviewed «some aspects of the theory of electron wave guides for cyclic accelerators», the meeting of Wednesday 16 September came to an end.



CERN Photo

## Round the ring

The session on "Production, transport and separation of particles" opened with an important announcement.

Immediately after the opening bell had sounded in the Auditorium, J.B. Adams announced the result of the latest PS tests. The previous night had produced cheerful news: a 50 MeV proton beam injected into the circular vacuum tank had made one complete 628 m revolution in the machine before disappearing into the stainless steel wall.

This was great news and those attending the Conference had every reason to feel excited on the morning of 17 September.



B. Smith Photo

The characteristics of the beams produced by the Berkeley Bevatron, the Brookhaven Cosmotron and the Stanford Linac, the experimental installations of the 12.5 GeV Argonne PS and information about a 7 GeV negative meson beam produced by the Dubna synchro-phasotron were among the items on the morning's crowded agenda.

One remark is worth mentioning, which may have been of minor importance scientifically, but was very significant from the point of view of co-operation in fundamental research. When talking about the focusing lenses used in the 25 to 30 GeV AGS under construction at Brookhaven, E.D. Courant stressed the benefits he had derived from the work done in this field by his colleague from the PS, G. von Dardel.

The whole afternoon was scarcely long enough to review the outstanding features of the big liquid hydrogen bubble chambers. A host of laboratories are constructing this kind of apparatus which is one of the few means available of observing and photographing particle tracks. Descriptions of 8 different chambers were given, from the gigantic 1.8 m diameter "walking" chamber at Berkeley — "it would take a year for it to travel from Berkeley to Brookhaven" joked A. H. Rosenfeld, one of those responsible for its design — to the 2 m diameter chamber designed at CERN.

At the same time a session on "Radio Electronics for Accelerators" was going on in the SC Conference

(continued on page 8)

In the next column: Scientific co-operation at tea-time.

Above right: A typical shot of Prof. V.I. Veksler, sitting beside Mr. J.B. Adams.

At the top of the page is a fine photograph of Professor Veksler.

## BOOKS FOR BRAZIL

An important gift of books has been made by CERN to help rebuild the library recently destroyed by fire at the Rio de Janeiro Physics Research Centre, the "Centro Brasileiro de Pesquisas Fisicas".

This library was unique for the documentation in the fields of nuclear physics and higher mathematics, and a campaign has been launched by the UNESCO to rebuild it.

On his way back from the Kiev Conference, Prof. C. Lattes, Director of the Centre, came to CERN to use the services of the synchro-cyclotron. On this occasion, Dr. H. Coblans, head of the CERN library, considered with him possible CERN contributions to restore the Brazilian library. It was then agreed to have 28 duplicate technical volumes of bound periodicals, a full set of CERN Annual Reports and the 1956 and 1958 Conference Proceedings, donated to Prof. Lattes.

... et de liaison qu'il se propose.  
J'aimerais vivement le recevoir régulièrement. Je vous en remercie à l'avance et je souhaite beaucoup de succès à cette nouvelle initiative.

J'aimerais toutefois vous signaler qu'une erreur s'est glissée dans votre texte français du numéro de septembre du "COURRIER CERN". En première page, à la fin de l'article "Le mois dernier au CERN" vous parlez du synchrotron à protons de 25 milliards d'électronvolt, alors que l'orthographe juste de ce mot est "électronvolts".

Je vous serais reconnaissant de m'éclairer à sujet dans un prochain numéro de "COURRIER".

## Unifying the units

We are sorry to have to contradict our reader whose complaints are printed above.

In February 1958 the members of CERN's scientific staff were asked to contribute to the standardization of symbols, units and terminology.

To this end two documents were distributed: "Symbols and Units" published in 1955 by the International Union of Pure and Applied Physics (IUPAP) and Publication No 27 of the International Electrotechnical Commission, entitled "International Letter Symbols used in connection with Electricity" (1953).

We note in one of these documents: "Symbols for units **should not** be written in the plural" — hence the spelling of "electronvolt" which, moreover, should be written as one word, not two.

## The CERN Conference on Accelerators

(Continued from page 7)

Room. It was worth splitting up the main conference on account of the three specialized reports by the Russian scientist A. A. Vasilyev, which could not be included in the main discussions owing to lack of time.

On the same afternoon one of the three complementary sessions dealing with beam stacking accelerators was being held at PS.

The full importance of the chambers showing the particle tracks was to be confirmed on the morning of Friday 18th. Nine reports dealt specially with bubble chambers using propane, xenon or a mixture of freon with one of these gases.

