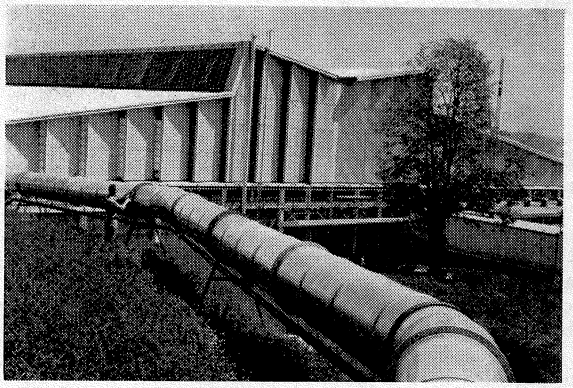
CERN COURIER



N° 12
July 1960

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

Who is who in CERN

Wolfgang GENTNER

Research Director
Synchro-cyclotron Division

In October, Prof. Gentner will resign from his duties as Research Director of the Synchro-cyclotron Division to become Director of the Max-Planck Research Institute in Heidelberg.

Born on July 23 1906 at Frankfurt-on-Main, Wolfgang Gentner chose to study physics. In 1925, he went to the University of Erlangen, then completed his education in 1930 at the University of Frankfurt. The thesis which he presented analyzed "the range of electrons in matter and their biological effects".

At that time, many students were attracted to biophysics : Wolfgang Gentner studied this science until 1933, working as assistant to Prof. Dessauer at the University of Frankfurt. In particular, he observed the effects of X-rays and cathode rays on albumin.

He left for Paris in January 1933. He remained at the Radium Institute until the beginning of 1956, working with Madame Curie until her death in 1934, and with the Joliot-Curies. Under their direction, his work was mainly concentrated on the diffusion of gamma-rays including abnormal absorption of these rays and their absorption by different photoelectric and Compton effects. He also did research on photonuclear effects in beryllium and on the production of pairs of particles—it was at the time of the discovery of the positron, "the positive electron".

Wolfgang Gentner then returned to Germany where he became Prof. W. Bothe's assistant at the Kaiser Wilhelm Institute (now the Max-Planck Institute) in Heidelberg. There, he continued his work on gamma rays. In particular, he determined their photonuclear effects on all the elements. For this work, he used gamma rays at 17 MeV—the highest energy gamma rays which had so far been obtained—produced by the reaction of lithium when bombarded by protons at an energy of a million electronvolt. The protons were provided by a 1 MeV Van de Graaff electrostatic accelerator constructed by the young physicist.

At the beginning of 1939, Wolfgang Gentner went to work for six months at Berkeley in the United States. He studied the construction of cyclotrons with their inventor E.O. Lawrence. At the Berkeley Radiation Laboratory, W. Gentner also co-operated in Segré's work and further improved the gamma-ray laboratory.

Science, it is said, knows no frontiers. Wolfgang Gentner's "French period" proved this once again. The young German scientist passed the first three years of the war at the Collège de France. He ran the small 10 MeV cyclotron with Frédéric Joliot. During these years, W. Gentner's contribution to international science was not only concerned with scientific matters but also political ones, as his nationality enabled him to extract some of his French colleagues—and in particular F. Joliot—from some difficult situations.

In 1943, W. Gentner was recalled to Germany. At Heidelberg he built the cyclotron for medical research at the Kaiser Wilhelm Institute. This accelerator, which is still in operation, produced 12 MeV deuteron beams or 26 MeV beams of alpha particles.

From 1946 to 1958, Wolfgang Gentner held the chair of physics at the University of Freiburg-im-Breisgau.

During this time, he also acted as consultant to the Study Group for the CERN proton synchrotron which was then under the direction of O. Dahl. With A. Citron, one of his former students, he calculated the concrete and earth shielding, which at present stops any ionizing radiation from the accelerator, as well as the mound between the accelerator and the French border.

In 1955, the CERN Council appointed Professor Gentner Director of the Synchro-cyclotron Division. On 1 October 1958, he was appointed Director of the Max-Planck-Institute in Heidelberg. This post meant that he could only give part of his time to CERN. He therefore resigned from his duties as Director of the SC Division but, as Director of Research, continued to give part-time service to CERN. He also continued to co-operate in the selection of fellows: it was he who was responsible for initiating the CERN fellowship scheme.

The Max-Planck Research Institute in Heidelberg, where Prof. Gentner will take up his duties in October, is one of the independent German research institut which are linked to the universities through their staff. Thus, while acting as Director of the Institute, Prof. Gentner will hold seminars on nuclear physics at Heidelberg University.

Contents

«CERN COURIER»

was founded in 1959 at the instigation of Professor C.J. Bakker, Director-General of CERN. It is published monthly for the staff of the European Organization for Nuclear Research and distributed free of charge to members of the organization, scientific correspondents and anyone interested in problems connected with the exploitation of particle accelerators or in the progress of nuclear physics in general.

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The cover photograph shows part of the CERN installations with the big 25 GeV proton synchrotron in the foreground. **Inset**, photograph showing the South side of the South Experimental Hall, with the piping for evacuating propane, in the foreground.

Last month at CERN

The **group of visiting scientists** headed by Prof. A. Lagarrigue, from the Ecole Polytechnique in Paris, arrived at the 25 GeV synchrotron on 1 July.

The group is placing a large piece of experimental equipment weighing nearly 100 tons in the synchrotron beam. This is a propane-freon bubble chamber measuring 1 x 0.5 x 0.5 m, installed in time to take its first photographs on 22 July and take part in a long experiment on 8 and 9 August. After Prof. B. Hahn's Group from the Swiss University of Fribourg, which will take part in experiments during the whole of 1960, this is the second team of physicists from the Member States to come and work at CERN. It will help to exploit the big synchrotron and the Organization will benefit from its exploratory measurements of the beam.

At the 600 MeV synchro-cyclotron, Prof. F.P.G. Valckx's team of physicists (Utrecht University) has left CERN. This is the first team to have completed a series of experiments: these were on "scattering of positive mesons by complex nuclei."

Prof. M. Conversi's Group from the University of Rome arrived on 13 June ; it is performing an experiment with the SC on "the emission of electrons by muon capture". Finally physicists under Prof. B. Brix and Dr. Stalder, from the Darmstadt Institute of Technology, will do a counter experiment after 10 August in order to determine the "radii of heavy nuclei".

Still at the SC an 85-ton magnet 6 m long arrived on 7 July. At the beginning of August measurements were made on the magnet and it was adapted to the requirements of the g -2 experiment now being performed by a team under F. Farley and R. Garwin.

The **Council** met on 11 July and appointed Mr. J.B. Adams Director-General until 1 August 1961. Further details are to be found on page 10.

The Director-General was awarded the **Röntgen Prize** of Liebig University at

CERN - DUBNA Exchange

One of the items on the Agenda of the 16th Council Session (see page 10) concerned an exchange of scientists between our European Organization and the Soviet Centre of Dubna.

