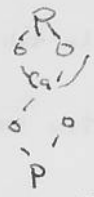
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA

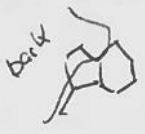
DIVISION OF BIOLOGY
KERCKHOFF LABORATORIES OF BIOLOGY

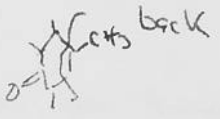
December 11, 1954

Dear Francis

Your letter and MS came yesterday. The Plant Virus MS seems quite sensible and to the point. I agree that it should be written - largely to stimulate Plant Virus Research. As to where it should be published: Why not Advances in Virus Research - A dreadful affair but nevertheless ~~to~~ it will be read by the people we want to convert. While at Woods Hole, Lauffer had asked me to write a review on Virus proteins and I turned him down. However I suspect the offer still stands. Its unlikely that I can work on the MS in the immediate future as I will soon be flying East - I leave in a week and beforehand I should prepare some seminars I'm to give at Harvard, etc. However I shall try to work on it while travelling from place to place.

About protein synthesis. After initial enthusiasm about DNA we are back to being solid RNA TIE CLUB members. Idea was the following. Take DNA - break H bonds and ~~split~~ shift one chain down so that it forms  Mg, etc bonds between the complementary chains. This brings back of one base near back of another base [not necessarily complement

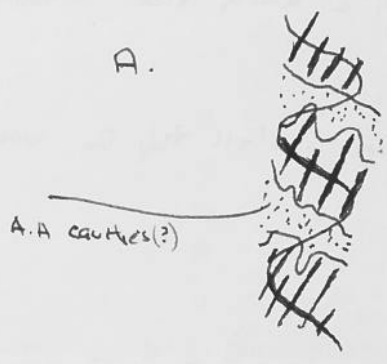




We thus have a series of holes of 16 base types [move if neighbors count.] However in its disfavor are (1) CH_3 can be replaced by Br - without serious effects - this "smells bad" in antigens work this usually stops cross reactions. (2) A.A. backbone does not fit in easily 3) since RNA also makes proteins [is this our downfall] it seems miraculous that it can provide a similar code without using 5 methyl group - ~~this~~ if both RNA and DNA make proteins they must do it by a similar trick

So back to RNA. At first site this looks just as discouraging as before. However I suspect the answer is staring us in the face. Important fact about RNA picture is 10 Å near "meridional reflexion. Must mean something periodic at this distance. Two possible structures. [I neglect multi stranded structures - origin too difficult if non complementarity exists.]

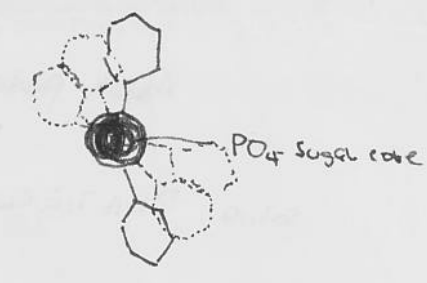
A.



one stranded helix with pitch of = 11 Å and containing about 8-10 residues / turn. In this model, bases must be seriously tilted. Bases inside - PO_4 out

B.

one stranded helix with pitch = 4 Å and with about 2½ residues / turn In this model, bases form two wedges



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The main point is that when we tilt the bases ~~about~~ almost ∥ to fibre axis we produce very suitable A.A. cavities. In fact we can say that it we were to create a A.A. making best we should arrange for a pitch of not greater than 11 to 12 Å and probably not less than 8 Å { if shaller will be very tricky to fit A.A. in backbone in. So I do not think the X-ray picture is against us. However it will be a nasty job to prove existance of 20 specific cavities.

I was in Berkeley over the Thanksgiving Holiday. Pleasant but without scientific stimulation. Only complaints about Stanley. Schachman's break story does not convince me. If they exist, they must be less than 1 in 500.

Did John Platt write you about transfer twists. I will see him while I in in Chicago He seems to have mistread our articles. I don't think his process really helps the situation

Also, were you invited to Brookhaven for a Mutation Meeting in June 55? I received an invitation which implied that they hoped originally to ask you but that now that you were back in England, you were no longer available. I could not make out whether they didn't have funds to ask you from England or whether you turned them down. I'm not anxious to speak on DNA and the

Mutation process, especially hesitant to write even an abstract on it. So I shall suggest they invite Seymour Benzer to talk about his phage crossing over data. [I believe Sidney showed you the Benzer MS at Woods Hole.

I am leaving for Chicago on the 20th. Then to Cambridge Mass for 10 days and finally a few days in Washington before flying back. No need to indicate my desire to return East.

If I learn anything of interest while in East, I'll write you

with Holiday Greetings to Odile

Jim

PP/CRI/D/2/45