However, it is not sufficient to carry out experiments, to observe the particles produced and to take photographs of nuclear events. In the course of a single experiment lasting a few days 100 000 photographs may be taken. This figure gives some idea of the difficulty of scanning and interpreting events.

Ten speakers — American, Belgian, English, Italian, and Russian — described the methods used for this purpose. Their work may be less spectacular than that of their colleagues engaged in gigantic electro-technical schemes. Nevertheless, this is one of the most important practical aspects of nuclear physics.

A meeting was being held at the same time in the SC, during which American, European and Russian linear accelerator specialists exchanged views on these essential components of the modern atom smashers.

### The last meeting

Then came the last day of a Conference which had gathered on CERN's international territory a scientific elite from the whole world. American and Chinese, European and Russian scientists described fresh developments concerning "Counters and other High Energy Particle Detectors".

After the 7th session, the last in the programme, had been declared closed by Professor W. Paul, it only remained for Professor V. I. Veksler, head of the Soviet Delegation, to deliver the closing address. This was short and academically concise. Speaking personally and on behalf of his colleagues, he stressed the great number of excellent reports and the valuable discussions to which the Conference had given rise. "It is a great pleasure", he said "to see that the authors of new proposals have carried out splendid research work." He was sure that the whole assembly would join him in congratulating Professor C. J. Bakker, J. B. Adams and their colleagues on the great scientific event of the Conference: the first revolution of the beam in the PS.

After thanking CERN for the excellent organization of the Conference and the welcome extended to the visitors, Professor Veksler concluded with the hope that this fruitful co-operation in high energy phys-

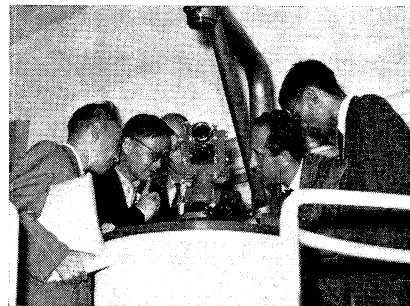
ics would continue in the future and by wishing everyone every success in their work.

\* \* \*

The flags standing out against the Jura have now been lowered. The scientists have returned to their respective countries. Another Conference on accelerators is over.

What remains? What conclusions are to be drawn? What will be the result of one of the greatest concentrations of scientists ever to take place? All that has been gleaned by individuals, of course, but also the detailed reports to be published in December by the CERN Scientific Information Service. The latter will be a useful reminder and at the same time a summary of high energy nuclear technique, 1959 style.

But has one any right to draw any conclusions from a Conference dealing with subjects as varied and as highly specialized as those discussed? It seems more reasonable to say that everyone will have drawn his own conclusions according to his tastes and his interests. The impressions of several leading scientists are featured elsewhere. They confirm this view.



CERN Photo

A group of Asiatic scientists listening to J. Gervaise explaining the positioning of the proton synchrotron magnets.

However, some remarks by Professor Leprince-Ringuet, Vice-Chairman of the CERN Scientific Policy Committee, will give food for speculative thought and serve to bring this article to an end. "The Conference" he said "has made it clear that important work is being done not only by the great nuclear research centres, but also by many universities, where original equipment is being developed." Accordingly Professor Leprince-Ringuet considers that CERN should encourage universities of the Member States to produce ideas and schemes leading to developments which could later be used in connection with the Organization's machines. "Furthermore", he continued "by keeping alive the interest of the universities, CERN will secure a flow of workers ready to perpetuate the spirit of research".



# SOCIAL EVENTS

It may be a good thing to give a few hundred people a chance of concentrating nine hours a day for six days on scientific problems. It is even better to provide them with a few opportunities for relaxation.

Such was the intention of the Conference organizers and of the Soviet Delegation in planning a few social gatherings to ease the strain of hours of concentration.

On the evening of Sunday 13 September, a reception was held in one of the big hotels in town for those attending the Conference; it gave several hundred guests an opportunity to meet each other.

On Tuesday 15th there was another opportunity of exchanging impression, as the evening had been reserved for a visit to the CERN proton synchrotron, where testing had been interrupted for several hours. About 100 CERN "guides" were at the disposal of the visitors who walked round the 1468 m of concrete tunnels of the big machine before drinking cocktails in the PS Experimental Hall.

On the evening of the 16th, the "Simplon" put out from the Quai du Rhône with 178 Conference visitors on board and

a distinguished guest, Mr. François de Rose, President of the CERN Council.