Three Soviet scientists arrived at Meyrin on 18 July for a period of six months, during which they will co-operate in various aspects of the exploitation of the particle accelerators and in theoretical studies.

Who are these new colleagues ?

Two of the physicists, V. Meshcheryakov and R. Ryndin, are physicists from the Theoretical Physics Laboratory at Dubna. They have naturally been attached to CERN's Theoretical Study Division, where they will continue work begun in the USSR before their departure.

Vladimir Meshcheryakov is the youngest: he was born on 20 September 1932 in Leningrad and graduated from Moscow University in 1953. He is married

Mrs. Bakker and her children will be leaving Geneva on 17 August. When these lines appear, Professor Bakker's family will already be back in the Netherlands.

The editor is sure that the whole staff of CERN will wish to join the CERN COURIER in sending all best wishes to Mrs. Bakker and her children and saying « Au revoir ».

●

Giessen (Germany). He received the prize on 1 July at a ceremony commemorating the 350th anniversary of the University, whose Physics Institute was directed by W. K. Röntgen until 1885. The prize will be awarded annually for exceptional work in fundamental research on particle physics.

The scroll handed to Mr. Adams states "the prize is awarded at the same time to all the scientists who under his direction have succeeded in this great venture in European co-operation".

From **the synchrotron Machine Group** comes the news that it has obtained a beam current of 2.5×10^{11} protons per pulse. The following figures may be of interest to the technicians: by 3 August the magnet of the big accelerator had been pulsed 2 286 500 times since it was commissioned. The electric power for the magnet alone reaches 3470 kvA.

In the field of **big accelerators**, the big Brookhaven synchrotron has come into operation; its energy reaches 31 GeV ("BeV" in America). A new 100 GeV machine is apparently under consideration in the States and may even have reached the planning stage.

European bubble chamber users held a small "international conference" at CERN on 17 June. The purpose of this meeting was to assess the facilities available in Europe in the field of bubble chambers and instruments for the evaluation of photographs, to form a committee for planning experiments and to organize the bubble chamber experiments with the synchrotron.

Other People's Atoms

This is the third article on high energy physics in the United States in 1959. The two previous articles appeared in the May and June issues of the "CERN COURIER".

G. Kenneth Green is in charge of building the 30 GeV synchrotron at the Brookhaven Research Laboratory in the United States.

On 5 February last, referring to the inauguration of the 28 GeV CERN synchrotron, he said: "The energy range beyond 20 GeV seems very promising. We hope to join you there soon!"

They have.

The following telegram arrived at CERN during the night of 29 July: "We finally made it. Went through half integral to thirty one".

Three official telegrams were sent off on the CERN telex:

- *"Congratulations from all CERN on your success. Nice to have company" from S. A. ff Dakin and G. Bernardini, in the absence of J. B. Adams.*
- *"Sincerest congratulations from the members of the PS Machine Group for your great success" from P. Germain.*
- *"31 000 congratulations to you from us all. Best of luck in the next stages" from the Members of the Parameter Committee.*

Two months — as in the case of CERN — after the first beam had been once round the machine, the Brookhaven proton synchrotron is operating at full energy. This is wonderful news for the scientific world.

Two giant accelerators will now share in the study of the infinitely small. A full programme can now be undertaken in cooperation. All physicists will be delighted at this, even though the title of "biggest in the world" has once again crossed the Atlantic... ●

THE 194-INCH SYNCHRO-CYCLOTRON AT BERKELEY

Because of the heavy demand for experimental time on the 184-inch cyclotron at the Lawrence Radiation Laboratory, this accelerator was placed on 3-shift, 24-hour-day operation early in 1959. The experimental physics programme at the cyclotron was concerned mainly with the study of the interactions and decays of pi and mu mesons. An intense beam of positive pions or pi mesons, has been formed at the 184-inch cyclotron in order to perform experiments relating to the scattering of pi mesons from protons. The analysis of these experiments promises to provide detailed information on this fundamental process.

An experiment also has been performed to study the production of an additional pi meson by the collision of a pi meson with a proton. The results of this experiment indicate that a much greater number of pi mesons are created than had been expected on the basis of prior theoretical predictions. New theoretical ideas which include effects of interactions between the pi mesons are in reasonable agreement with experimental results.

ATMOSPHERIC NEUTRON SPECTRUM

An experiment to study the atmospheric neutron spectrum and its relation to the Van Allen radiation

See page 8.

Mr. S.A. ff Dakin, Director of Administration, welcoming the Russian scientists who arrived at CERN on 18 July: V. Meshcheryakov, Y. Sherbakov and R. Ryndin.

and since 1958 has been working at Dubna, where among other work he has been studying the "field of application of Mandelstam's representation".

Rostislav Ryndin also comes from Leningrad, where he was born on 20 January 1920. He studied at the Leningrad State University where he obtained his Doctorate in 1952. He then entered the Dubna Nuclear Study Centre where his latest work was on the "Low energy bremsstrahlung from high energy electron-proton collisions". Mr. Ryndin is married and has one child.

Yuri Sherbakov, the third scientist, is an experimental physicist who has been attached to the Russian Centre of Dubna since 1953. At CERN he will take part in the exploitation of the 600 million electronvolt (600 MeV) synchro-cyclotron.

He was born at Volsk on the Volga in August 1925. He was a student at the Moscow Institute of Technology and studied physics under Professor Kosadev. He went to Dubna in 1953 and has been working there for five years on the 680 MeV synchro-cyclotron.

