UNIVERSITY OF CAMBRIDGE DEPARTMENT OF PHYSICS

TELEPHONE:
CAMBRIDGE 55478

CAVENDISH LABORATORY
FREE SCHOOL LANE
CAMBRIDGE

3 June 1955

Dear Rosalind,

Many thanks for your letter and the manuscript. I have no important comments on the latter, which reads very nicely. I think that perhaps you might have made the point that since the repeat is not exact after 3 turns there is now no need to look for some special reason for this, and that the close approximation to three is presumably fortuitous.

The theoretical part is quite adequate for the case of TMV, but Aaron might like to tackle the more general problem, namely what effect you would have had if you did not have a fibre diagram, but a full three-dimensional reciprocal lattice. This presumably involves a discussion of the "effective length" of the diffracting unit - in this case presumably the virus. How will the intensities change as you go from the case of complete coincidence of layer-lines to the properly split case? One can see the answer in a general sort of way but it would be useful to have an exact (or semi-quantitative) treatment. Naturally the average intensity will obey your expression, but the variations in intensity (due to Bessel function interference) are worth looking at.

There is one general point on which I am not clear (through ignorance of the literature), namely the nature of the evidence for chemical bonding between sub-units. Put another way, what is the mildest treatment which will split the virus up into sub-units and what chemical bonds is such a treatment likely to break?

I have recently had a letter from Jim, who has got a year's leave of absence from his new job in the Biology Department at Harvard, and who is coming here in July and hopes to be able to stay here for a year. He is interested in TMV from the point of view of RNA structure and in particular is wondering whether the helical symmetries of the two parts (protein and RNA) may be related. He has been doing this with Don Carper, who, incidentally, appears from an aside of Jim's to have confirmed his equational signs by using $P b^{++}$ - but I expect you know about this. . . .

Jim is anxious to find out about potato virus and asked me to ask Roy Markham whether he could grow some for us. Roy tells me that you wrote to him some time ago asking if he had some. If you are seriously considering working on PVX I shall write to Jim and suggest that it would be better

if we left the problem to you. Roy tells me that he omitted to reply to your letter (having no virus at the time) but that he would be prepared to grow some. He thinks that it ought to be used fairly fresh, as it tends to aggregate. (Jim mentions something about the Berkley people using distilled water to reduce this effect). If you are wanting some, and haven't made other arrangements, I would suggest you write again to Roy and ask him to grow some for you. Apparently the yield is poor, so don't ask for too much! In any case would you let me know your plans about PVX, so that we can avoid unnecessary duplication.

Incidentally my last letter from Beatrice says "I never intended to work on TMV - since it was the only virus I had available for months - I was playing and trying to orient it .....I expect to work on spherical viruses...." She goes on to say that she is going to try to locate the RNA.

Best wishes to you and Aaron,

Yours ever,

Francis

Dr. Rosalind Franklin,
Birkbeck College Crystallography
Laboratory,
University of London,
21 Torrington Square,
W.C.1.