The evening might have been nothing more than a pleasant social function. It turned out to be most entertaining, thanks to W. Klein's prodigies of mental computing.



Professor C. J. Bakker and Mr. François de Rose, President of the CERN Council, took part in the trip on the Lake of Geneva on 16 September.

CERN Photo

On the evening of Thursday 17th, the Director-General received a large number of distinguished guests. On that occasion the electricians of the "Site and Buildings" Division had most effectively floodlit the house and garden.

The final cocktail party was given by the USSR scientific delegation on Friday 18th.

---

## Synchro-cyclotron to be shut down

(continued from page 4)

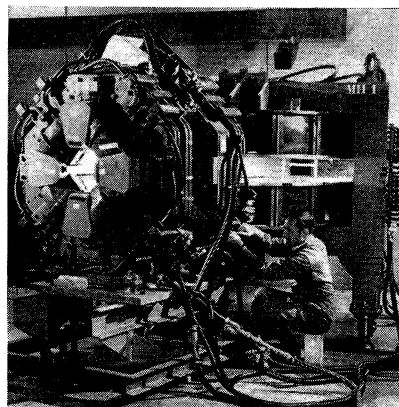
be added on the bottom pole face. As for the target arrangement, the so-called Fermi trolley will be modified in order that targets can be fed through an existing airlock for the probe target, without breaking the vacuum inside the chamber. Later a completely new trolley will be mounted, having its own airlock.

The rearrangement of the experimental apparatus is the province of F. Blythe. A new "window" through which meson particles will be extracted is to be mounted on the back of the vacuum chamber. It will be made of aluminium 2 or 1 mm thick. For protection against radiation during work near the machine a lead curtain 5 cm thick is to be installed to cover the window.

Seven different channels will be laid out through the large, lifting shielding wall on the "neutron" side of the machine instead of the ones shown as A, 1, 2, and 3 on the drawing. They will carry beams of particles from 70 to 200 MeV energy. Fixed and movable lenses will be placed along the channels in order to deviate particles according to their characteristics. Some lenses are to be carried by trolleys. Others are to be positioned on air platforms gliding on special base plates (see "CERN COURIER" No. 2).

The shielding wall 01 erected to stop radiation and particularly neutrons, from straying outside the synchro-cyclotron chamber, will be made thinner in the middle to make room for quadrupole and other lenses. To obviate the eventual lack of protection, the density of the wall will be raised from 3.5 to 5 kg/dm<sup>3</sup> with the help of an iron-concrete mixture.

The elevating shielding-wall platform will become unevenly loaded after all the arrangements mentioned have been performed. The incidence of this situa-



CERN Photo

tion on the lifting mechanism will have to be taken into account.

The gear required for beam stacking in connexion with the new principle of acceleration developed by Dr. Keller, will not be installed during the shut-down period. However the vacuum chamber will be modified to avoid further extensive work.

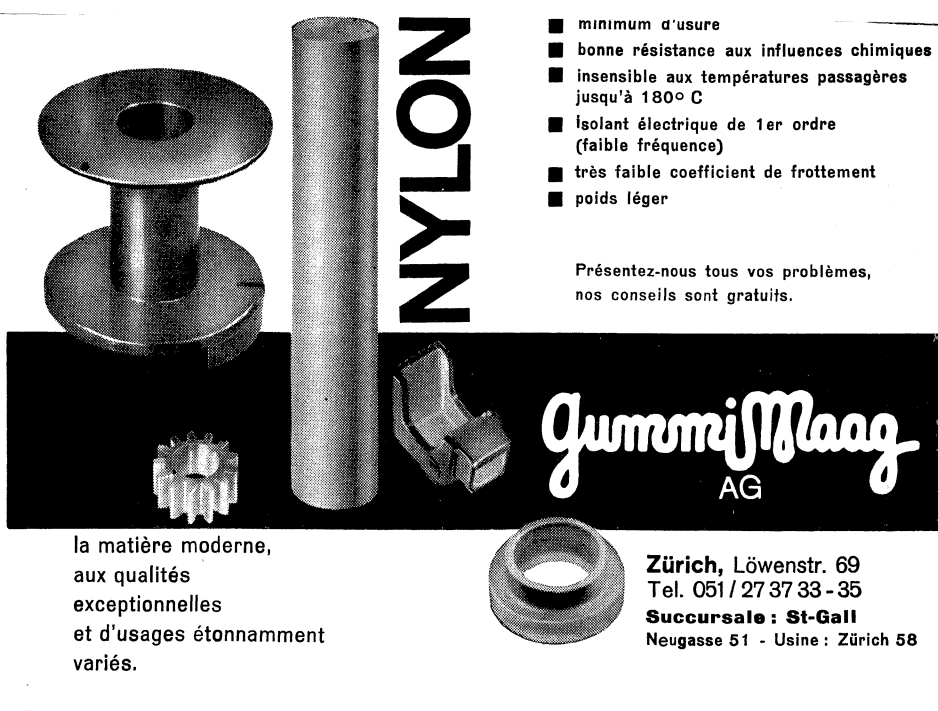
The PS survey team is to carry out a survey of the neutron room, the floor of which will be marked with a large grid to help position the channels and instruments.