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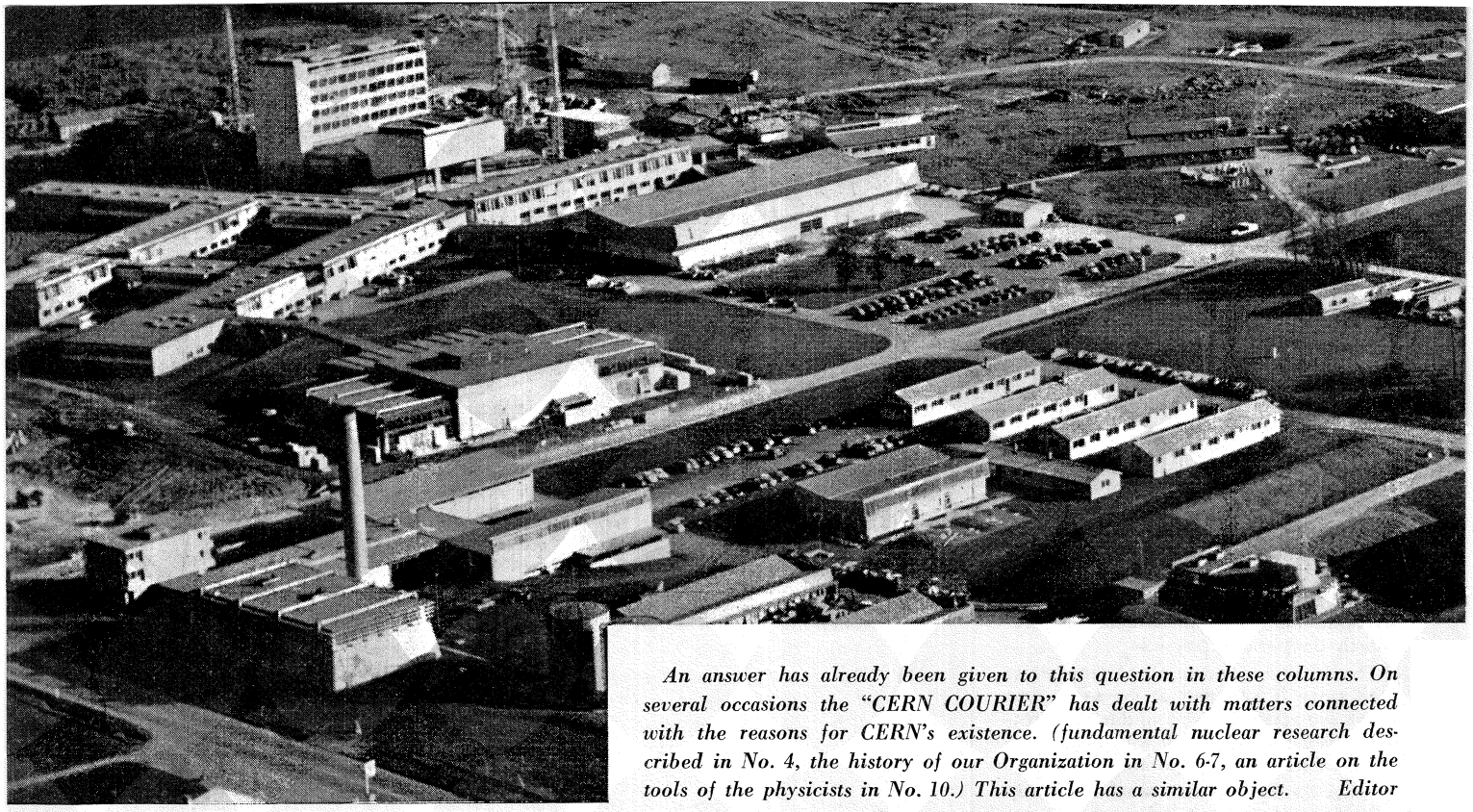
Three European scientists will soon be sent to Dubna for six months in exchange, but their names had not yet been announced when this article was written.



An answer has already been given to this question in these columns. On several occasions the "CERN COURIER" has dealt with matters connected with the reasons for CERN's existence. (fundamental nuclear research described in No. 4, the history of our Organization in No. 6-7, an article on the tools of the physicists in No. 10.) This article has a similar object. *Editor*

CERN is concerned with fundamental research to increase our knowledge of the ultimate structure of matter. This is pure research involving mostly elementary particle physics.

This work is completely free from any idea of immediate practical application, whether peaceful or military.

This being so, the uninitiated sometimes ask: "Why do work which is no use?"

Pure Research

Contrary to ordinary **applied research** which helps production and sales, **pure research** seeks "knowledge for its own sake". It is a reward in itself for pure researchers to satisfy the urge to explore new fields, which after all is one of the basic traits of the human mind. It seems fair to say that they are spurred on by their desire to make discoveries. And what use is pure research? Like music or painting, it gives satisfaction to those who practise or appreciate it, and acts as an intellectual stimulus for the society where it develops.

For those who are not impressed by intellectual considerations of this kind, let us be more matter of fact. Thirty years ago no direct application of nuclear physics could be foreseen. At the present time it is being used in two fields which have many implications, both economic and, alas, military: nuclear chemistry and nuclear engineering.

Today elementary particle physics is pushing back further and further the boundary between the known and the unknown. Perhaps the next generation will live to see humanity benefiting from the work which is now going on round the two big CERN accelerators, but the Organization does not exploit the results of its research work, it only publishes them. Anybody, anywhere in the world, has access to these results and may draw practical conclusions from them.

Two accelerators are mentioned above. What are they? What part do they play in CERN's life?

In order to answer these questions we have to follow the development of a scheme which was first mooted just after the last war.

The European idea

The post war exodus of an alarming number of European physicists to countries with more advanced research equipment led to the setting up of a big European centre for fundamental nuclear research. European physicists considered that the equipment of the centre should above all include a high energy accelerator which would allow further research work on mesons, the new particles that were being observed in cosmic rays.

However, the idea of setting up a laboratory for pure research was not born until later. This was because those in favour of international co-operation were aware that public opinion might be willing to accept heavy expenditure on nuclear projects which would sooner or later provide some return, but that it might prove reluctant to countenance the spending of comparable sums on pure scientific research.

As time went by, however, public opinion came to realize the need for disinterested research, the basic driving force of progress. Accordingly, Louis de Broglie's proposal at the European Cultural Conference in Lausanne, at the end of 1949, received the attention it deserved. He favoured the creation in Europe of regional research institutes for the types of research calling for powerful machines. Once the resolution to that effect had been adopted, it was up to an international body to lay the material foundations of Euro-

What is CERN?

pean co-operation in fundamental nuclear research.

Need for co-operation

The lead given by Professors I.I. Rabi and P. Auger brought even more clearly in evidence the need for European co-operation. A group of consultants met for the first time in May 1951. They suggested as a long term project the construction of the biggest accelerator technically possible. This idea was to materialize in 1959 in the shape of the big 25 thousand million electronvolt (25 GeV) synchrotron.

In the meantime it was decided to construct a machine with which the European scientists could become familiar with high energy physics : this was the 600 MeV (600 million electronvolt) synchro-cyclotron which was commissioned in 1957.

The Interim "CERN"

At the same time (1951) an interim organization was set up, responsible for the preparation of building plans and draft budgets. Government delegates met under the auspices of UNESCO which invited to the meetings all its European Members including the countries of Eastern Europe. Twelve western countries were represented at the second conference held in Paris at the end of 1951 and in Geneva at the beginning of 1952.

The representatives of eleven European Governments signed the Convention setting up the interim organization which came into being on 15 February 1952 with the title of "European Council for Nuclear Research" (CERN). Belgium, Denmark, France, the German Federal Republic, Italy, the Netherlands, Norway, Sweden, Switzerland and Yugoslavia were then provisionally united to carry out nuclear research. During the whole life-time of the interim CERN the United Kingdom remained simply an observer, but showed its interest in the scheme by suggesting new ideas, providing consultants and making gifts. The first Council Session was held in Paris, in May 1952.

Shortly afterwards the Proton synchrotron Group embarked on its ambitious project : the construction of what was then to be the biggest accelerator in the world, based on a new and untried principle. The Synchro-cyclotron Group assumed the task of providing CERN within a short time with a conventional machine of up-to-date design and sufficiently high energy to enable the European Organization to work in a new field of nuclear physics. By 1957 CERN had at its disposal a 600 MeV synchro-cyclotron which was soon being used twenty-four hours a day and which rapidly provided scientific data of outstanding interest.

