12, quai Henri IV

Paris IV

France

24/11/50

Dear Professor Randall,

It is a long time since I have written to you because I was waiting, expecting to hear about my apparatus. Now, as you doubtless know, I have heard from Dr Price, and since then I have started thinking seriously about the design of the camera. Since I know little or nothing about the manipulation of protein solutions I should be glad to have your opinion on certain points before going any further.

All complications in the design arise because it seems to me that it is desirable to be able to control the temperature of the solution during the exposure. You I imagine that in general rather low temperatures (perhaps down to 0°c) are desirable to prevent the structure of the solution from changing during the exposure. The same apparatus could, of course be used to study solutions at higher temperatures — the upper

temperature limit depending, probably, on the quality of the rubber used for the joints. Do you agree that these things are important? And if so am I correct in my choice of temperature range?

In the original design the sample-holder and temperature-control were all under the vacuum cover, which is, of course, desirable for work at very low temperatures. But as I shall probably not need very low temperatures I am proposing to make things simpler and more convenient by putting the sample just outside the vacuum, and using the camera itself as the vacuum container.

The form of the sample in the focussing camera is a parallel-sided plate. I am trying to arrange that it should be possible to study in this form a continuously flowing solution.

If you can think of any other special conditions or possibilities which might be useful I should be very grateful if you would let me know, so that as much as possible can be incorporated in the camera from the start.

The original basic design and cost (which I sent you in July) did not include the sample-holder. But as I am proposing to simplify considerably the design of the large parts, the sample-holder, which is small but somewhat complicated, could, I think, be included under the original estimate (Fr. 200,000). On the other hand it might be better to have made here (by Paul) the monochromator support and slit system, which would enable me to set up the monochromator and use it for other things while waiting for the second sample-holder to be made in London. What do you think? Of course if I find that both can be included under the original estimate I shall ask for both from Paul.

Apart from all the, the principal thing needed for setting up the lab is, of course the pumping system. I do not know whether you already have the necessary pumps or whether you are leaving that for me to see to when I arrive but in any case it will be necessary to have

made the piece joining the tube & the diffusion pumps.

If there was no particular reason for me to come sooner, I shall come over for the new year. But if at any stage it seemed particularly desirable to come over and discuss apparatus and prepare things I would always come for a short while in December and stay on here for a bit in January to make up (I've got so much remaining to be done here that I cannot really cut down my total time here) Probably in that case it would be best for me to come after the delivery of the tube.

Would you please let me know when the order for the tube finally goes through, as I should like to ask for a few minor modifications to be made?

For how long does your laboratory close over Christmas?

Please forgive me for bothering you with so many questions after such a long silence.

Yours sincerely

Rosalind Franklin