The "Site and Building" Division will intervene too, to make modifications in the ventilation and lighting system, to prepare additional shielding, to build the extension of the generator room.

In the SC, Mr. Duval putting the finishing touches to a pair of quadrupole lenses used for deflecting the proton beams.

## Did you know that...

- Mr. R. Gabillard has been appointed Professor in the Faculty of Science at Lille, as from 1st October. He will hold the chair of electronics and direct the « Institut Radiotechnique ». Prof. Gabillard who was one of the first members of CERN since he began to take part in the studies concerning the PS in 1953, will continue for some time to take an interest in CERN's work as a consultant. Among the work done by Prof. Gabillard, special mention should be made of the pick-up electrodes, as well as the development of devices for the instantaneous measurement of the magnetic field and frequency which are used in the PS timing system.
- A 35 mm colour film lasting 20 to 30 minutes is being made for CERN by Mr. Georges Pessis, an independent producer.
- A series of lectures on « Elementary theory of dispersion and pion physics » was given from 25 September to 15 October at CERN by Professor M. Cini. These lectures were part of a joint seminar organized by the Synchro-cyclotron and Theoretical Studies Divisions.
- Generators capable of producing a total power of 11 300 kW have been ordered for energizing the magnets in the PS South Experimental Hall. Water cooling of these magnets will call for the erection of cooling towers 12 m high.
- Dr. Lundby is spending 3 months in Israel at the invitation of the Weizmann Institute of Science. He will



**NYLON**

- minimum d'usure
- bonne résistance aux influences chimiques
- insensible aux températures passagères jusqu'à 180° C
- isolant électrique de 1er ordre (faible fréquence)
- très faible coefficient de frottement
- poids léger

Présentez-nous tous vos problèmes, nos conseils sont gratuits.

**Gummi Maag AG**

la matière moderne, aux qualités exceptionnelles et d'usages étonnamment variés.

**Zürich, Löwenstr. 69**  
Tel. 051 / 27 37 33 - 35  
**Succursale : St-Gall**  
Neugasse 51 - Usine : Zürich 58

probably work there with the 5 MeV Van de Graaff generator.

- A new generator room, a compressor building and a bubble chamber hall will be constructed in the East Experimental Area. These buildings will be situated inside the angle formed by the road leading to the PS and that leading to the centre of the ring.
- The TH Division has just welcomed 17 fellows or visiting scientists, here for periods varying from a few weeks to a year. They are : Messrs. N. Cottingham, P. Denney, Profs. D. L. Falkoff, R. A. Ferrel, B. Ferretti, Dr. J. Goldstone, Mr. M. Gourdin, Dr. L. E. Halpern, Professors K. J. Lecouteur, H. Lehman and M. Levy,
- Mr. E. Lieder, Dr. A. Minguzzi, Mr. J. Naisse, Dr. J. Regnier and Messrs. A. Verganelakis and W. Zimmermann.
- Between 1 January and the end of May 1959, the Personnel Office received more than 2000 applications.
- The electricity consumption at CERN from December 1958 to May 1959 was 5 500 000 kWh with peaks of 3500 kW...
- In the same period, the Transport Service covered 82 300 km, or more than twice the distance round the earth and about a quarter of the distance from the earth to the moon. During the same time 70 550 tons of material were handled.



**NIBCO**

**OEDERLIN**

**Les raccords à souder OEDERLIN-NIBCO** permettent le montage simple et étanche des tubes de cuivre en dimensions métriques et en pouces.