In October 1952, at its third session the Council decided that the future European laboratories should be set up in Geneva. The places originally considered had been Paris, Copenhagen, Arnhem and Geneva. The latter was chosen because of its international nature, its geographical position and Switzerland's offer to make available at Meyrin the 40 hectares of land necessary.

A description of CERN's two machines and of its future installations, and an estimate of capital and operational costs were submitted to the Council in April 1953. These reports were the prelude to the setting up of a permanent Organization.

The Permanent Organization

The Convention establishing the permanent Organization was signed in Paris on 1st July 1953. The European Council for Nuclear Research, a provisional body, ceased to exist. It became the "European Organization for Nuclear Research" but kept the initials "CERN" which had been adopted in 1952 for the interim period.

The modest budget available did not prevent work from progressing. On 17 May 1954, excavations were started on the Meyrin site.

On 1 August 1957 the synchro-cyclotron produced its first beam. This machine was to give the scientific staff a chance of becoming familiar with a big particle accelerator before concentrating all their efforts on research.

A year later the 600 MeV synchro-cyclotron made front page news. A particularly difficult experiment revealed for the first time a nuclear phenomenon foreseen by the theoreticians ten years earlier : the direct decay of one of the least known particles, the pi-meson, into an electron.

On 16 September 1959, a proton beam went once round the 200 metre diameter synchrotron for the first time. On 24 November, an energy of 24 GeV was reached and, on 8 December, the machine produced particles with a kinetic energy of 28,3 GeV.

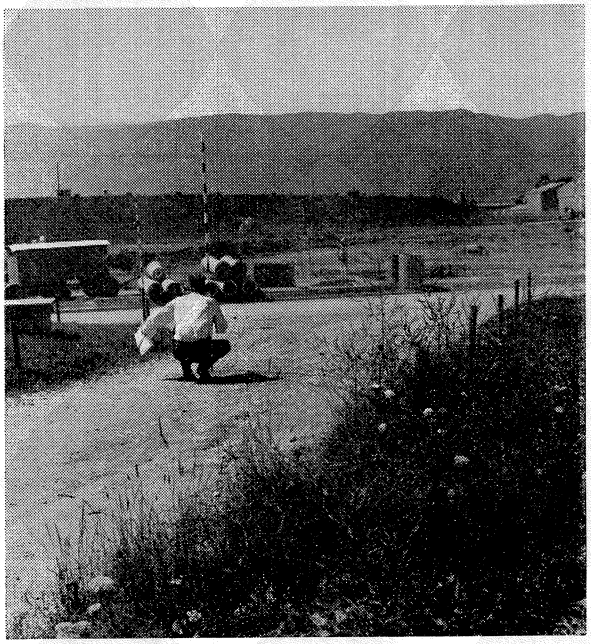
This year, physics experiments have been carried out with the big synchrotron, concurrently with exploration work. This is being done by teams of CERN scientists and groups of physicists from the Member States.

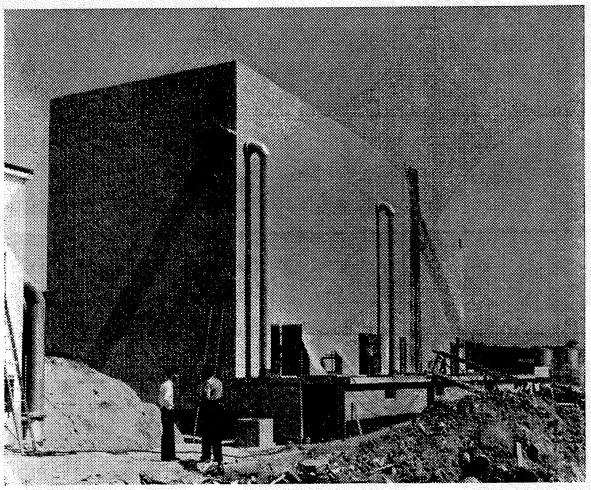
What discoveries...?

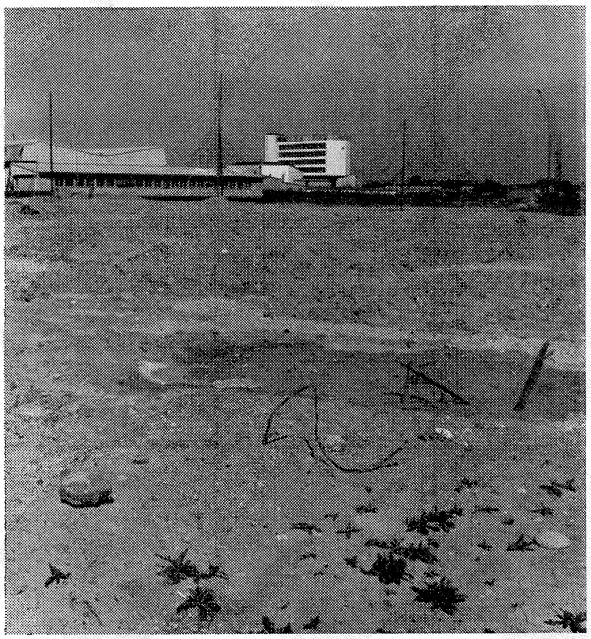
"What discoveries can be made with the synchrotron ?" The question to ask is really "What problems do you hope to solve ?" Even then, the answer would be rather sketchy and, in any case, far too long for the present article. If we knew what discoveries could be made, we should already know the answer to our investigations.

However, CERN's big accelerator is certainly a first-class research tool. Soon research scientists will be able to exploit to the full one of the most expensive physics instruments ever put at their disposal.

CERN Building Sites







The shining blades of the bulldozers, the roar of the scrapers, the clouds of dust ... all remind us that the Organization is still growing and that the building period is by no means over, even though the two big particle accelerators have been completed.

The Site and Buildings Division, which is responsible for carrying out or supervising all work connected with the new CERN buildings, has eight projects on hand at present. Some of these, like the building site near the Customs, are for utilitarian purposes. Most of them, however, are new facilities to add to the existing scientific installations and help CERN to pursue and improve its research programme.

The Third PS Wing

In 1957, to help in the assembly of the big proton synchrotron (the PS) the PS Engineering Workshop was installed in the South Experimental Hall *. In 1961 this Hall will be handed over to the physicists and the workshop will have to be moved into another building which is now being put up at the end of PS laboratories 6, 8 and 9. By the end of March 1961 there will be a two-storey building opposite the PS Power House. The two upper storeys will be occupied by staff from P. Germain's Machine Group aud F. Grütter's Engineering Group. The ground floor will house the workshop annexes : pickling, electro-plating and painting shops etc.

The Reception Office will be transferred to the ground floor of this building, which will house the main entrance to the synchrotron installations. Behind this wing, and at right angles to it facing the courtyard, will be J. Augsburger's PS Workshop in a hall 9.8 m high, slightly higher than the other building. The hall will be equipped with a 10-ton overhead travelling crane and will be 24 x 40 m, nearly the same size as the present workshop.

