

Minutes of meeting on Bubble Chambers.

Thursday, January 30, 1958.

Present: J.B.Adams, G.Bernardini, W.Gentner, L.Kowarski, H.Bridge, F.Cerulus, G.von G.von Dardel, H.G.Hereward, C.Germain, A.Merrison, M.Morpurgo, C.Peyrou, C.Ramm, B.de Raad, L.Resegotti, A.Schoch, J.Vilain.

Kowarski opened the meeting with some comments on the proposal made in the appendix of the minutes of the meeting of December 20th. A "90 cm bubble chamber" in this report is intended to mean "a bubble chamber big enough to be of use during the initial operation of the proton synchrotron, but not so big that it necessitates a huge effort to be built in time for the machine". The dimensions of this chamber will only be established after a detailed study. Before a decision can be made one must know what such a project would involve.

The staff situation in various alternatives for the immediate future (1958) would be the following:

Group of users: 8-12 nuclear physicists and technicians, involved in the use of the 10 and 30 cm chambers, independent of any other project.

Design and construction group: Physicist

	Physic. (pure and applied)	Engineers	Draughtsm.	Technic.	Unsk.	Total
At present(1.2.1958)	2	2	4	6	1	15
Later in 1958:						
1) if no big project	2	2	4	10	2	20
2) if big project	4 ¹⁾	3	5	10	2	24
3) if <u>urgent</u> big proj.) (90 cm chamber in 1960)	4 ¹⁾	5 ²⁾	7	10	2	28

1) Including J.Vilain and a Ford Fellow.

2) An increase of 1-2 from SC Division for magnet design.

In case we want to build a "90 cm" chamber, the staff requirements for 1959 are more difficult to estimate. Judging from the figure of 50 people during 3 years for Alvarez' 180 cm bubble chamber, it might be estimated that 35 ± 7 people would be a reasonable figure for a 90 cm chamber. This would involve an increase of 7 over the position at the end of 1958 in alternative 3), which seems a relatively trivial increase. These qualitative considerations can however be made more quantitative only after a more detailed study. A bigger project, as for example a 150 cm chamber, would of course involve a much bigger effort.

Adams pointed out that the result of this simple scaling down of the Alvarez effort in proportion to the chamber dimensions, although very rough, seemed reasonable, and should encourage us to look into the question in more detail. He recommended to set up a group which would study/what the suggestion would involve ^{in more detail}.

Peyron emphasized that this study would also form the basis for a final decision on the dimensions of the chamber. Several alternatives must be investigated, for example a 90 cm chamber in 1960 or a 150 cm chamber in 1961, taking the risk that this may not be in time for the initial operation of the synchrotron. Vilain pointed out that a sufficiently thorough investigation, to indicate the effort needed for the projects, need not be very long since the magnet and the vacuum chamber alone essentially set the scale of the project. 3 months should be sufficient.

Hereward pointed out the discrepancy between the size of the envisaged 90 cm chamber and projects in other institutes, when our higher energy is taken into account.

Adams recommended that a 150 cm chamber should be considered as one of the alternatives studied by the group. The study group would also have to take into account the further programme. There may be a final, very big, bubble chamber built by CERN, in addition to the British chamber. This ultimate project will undoubtedly be delayed if all our resources up to 1960 are taken up by the 90 cm project. This is what we will have to pay for having a smaller bubble chamber available when the machine works.

Bernardini remarked that the first type of experiments with the machine will be of a qualitative and exploratory type for which a bubble chamber is necessary, but perhaps does not need to have very large dimensions, since accurate measurements need not always be done.

von Dardel pointed out that independent from our projects, we should have the British 150 cm bubble chamber and that therefore it would not be so serious if the final very large chamber were delayed to produce the 90 cm chamber.

Bridge remarked that it is reasonably certain that a 60 to 90 cm chamber could be made to work in time for the synchrotron whereas with bigger chambers one would have to run a risk. Peyrou said that at high energies the increase in dimensions should be made only in length and that this increases the size of the pieces and the number of expansion valves and other details, and some of the engineering difficulties, but does not necessarily raise any new problems of a more general kind.

It was decided to set up a study group which would investigate in more detail the alternatives of a "90 cm" (60-100 cm) chamber, a "180 cm" (150-200 cm) chamber, or both chambers in succession. For each alternative three time schedules should be considered, namely the end of 1960, 1962 or 1965. The study group would be a combined team of Peyrou and his staff from S.T.S. and Ramm and what other staff would be needed from the P.S. S.C. would also be able to contribute some staff for magnet design. The group should complete its study by May 1st.

G.von Dardel

/jdw.