

OFFICE OF STRATEGIC SERVICES

WASHINGTON, D. C.

FA 130

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APPROVED FOR
RELEASE DATE:
21-Mar-2011

1 December 1944

Major General Leslie R. Groves
Room 5120, NWD Bldg
Washington, D.C.

Dear General Groves:

I am sending you by our Colonel
Dix some material which I believe to be of un-
usual interest concerning the general field in
which, more than a year ago, you asked for the
assistance of our Organization.

I know you will be elated that
our Bern representative has, to this extent,
been able to penetrate enemy activities.

Since our chief in Bern has
asked our Paris office to furnish copies of
this material to Major Furman it may be that
Major Furman has already been able to get his
copies through to you. If, however, you have
not yet received this report we are hastening
to furnish an additional copy through Colonel
Dix.

Sincerely yours,

William J. Donovan
William J. Donovan

Director

NW 33026

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COPY

REPORT B-

From: OSS Bern

Date of Report: Nov. 16, 1944

Source: Flute

Evaluation: B-2

Subject: AZUSA

Distribution: - Washington for 109 and 106
Paris for 105 and Major Furman

Dallenbach's Supercyclotron

Xref cyclotron

Enclosed is description and design of Dallenbach's
supercyclotron, announced in our report B-577.

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THE SUPER-CYCLOTRON IN BISINGEN

The Super-cyclotron has been invented and designed by a man called Daellenbach, a Swiss citizen who has been living in Germany for many years and is a convinced Nazi.

Daellenbach is a very able engineer; he developed the Pintsch rectifier when he was chief of the electrical laboratories of Julius Pintsch and Co. in Fuerstenwalde; then did a lot of work on resonator (Schwingtopf) theory in connection with ultra-short wave generators of the Klystron (Clystron) type. It is in connection with this work on resonators that he got the idea of the supercyclotron.

Daellenbach was already working in Bisingen (Forschungsstelle E) for the German government. He submitted his plans for the supercyclotron to the Kaiser Wilhelm Gesellschaft, which is a foundation for the encouragement of science, which finances the Kaiser Wilhelm Institutes for the different sciences. When a new research project is submitted to the Kaiser Wilhelm Gesellschaft, the sponsor of the project must hold a "Colloquium" (a controversial report) in front of a public consisting of scientists of the K.W. institutes and of members of the Gesellschaft, mainly big industrialists who put up the money.

Daellenbach had his Colloquium at a sitting of the K.W. Gesellschaft last July (1944); many of the scientists were against the project, mainly because of the very untried elements; but Daellenbach had the complete design ready and detailed, and was extremely well prepared to meet all objections made by his contradictors; the meeting was very favorably impressed by the thoroughness of his preparation (and probably by his past record) and decided to grant a credit up to 100 million marks for the immediate construction of a super-cyclotron for 100 to 200 million volt. Ordinarily this would take about four years, but the construction is being rushed as a war measure and it is likely that the super-cyclotron will be ready in about a year from the start of manufacture, that is, in the summer of 1945. It must be noted that the design was quite ready at the time of the K.W. Gesellschaft sitting last July, so that manufacture could be started at once. A committee consisting of Laue, Heisenberg and Moliere meets Daellenbach every week to examine progress; the project enjoys full priority. It seems likely that most of the K.W. Institutes which were formerly in Berlin have now moved to Bisingen.

A very schematic description of the principle on which the supercyclotron works has been obtained by Flute from one of the K.W. Gesellschaft members (a German industrialist) who was present at the Colloquium. Although Daellenbach often comes to Switzerland (he has a visa granting him unlimited journeys from Germany, which shows that the Germans hold him in high esteem) and even sees Flute, he does not give any details about the supercyclotron; he only says he is engaged in work of supreme importance for Germany, ultra secret; also he is very proud of the fact that he meets Laue, Heisenberg and Moliere every week (apparently on Wednesday afternoon).

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connected by two straights.