This building is marked No. 1 on the plan on the opposite page drawn by Marcel Bron (SB).

The South Generator Building

is the vast 32 x 26 m structure being fitted up behind the South Experimental Hall (No. 2 on the plan). This building houses the equipment for supplying electric power to the experimental apparatus installed in the Experimental Hall, comprising the 18 kV switchgear, 5 transformers, 21 motor generator sets including 34 generators, a nitrogen compressor, battery, charger and 48 V battery, the line selector and the outgoing cables and busbars. There are two 10-ton overhead travelling cranes in this large machine room.

F. Grütter and E. Hugi will shortly contribute an article to the "COURIER" describing the installation.

Ventilation and Drainage

The bubble chamber area at the West end of the South Experimental Hall (No. 3 on the plan) has its own ventilation and drainage systems.

Liquid hydrogen and propane, which are used for filling the bubble chambers, are highly explosive.

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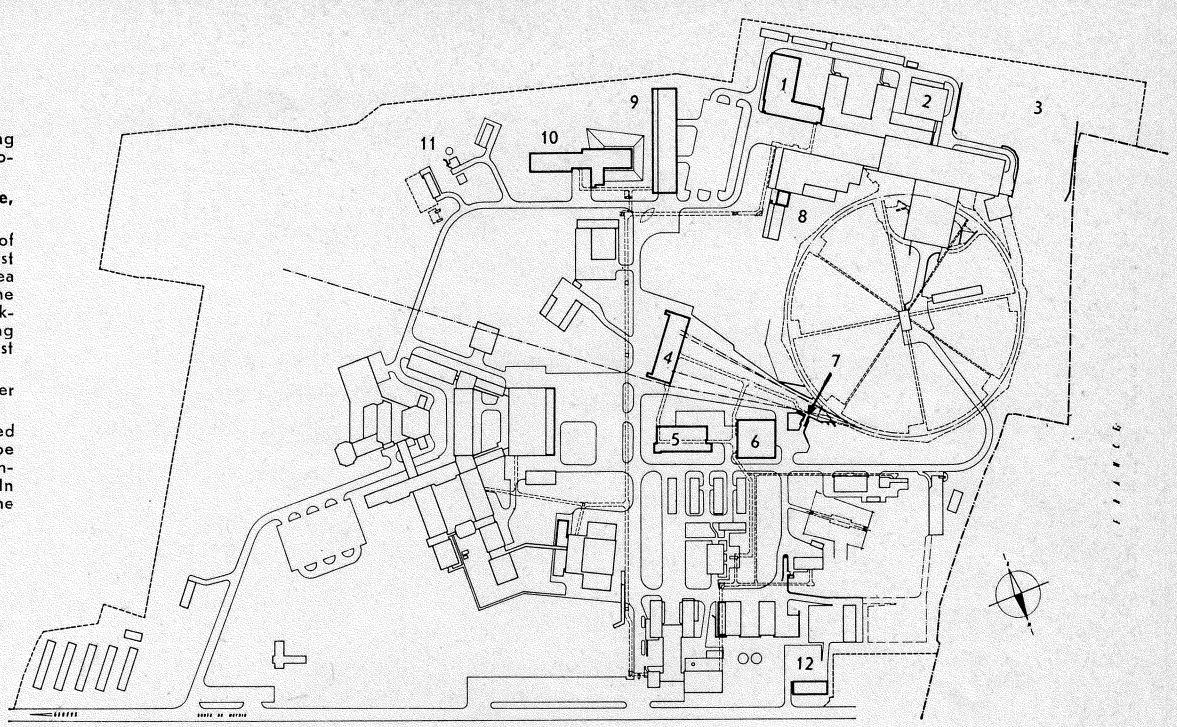
* See detailed plan in CERN COURIER No. 9, April 1960.

Right : A plan showing building work in progress at CERN.

On the lefthand page, from top to bottom :

- the marking out of the site of the East Experimental Area (Nos 4-7 on the plan). In the background, the PS ring standing out against the Jura ;
- The PS cooling tower building (No. 8) ;
- the buildings marked 9 and 10 will be built on this sun-baked ground. In the background, the Main Building.



All flames, sparks or hot points which could ignite the gases emanating from these liquids therefore have to be avoided in this area. Smoking is accordingly prohibited and the electrical installations are flame-proof and pressurized. As an additional precaution the atmosphere in the bubble chamber area is isolated from that of the neighbouring experimental hall. This is why the air tight partition was erected a few months ago.

Moreover, arrangements have been made for the continual renewal of the atmosphere likely to be polluted by hydrogen or propane gas. For this purpose a big ventilator sucks in air from outside, which it heats and sends under the floor to renew the air in the bubble chamber area fifteen times an hour. Ten ventilators simultaneously evacuate the air through the ceiling.

In the case of propane, which is heavier than air, any leaking gas is extracted at ground level and ejected through the large galvanised tubing which can be seen against Mount Citron. The ventilator for the system is driven by a compressed air motor and renews the atmosphere in one of the three rooms concerned twenty times an hours.

If there is any need to empty the liquid propane rapidly, this will be done through the smaller tubing beside the main tube. Similarly the liquid hydrogen would be evacuated through the special vent pipes many examples of which can be seen outside the bubble chamber test building.

The East Experimental Area

The East Experimental Area (Nos. 4 to 7 on the plan) is now the most important building site at CERN.

On 27 July the enormous and astonishingly powerful earth scrapers completed their excavation work. Building could then start. If all goes according to plan the work will be finished at the end of March 1961. There will then be three more buildings between the underground synchrotron ring and the Main Workshop.

The East Bubble Chamber Building

18 m high, will be beside the road now leading to the Synchrotron Division (No. 4). Incidentally this road will be slightly deviated during the building period.

Two 30-ton overhead travelling cranes will be fitted above this bubble chamber area of 57 x 18 m, which will be spanned by a metal framework covered with removable sheeting. Why such heavy lifting apparatus ? To handle the components of the heavy hydrogen bubble chambers which are to be installed there. The 2 m bubble chamber at present being designed by C. Peyrou's Group will weigh no less than 680 tons ! It is obvious that such heavy weights pose considerable problems in connection with the strength of materials. Therefore a double railing truck is being provided to support this bubble chamber.