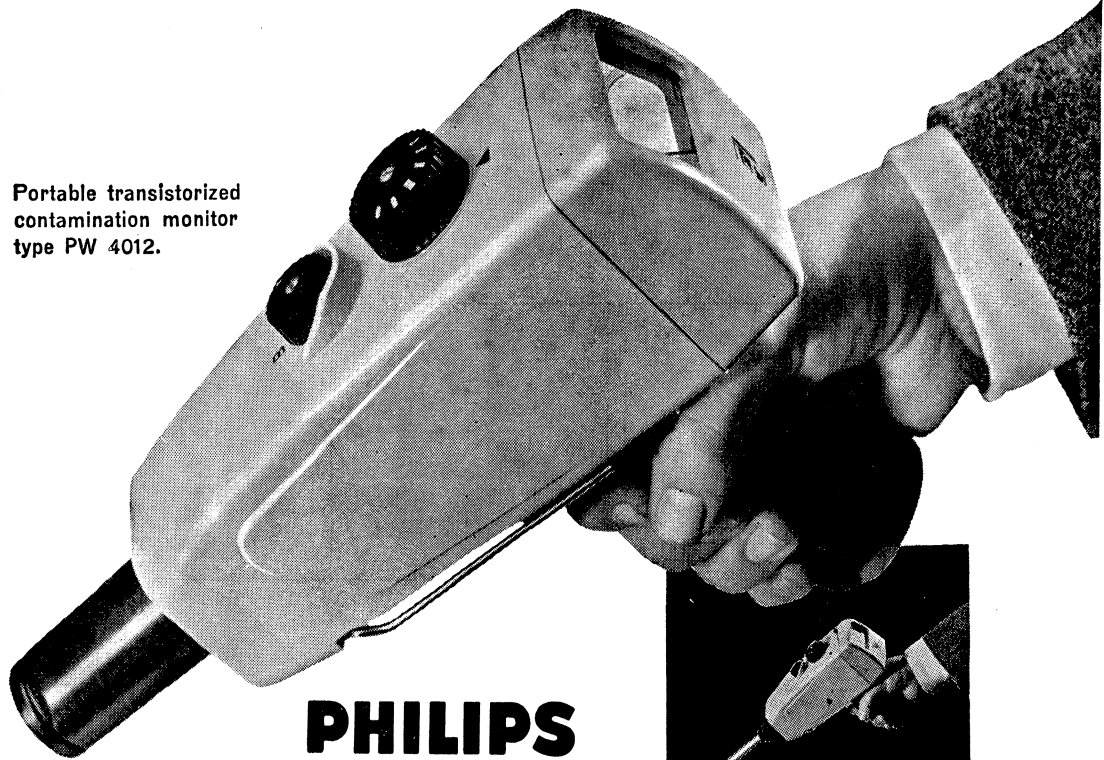
Un assortiment complet pour tubes de diamètres nominaux allant de 1/8" - 4" et de 6 - 54 mm est à votre disposition.

La robinetterie à souder OEDERLIN a fait ses preuves dans les installations d'eau, d'air comprimé etc.

Demandez la documentation technique complète, références et adresses des distributeurs-NIBCO dans les pays d'Europe.

**Société Anonyme**  
**OEDERLIN & CIE. Baden (Suisse)**

Portable transistorized  
contamination monitor  
type PW 4012.



# PHILIPS

*equipment for Nuclear Physics  
and Atomic Energy*

PW 4012  
with probe extension.

This rugged, watertight and tropicallized battery-operated instrument incorporating the Philips G.M. counter tube type 18503 has been designed for the detection and measurement of radioactivity in such applications as:

- General radiation intensity checks in isotope laboratories, around isotope containers etc.
- Contamination checks of benches and apparatus.
- Radiation exposure measurements of personnel working with isotopes or X-rays.

*It incorporates the following features:*

- Three measuring ranges resp. 0-1, 0-10 and 0-100 mr/h (Ra  $\gamma$ ).
- Compensation for voltage drop during battery life ensures maintenance of accuracy.
- Provision to insert probe extension.
- Beta sensitive G.M. tubes 18504 (2-3 mgr/cm<sup>2</sup>) and 18505 (1.5-2 mgr/cm<sup>2</sup>) can be used as well.
- Large, easy readable and shock-proof measuring instrument.

- Synchro-cyclotrons for various final energies.
- Cockcroft-Walton accelerators.
- Generators for very high d.c. voltages.
- Linear electron accelerators.
- Reactor control instrumentation.
- Radiation measuring and detection equipment.
- Civil defence instruments.
- Area monitoring instrumentation.
- Geiger counter tubes.
- Photomultipliers.
- Radio-active isotopes.
- Air & gas liquefiers.
- Vacuum measuring equipment.