There are about 100 canals, so that the total accelerative potential should correspond to 100 to 200 million volts. At the end, the last canal is n, n' ; opposite n' is a further canal with entrance in N , which leads the particle on to the object to be bombarded.

Owing to the fact that, for velocities corresponding to a potential of more than 20 million volts, the apparent mass-increase of the particle due to velocity begins to make itself felt, the magnetic field must be adjusted so as to give the right curvature to the path; this correction requires that the magnetic field should be progressively stronger in the outer canals; this is obtained by making the pole-pieces in stepped form, the distance between the pole pieces being smaller in correspondence with the outer canals (l, l' ; m, m' ; n, n') and greater for the inner canals (a, a' ; b, b' , etc.).

The shape of the pole pieces is shown in fig. II, which is a partial section of fig. I along the line Y, Y , at a height corresponding to the height of the centre of the upper set of canals, (centre 6); X, X represents the axis of the upper magnet and the direction of the lines of force; the canals of the upper set appear as small circles (a, a' ; ... n, n') the pole pieces, 9 and 10, are stepped and get nearer the farther one gets from axis X, X ; the pole pieces are, of course, semi-circular.

The actual constructional details of the supercyclotron are not known; for instance, the exact shape of the magnets, the location of the ions source, etc. Apparently, in order to avoid vacuum discharges across the vacuum chamber, Zircon electrodes are to be used.

As already stated, at the July sitting of the K.W. Gesellschaft, Daellenbach was in a position to counter successfully all objections of the members; a scientific committee, composed of Bothe, Heisenberg and Gentner, had particularly studied the project, and these three raised a lot of objections, but Daellenbach had an answer to everything.

According to Flute, taking into account Daellenbach's experience, the formidable means at his disposal and the advice of his scientific committee, it is probable that the supercyclotron will work successfully.

Flute

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November 16, 1944

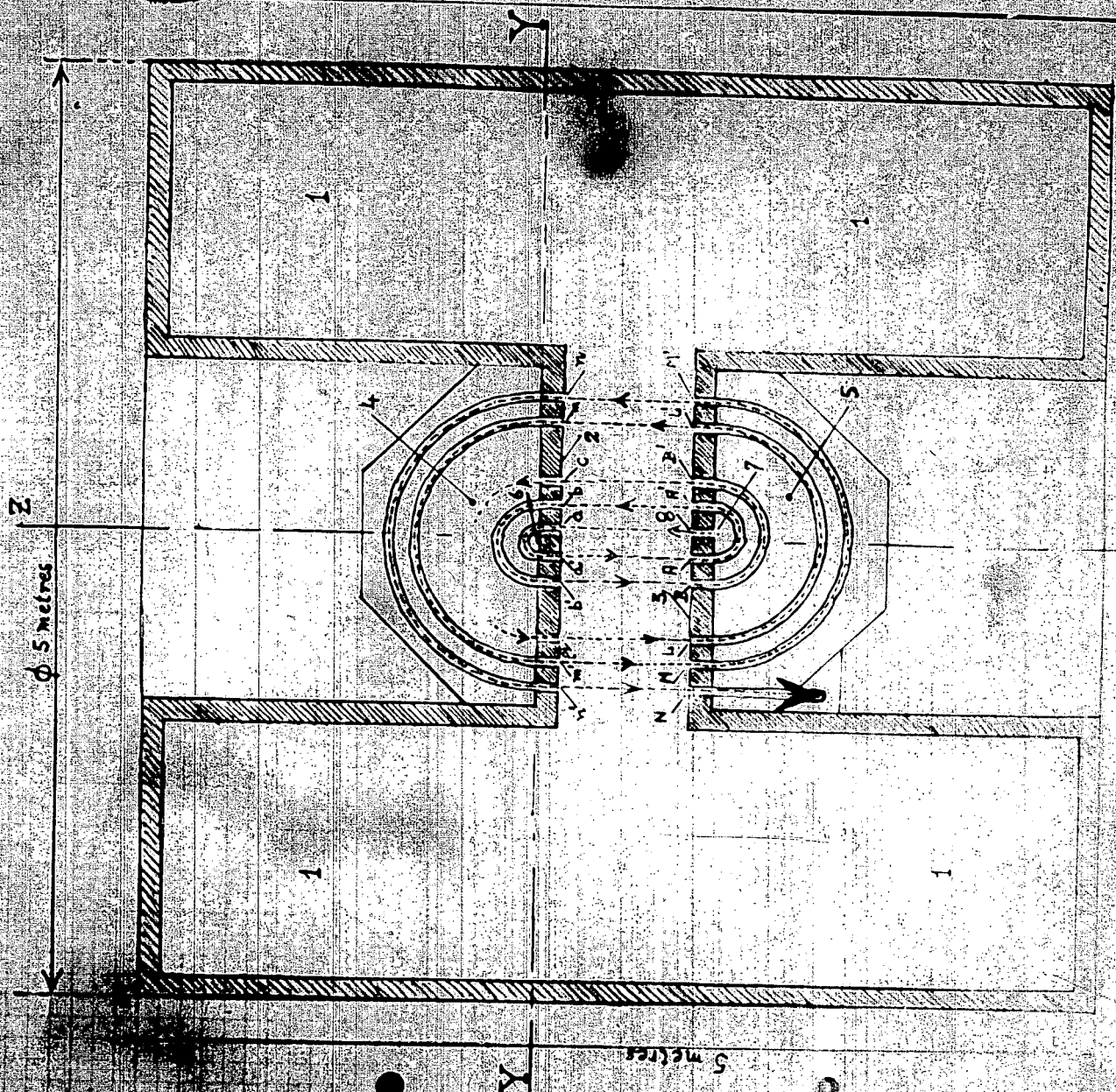
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The schematic principle of the supercyclotron is as follows:

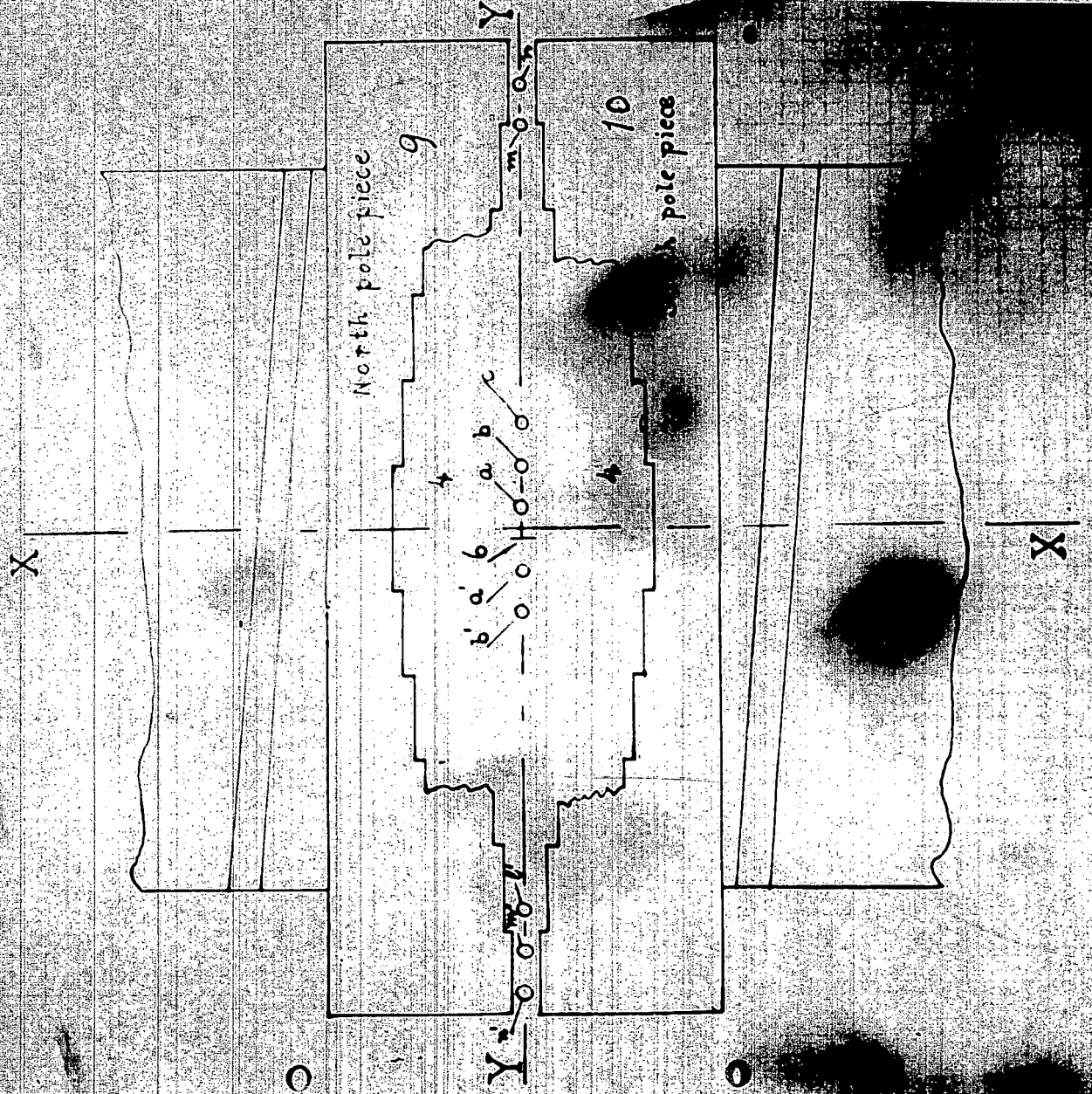
The main vacuum chamber (1, in fig. I) is a cylindrical rotation body, having an H section, the axis of the cylinder being z, z. This vacuum chamber, which is of enormous size (about 5 metres outside diameter and 5 metres height) constitutes a colossal resonator; the walls are of very thick copper, water cooled from the outside. When the resonator is excited by means of an aerial inside it, working at an appropriate resonance frequency, the whole resonator begins to oscillate, and a very high electric field takes place between the two opposite faces (2, 3) which form the bar of the H in the sectional figure; this alternating field gives between 1 million and 3 million volts between the said faces. Inside the vacuum chamber, a very high vacuum must be obtained (at least 10^{-6} mm Hg, and even less) and this presents one of the main difficulties in view of the size of the chamber.