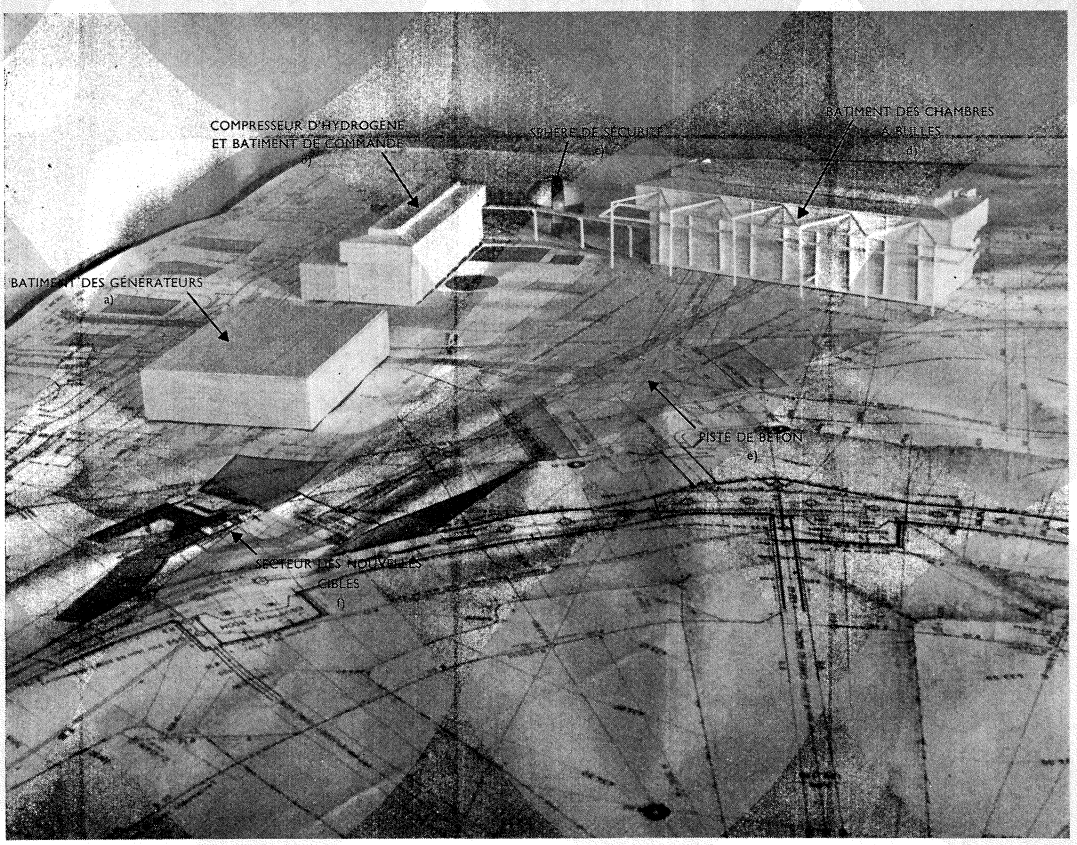
The floor of the building will be supported on a hollow raft foundation, which will enable it to take a load of 100 tons/m². It will be possible to move the chamber a few metres along rails to place it in the beams of particles extracted from the synchrotron ring.

This big 2 m chamber will not be the only one in the building ; there will be room for others belonging to CERN or teams of visiting scientists from the Member States.

The usual safety regulations will apply to the building : ventilation, entirely pressurized electric equipment, etc. As an additional precaution the West wall on the synchrotron side will be fitted with a gantry. Another overhead travelling crane will handle concrete blocks to make a shielding wall preventing accelerated particles from going outside the experimental area.

There will be two further buildings : the compressor building which will house in a hall 10 m high the equipment for supplying the nitrogen under pressure used to operate the expansion mechanism of the bubble chambers. Beside this hall (No. 5) there will be a wing consisting of laboratories and the control room for this equipment and for the bubble chambers.

CERN Building Sites



Left : the future buildings (6, 5, 4, from left to right) of the East Experimental Area.
On the righthand page, from top to bottom :
A view of the same building site at the beginning of August and the work on the storage area close to the Customs (in the background).

The East Generator Building

is practically identical to the South Generator Building described above (No. 6).

In the Spring of 1961 when these three buildings are completed, work will start on the junction with the ring (No. 7). The object is to clear a passage from the accelerator tunnel through the protective earthwork so that the high energy particle beams necessary for the experiments may be extracted.

They will be extracted at the level of survey pillar No. 6. A new tunnel will go outwards from the 200 m diameter circular tunnel. 2.5 m above the junction of the tunnel there will be a 15.4 m long girder 6 x 5.5 m in section. Concrete blocks will be suspended from this girder and will determine the shape of the aperture through which the particles will pass. This "loop hole" will open on to a triangular concrete apron connecting it to the bubble chamber building 115 m away. Over its surface of 5000 m² it should be able to take a load of 30 tons per m² and be as level and stable as possible.

Like most of the other CERN buildings, those mentioned here will be connected to each other and to the SB Power House by tunnels containing the electric, hydraulic, compressed air and heating supply lines.

Other People's Atoms

Continued from page 3.

belts of the upper atmosphere has been completed at the Lawrence Radiation Laboratory through the cooperation of the US Air Force. Techniques originally developed for surveying the neutron fields produced by the Bevatron were utilized to determine the flux and spectrum of neutrons leaking outward from the earth's atmosphere and decaying in space. It seems highly probable that a large fraction of the charged particles in the inner Van Allen radiation belt arise from the capture by the earth's magnetic field, of the electrons and protons emitted when these neutrons decay.

CALIFORNIA INSTITUTE OF TECHNOLOGY PI-MESON RESULTS

Experiments performed with the 1.4 BeV electron synchrotron at the California Institute of Technology have added to knowledge of the pion-nucleon system of particles. It has been found that there are two further peaks in the photoproduction curve at 700 MeV and 1 BeV in addition to the known resonance at 300 MeV. This discovery has occasioned much theoretical interest.

Do you know that...?

- Princess Beatrice of the Netherlands paid a private visit to CERN in the afternoon of 19 July.
- "Les Editions Eyrolles", Paris — have just reissued the book entitled "Electronique Générale" whose joint authors are Pierre Lapostolle of PS Division, A. Blanc-Lapierre and G. Goudet.
- The Soviet Tass Agency has released the statements recorded last June during Mr. J.B. Adam's visit to Dubna.
- Volume VIII in the series "Théorie et technique des accélérateurs de particules" published by the Institut National des Sciences et Techniques Nucléaires (France) is entitled "Les Oscillateurs" ; its author is M. Combe, a physicist at SC.
- Miss J.M. Rabbinowitz (Scientific Information) left on 7 August for the United States where she will spend 3 months. She was invited by the organizer of the Rochester conference, Prof. Marshak, and as an experienced editorial assistant, will help in the quick production of the proceedings of the 10th international conference on high energy physics. This conference will be held from 25 August to 1 September under the auspices of the International Union for Pure and Applied Physics. It will be attended by 325 scientists, including about 10 from CERN.
- Prof. W.K.H. Panofsky, who was at CERN last year as a visiting scientist, has been appointed a member of the President of the United States' Science Advisory Committee. Prof. Panofsky is Director of the High Energy Physics Laboratory, at Stanford University, California.