# PHILIPS

## Nuclear Equipment

*For further information please apply to*

*the Philips organisation in your country or to:*

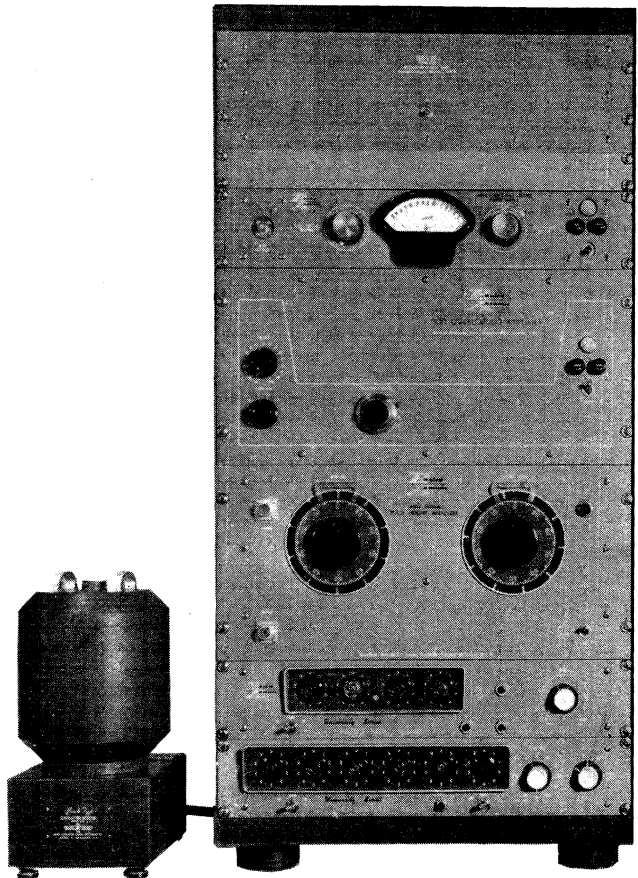
N.V. PHILIPS GLOEILAMPENFABRIEKEN, Scientific Equipment Department, Eindhoven-Holland



# Baird-Atomic, Inc., USA

Low Cost Glow Tube Scaler  
Multiscaler II  
High Speed Glow Tube Scaler  
General Purpose Amplifier  
Non-Overloading Linear Amplifier  
Proportional Amplifier  
Super Stable High Voltage Supply  
High Voltage Power Supply  
General Purpose High Voltage Supply  
Precision Dual Rate Meter  
Logarithmic Survey Meter  
Single-Channel Pulse Height Analyzer  
Precision Glow Tube Timer  
Alpha Scintillation Probe

**Omni Ray AG.** Zürich,  
Dufourstrasse 56  
Tel. (051) 34 44 30



**FABRIMEX**



**CONDENSATEURS  
MP**



**CONDENSATEURS  
MP**



**CONDENSATEURS  
MP**



- Une invention de la maison BOSCH



- Autorégénération en cas de courts circuits



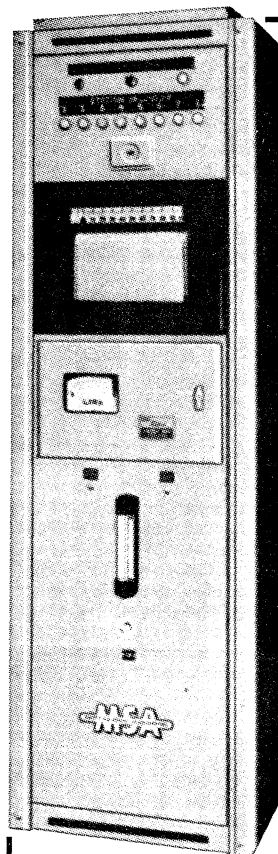
- Sécurité de service



Profitez de la grande expérience soulignée d'une garantie de plusieurs années.



**FABRIMEX AG ZÜRICH**  
Kreuzstrasse 36 Tel.: 051/34 10 31



MSA Combustible Gaz Analyzer, measurement of potential explosive atmospheres, such as hydrogen

**Gas and liquid for rapid automatic analysis of fluid mixtures**

Industrial Safety Equipment: Dustfæ, Gasfæ, Acid Hoods, Gloves, Goggles, Helmets, Faceshields, etc.

**MAVEG LTD.**  
BIENNE Switzerland

Safety Equipment Depart.  
135, rue des Prés Tél. (032) 21551