Just about face 2 and just below face 3 of the vacuum chamber there is a very strong magnetic field, the direction of the lines of force being perpendicular to the plane of fig. I; the part indicated with 4 and 5 in fig. I lies in the interpolar space of the twin magnet, the actual poles being therefore in front and behind of the plane of fig. I. If we call y the direction of the horizontal co-ordinate in the plane of fig. I, the magnetic lines of force are parallel to the x direction and the field is concentrated in 4 and 5, just above face 2 and below face 3. In the plane of fig. I (plane y, z) a series of holes or canals are excavated in the material which constitutes the faces 2 and 3 of the vacuum chamber, and in the interpolar pieces 4 and 5; these canals communicate with the vacuum chamber and inside them reigns the same high vacuum; they are concentric and the centre of each of the two sets of semicircular canals lies in 6 for the upper set and 7 for the lower set. We shall indicate these canals with a, a'; b, b'; m, m'; n, n', for the upper set (with centre in point 6); and with the corresponding capital letters for the lower set, with centre in point 7. Right opposite point a, but in the lower face, abuts in point 8 the canal leading from the source of ions into the vacuum chamber.

If we imagine that a positive particle enters the vacuum chamber in 8 at the moment when face 3 is positive and face 2 is negative, it will be attracted towards face 2 by the electric field (1 to 3 million volt) and will enter canal a, a' in a; the magnetic field will ensure that the particle follows exactly a path corresponding the axis of canal a, a'. By the time the particle reaches again the main chamber in a', the electric field will be inverted, upper face 2 will be positive, lower face 3 negative, so the particle will be further accelerated with 1 to 3 million volt on to face 3, and will enter canal A, A' in A; it will come out in A', be further accelerated across to 2, enter b, b', and so on, the entrance of one set of canals being exactly opposite the exit of the preceding one (A opposite a', b opposite A', B opposite b' and so on). The particle follows therefore a path (indicated in red, dotted line in photograph, in fig. I) which might be called a "race track spiral"; in that the two halves, upper and lower, of a spiral, are connected with parallel straights, just as a race track consists of two semi-circles



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REPORT B-

C O P Y

November 20, 1944

From: OSS Bern
Date of Reports: Nov. 17, 1944
Source: Prof. Edgar Meyer, Physics Dept., Zurich Univ.
Evaluation: A-2
Subject: Azusa
Distribution: Washington for Col. Buxton and 109
Paris for Major Furman and 105

Regener

Regener's personal address is Karlstrasse 9, Friedrichshaven. Source has heard his institute is near Langenargen on the Bodensee. His work is principally on cosmic rays, and he has a registering device one end of which is near Langenargen and the other somewhere on the bottom of the Bodensee (sunk there, as I understand it) so that the water can provide the necessary thick or resistant medium between the two ends of the registering device.

Source and subject are very good friends. Source is inviting him to come here (at my expense). Thinks he might talk. Regener's wife is half Jewish. He was dismissed from K W Institute (Stuttgart) about 1935, suffered a lot, is not a Nazi sympathiser. Later he acquired the institute near Langenargen, and thereafter the KWI took over this institute.

Regener has a daughter in Australia. He also has a son, Victor, a physicist, who studied in Bologna, but is at present with Milliken in Pasadena. Can you get me a personal letter of greeting from the son that I can use to strengthen my approach to the father?

Bothe

Is in charge at Heidelberg.

W. von Weizel

Is a physicist in Bonn who is doing theoretical work on cyclotrons.

Clusius

Working in Munich on separation of isotopes by means of heat. (Source scoffs at Kuhn's centrifuging idea due to the infinitesimal difference in weight of the atoms involved.) Work of Clusius should be known to von Halban, Austrian physical chemist who is engaged in secret war work in Canada and whose father teaches physical chemistry at University of Zurich -- something for Wardenburg when he comes and I have arranged a meeting.

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Forshungsstelle E. Bislingen

Source will try to locate it for us, and we are trying by other means as well.

Source knows the region. After a look at the map he suggests it may be in the cellars of the nearby Burg Hohenzollern which is a castle built around a peak that protrudes up through its roof. The peak within the castle is probably honeycombed with cellars.

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C O P Y

REPORT B-
Nov. 21, 1944

From: OSS Bern
Date of Reports: Oct. 1, 1944
Source: Flute
Evaluation: B-2
Subject: Azusa
Distribution: Washington for Col. Buxton and 109
Paris for Major Furman and 105

Dallenbach

At the request of Major Furman I am writing up herewith a few notes on Dallenbach which I had not sent previously.

He was formerly with Julius Pintsch & Co. His work was in connection with resonators (Schwingtopfe). He made an invention which is licensed to the Secheron firm in Geneva and carried out by them under the supervision of Gerecke, an assistant and satellite of Dallenbach and reputed to be hard of hearing.

Dallenbach is made about women, and it was for this reason that his wife divorced him. She married a second time, a hotel proprietor in Davos, Switzerland. Dallenbach visited her in Switzerland six weeks ago and is said to have "abused her as if she were still his wife". She is an ex-dancer.

Dallenbach has a child about 14 years old whom he brought with him to Switzerland on this visit and left in Geneva -- probably in some school. We hope to find the child, and the address he uses in writing to his father.

Correction: Arosa, not Davos.

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