Cooling Equipment

The building on the edge of the synchrotron ring (No. 8 on the plan) forms part of a system with a total heat dissipation of about 4000 kcal/s. The magnets installed or to be installed in the South and East Experimental Areas will be cooled by water circulating through the hollow conductors of the magnet coils. Demineralized this water has to be re-cooled by water—water heat exchangers with a cooling tower in the primary circuit. The grey rectangular cooling tower building actually consists of two cooling towers each having two compartments ; each tower serves one experimental area. According to E. Hugi and J. G. Noble this also includes pumps, the equipment for demineralizing the water and huge ventilating fans whose 3.50 m diameter rotor sends 120 m³ of fresh air per second on to the elements receiving the primary water for re-cooling.

At present only the two towers serving the South area are fitted up : the PS Engineering group will bring them into operation in August.

South-East Area

A group of buildings will soon be erected near the PS car park (Nos. 9 and 10 on the plan).

The foundations of one of them, the Apparatus Development Building, will already have been begun when this article is published. In Spring 1961 an oblong hall will block the view of the Geneva countryside. 16 m wide and 8 m high, this building will be 86 m long and almost parallel to the car park. There will be a one storey office wing erected against this building on the East side.

This building will house Colin Ramm's Group in charge of the propane bubble chamber and of the designing and construction of the beam handling equipment.

Close by will be the laboratory where Arnold Schoch's team will do *accelerator research.* (No. 10). It is more or less "T" shaped. The right wing will house the new accelerator model with storage rings which has been planned and will be surrounded by a 4.80 m high bank as a protection against ionising radiation.

The other arm of the "T" will be built on the existing slope and its first storey will therefore be at the same level as the floor of the hall in the right wing. The upright of the "T" will house a sub-station for transforming the electric current from 18 000 to 380 volts to feed the surrounding laboratories with electric power. This sub-station will be connected through a tunnel to the cable and piping tunnel at present connecting the Power House to the PS.

Propane Distillation

The small grey cubic structure below the general level of the site will be L. Resegotti's domain ; it will house the installation for distilling propane which is essential for the operation of some bubble chambers (No. 11 on the plan).

Great precautions have to be taken for handling liquid propane because of its explosive nature. In order to prevent the formation of any sparks the whole electrical installation consists of explosion-proof apparatus. The plugs are in a separate place. The whole building has a special ventilation system at ground level for evacuating propane gas, which is heavier than air.

Storage Depots

It is intended to have two stores (No. 12 on the plan) for the Site and Buildings Division close to the Swiss Customs just behind the cylindrical fuel oil tanks. The first was finished a few weeks ago. The second is still being built and will communicate directly with the Route de Meyrin.

15 000 000 Sw.frs.

This rapid review of the building sites shows how much civil engineering work is going on at CERN. J. Rouel of the Site and Buildings Division (SB) estimates that the total expenditure on this programme will amount to 15 000 000 Sw.frs. C. Mallet, Director of the SB Division, states that this expenditure is to be spread over three years from 1960-1962. Will the building programme continue at the same rate ? This does not seem likely in the near future. Among plans for the future is that of roofing over the courtyard between the PS laboratories and power house.

Some thought has also been given to making a road round the site on the Swiss side. Another project in connection with new acceleration principles may also get under way in the more or less distant future. Finally beyond the East Experimental Area a covered path several hundred metres long and 10 m wide may be constructed for further experiments on high energy particles, but this would be done even later. 1963 or 1964 have been mentioned as possible dates, subject to approval of the projects by the Council.

CERN Councils

The Council of CERN, superior authority of the European Organization, held its 16th Session on June 14, 1960, in Geneva, under the presidency of Mr. F. de Rose.

A brief ceremony marked the **inauguration of the "Pauli Room"** where the volumes composing the library of the great scientist have been housed.

A physicist of worldwide repute, Professor Pauli had always shown a deep interest in CERN, a centre for pure nuclear research, where so many physicists from all over the world meet.

Professor Pauli died in 1958. The Nobel Prize for Physics was awarded to him in 1945 for his discovery of the "exclusion principle", one of the basic principles of theoretical physics.

His library consists of some 700 books dealing with literature and philosophy in addition to theoretical physics. It also includes sets of periodicals and a unique collection of reprints.

The works in the "Pauli Memorial Room" may be consulted by those interested in the great scientist and thinker, Wolfgang Pauli.

*

THE DIRECTOR-GENERAL OF CERN

The appointment of Mr. J.B. Adams, as acting Director-General was confirmed by the Council. Mr. Adams assumed the Direction of the Organization since the accidental death of Prof. C.J. Bakker, on April 23.

The Council met again at a special session, on Monday July 11 and appointed Mr. Adams as Director-General of CERN, until August 1st, 1961.

As from October 1st, 1960, Mr. Adams will serve in this capacity on a part-time basis since, by agreement with the British Authorities, he will divide his time between CERN and the new laboratory for Plasma Physics at Culham of which he is Director Designate.

*

LONG-TERM PROGRAMME

Prof. E. Amaldi, Chairman of CERN's Scientific Policy Committee, expressed the opinion that 10 years hence the state of research in high energy physics in Europe will compel CERN to use "a new tool of research". The importance of the latter will be, in 1970, comparable to that of the large 25 000 million electronvolt synchrotron now operating at CERN.

The Council agreed that it was now necessary to start thinking seriously about the long-term programme of CERN. Indeed, the construction time of any large new nuclear project is very long. Furthermore, scientific and other factors are so numerous that very careful studies are necessary before a project can even be ready for consideration.

