

16th May 1967.

Dr Warren Weaver,
Second Hill,
New Milford, Conn. 06776,
U.S.A.

Dear Warren,

I was very glad to get a letter from you and to learn that you are writing a scientific autobiography. I was particularly interested to learn that you used the phrase 'molecular biology' as early as 1938. I had no idea that it was around at that time.

I have a few small comments to make on the part that you sent me. On page 131 I think the reference, near the top, to 1944 does not refer to Schrödinger's book but to the paper by Avery, MacLeod and McCarty showing that transforming factor was made of DNA. This is usually taken to be the beginning of that part of molecular biology which led to the genetic code. I don't think anything particular happened in 1950. It is just that after the war things got off to rather a slow start. I really don't think I can go along with the actual wording that Bragg uses. It is nonsense to say that the α -helix was the first example of a correct determination of atomic arrangement in biological substances. One would surely include cholesterol as a biological substance, and there must have been lots of earlier examples. What I think Bragg meant to say was a biological polymer. In point of fact the crucial experimental evidence did not come from a natural material but from some polymers made synthetically.

I have no objections to the things you have quoted from me. I think it is perfectly clear that the term 'molecular biology' can be used either in the very broadest sense, or, alternatively, in the more narrow sense employed in the last few years. This narrow sense applies to two main fields: that of molecular genetics (and the biochemistry associated with it) and of molecular structure, especially of macromolecules. The structure of DNA is unusual in that it can be classified under both these headings.

You may be amused to know that the original title of our unit was 'The Medical Research Council Unit for the Study of the Molecular Structure of Biological Systems'. Somewhere about 1958 we realized that Sydney Brenner was studying function in addition to structure and we changed the title to 'The Medical Research Council Unit for Molecular Biology'. Sydney likes to think that this is what has made the name popular, but I think what really brought the term into such general use was the starting of the Journal of Molecular Biology.

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the first number of which appeared in April 1959. I would be interested to know if there were any labs with molecular biology in their title before that date, though, as you make quite clear, Astbury had wanted to use it for his lab.

I was very interested to see the wonderful record of the Rockefeller Foundation in supporting molecular biology. I know Max Perutz was always very grateful for the money that he got. On a minor point, I think if you are going to mention Cambridge University (page 136) you should slip in a reference to the Medical Research Council, who deserve the major credit for supporting us in the years when we were quite unknown, and who also supported Wilkins.

Max Delbrück's role is really a most interesting one. There is really no doubt that he was the most important influence in the phage group. What is so odd is that one of his major motivations, unlike the rest of us, was to show that there were things in biology which could not be explained by physics. In addition, he was hostile to biochemistry, and also to molecular structure, although he was one of the first people to realize the importance of the DNA structure. One of the other curious things about him has been his very poor judgement. He has guessed wrong on far too many occasions as you will notice from the festschrift. And yet, in spite of all this, he was the pioneer, and he also set the tone (Don't quote this!).

Astbury is equally curious. He was a pioneer, but he never solved a single structure, and never founded a school. His contribution was to provide enthusiasm. Molecular biology would be radically different if Delbrück had never lived. I rather doubt if it could have mattered if Astbury had died early.

Two tiny points of detail. On page 128, line 10, RNA should be DNA. On page 131, Sir W.L. Bragg is not the English usage. The correct usage is Sir Lawrence Bragg, as on page 132.

We missed you very much at the meeting last February. Do you think you will be able to get to California next year? It would be so nice if you could.

With all good wishes,

F.H.C. Crick.