*

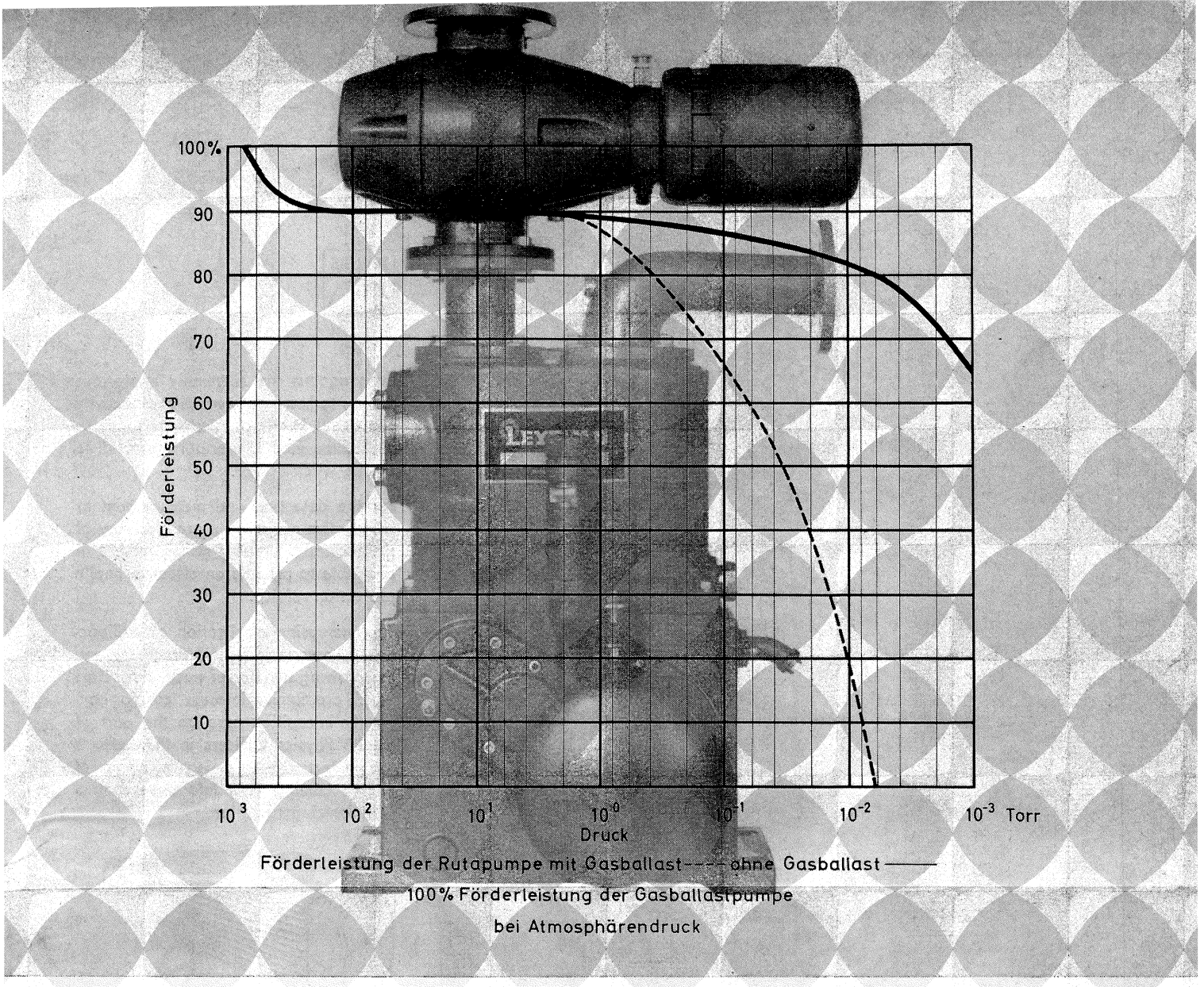
AGREEMENT WITH THE FEDERAL INSTITUTE OF TECHNOLOGY (ETH), ZURICH

CERN has built a 150 cm cloud chamber, equipped with a magnetic field. This apparatus should be completed about the end of 1960. The cost of construction and operation, staff and material included, is estimated to 3 million Swiss francs.

The ETH wishes to co-operate in the construction of this machine and in the experiments undertaken by the cloud chamber group.

An agreement between CERN and the ETH stipulates that representatives of both parties will participate in the building of the apparatus. Once finished this cloud chamber will remain their joint property for two years. Scientists from CERN, from ETH and from other Member States will operate the chamber.

The cloud chamber is an experimental apparatus associated with the operation of accelerators. Very much as it is the case with bubble chambers, particles going through it leave tracks inside the chamber ; these tracks can be photographed and allow subsequent study of the nature and behaviour of the tiny "grains" of matter.



Förderleistungsverhältnis 1 : 1

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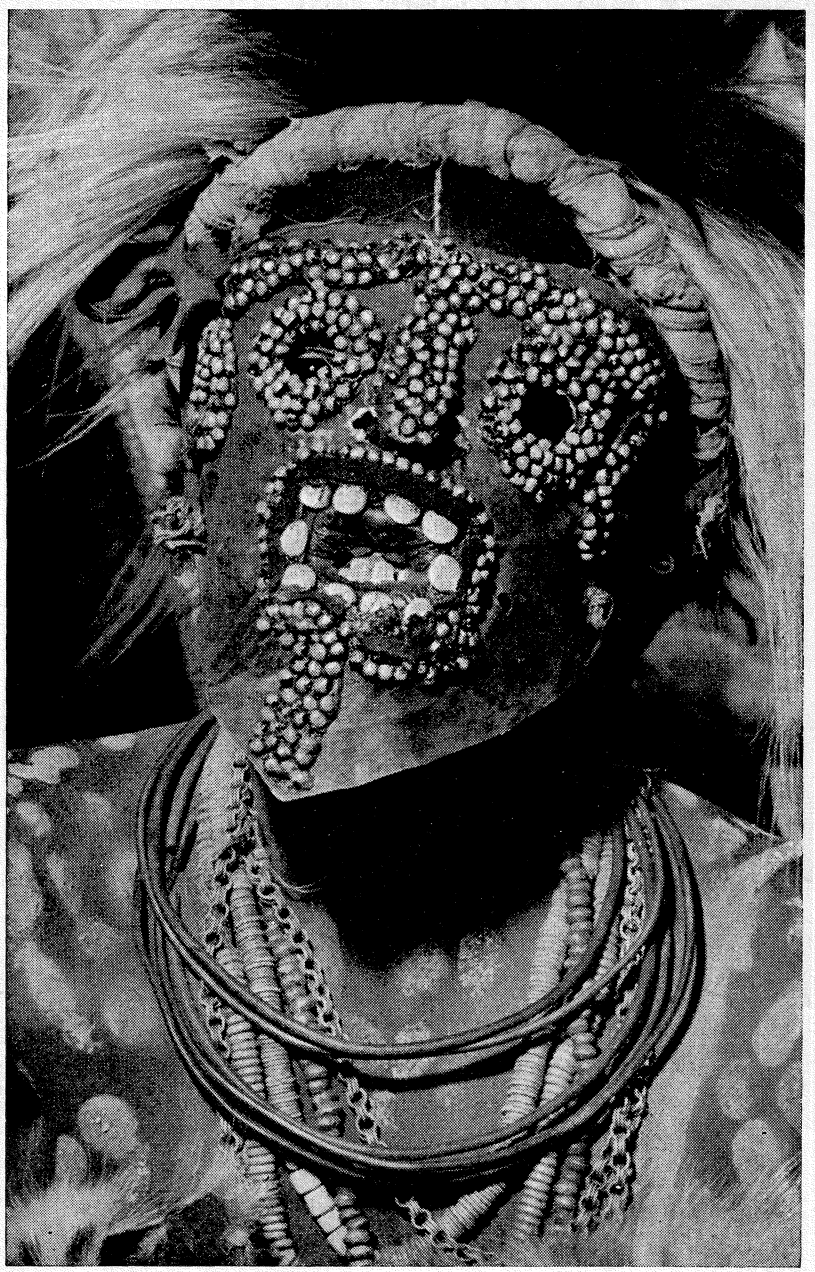

PHILIPS

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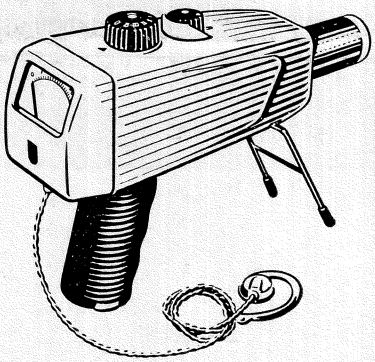

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