Chapter 56

HELMUT METZNER
(with Barbara Metzner)

Tübingen

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VM = Vivian Moses; HM = Helmut Metzner; BM = Barbara Metzner

VM: This is a conversation with Helmut and Barbara Metzner in Tübingen on the 13th of September, 1997.

Helmut, can I start by asking you about your early education, where you had it, which subjects, and what led you to go to Calvin's lab. in Berkeley?

HM: I was a student in the University of Göttingen and a specialty in plant physiology and plant biochemistry was at that time photoperiodism. So, we studied the reaction of plants to various light qualities, light intensities, but we never worked on photosynthesis and at that time we had not the opportunity to work, for example, with radioactive materials. Then, one day the institute had a visitor from the Rockefeller Foundation and we had a long conversation. Then he said "wouldn't you be interested to come to the United States?" He promised to go to Berkeley.

VM: What was your position at the time?

HM: My position at that time was a Lecturer for Plant Physiology. Then after a while I received this invitation from the Foundation and we decided to come to Berkeley. This field of photosynthesis was new for me, some techniques were known like the chromatographic separation, but then we learned how to apply radioactively marked compounds to identify them and, what was even more valuable for me, was the discussion with many scientists which at that time were in Calvin's lab. So, we learned so much of photosynthesis that after my return to Germany I decided to continue this line of research so we left more or less the old photobiology and concentrated on photosynthesis research.

VM: OK. You are going very quickly. I'll go through these topics rather in more detail! When you decided to go to Calvin in Berkeley, did you already know about his work?

HM: Yes, I knew about his work. I had seen several of these publications and I was very much interested to learn more about this type of research and the methods which could be applied at that time in Berkeley.

VM: Had you met Calvin himself before you went to Berkeley?

HM: Yes, I met him in Göttingen, but that was after my contact with the Rockefeller Foundation. And then we could talk about the research which at that time was just going on in Berkeley. Then he invited me to come to his place.

VM: That must have been, when? In ’55, ’56?

HM: It actually was ’55.

VM: He was on a big trip through Europe.

HM: He was on a big trip and so he just interrupted this round trip in Göttingen.

VM: Did he give a lecture here?

HM: No, he didn’t give a lecture: we were just discussing in a small circle.

VM: Then you travelled to the US...when was it?

HM: It was one year later, it was ’56.

VM: By sea did you travel there?

HM: Yes, that’s right.

VM: How did you travel across the country, across the US?

HM: We had no car so (*indecipherable*) we made all our round trips with Greyhound.

VM: That was the first time you had been in the US?

HM: It was our first visit to the United States, that’s right.

VM: Incidentally, what was your first impression of America when you saw it?

HM: We had read so much about these places. For us these big cities were very interesting, the universities were interesting. But we liked to travel around to see the landscape, places like Arizona and so on were quite new for us. And so we used the free time to travel around by bus.

VM: When you arrived in Berkeley, can you remember what it was like when you first arrived? Can you remember arriving? What happened? Did somebody meet you? How did you actually arrive on the West Coast?

HM: We arrived with a little freighter coming directly to the West Coast and one of the passengers which was on board took us with him to Oakland and from there we went to Berkeley. That was our first impression from the United States.

VM: When you got to the lab., you went presumably direct to the lab. in Berkeley? How did you find somewhere to live?

HM: We found pretty fast a little place, not too far away from the campus, and we stayed there so it was not necessary to have a car. We spent most of our time, I must say, in the laboratory and even sometimes during the night I had to go to change chromatographs and things like that.

VM: I think everybody who was there at that time spent many nights changing chromatograms. How did you decide what you were going to do? What was it? How did you come to this decision? Who did you work with the lab.?

HM: After the first discussion with Calvin, I told him what we had already done in the field of photobiology and that I would be very much interested in these reactions of the Calvin cycle and to learn how we can identify such compounds, and so on. And so we were then advised to go to this lab. and started our work with various kinds of organisms which we knew partly already from our work in Göttingen.

VM: But many of the techniques in the lab. were not familiar to you, they were new for you.

HM: Many techniques were completely new, that is right.

VM: Who showed you? How did you learn?

HM: We learned by discussion with the guests which were there and with some of the scientists which belonged to this lab. so this was not too difficult for us to get acquainted with these new techniques. After a while we could make our own programme which was close connected to the experiments which were going on at that time.

VM: As I remember, Barbara and you worked together in this.

HM: We worked all the time together, that's right.

VM: What was the problem you began to work on?

HM: We worked on the first fixation products, that was interesting for us. We wanted to know how fast the CO_2 is incorporated, which are the compounds which we can identify first. Whereas the further steps at that time were already well known by other experiments in the group.

VM: What did you do to take this investigation forward?

HM: We made these investigations with the thin-layer chromatography and with paper chromatography at that time but used very short light times to get the first fixation products.

VM: How short is very short?

HM: It was sometimes less than one minute.

VM: Less than a minute!

HM: Sometimes seconds.

VM: This sort of short-term photosynthesis radioactive study, some of this work had been done already by Benson and Bassham in the early years when they discovered PGA.

HM: These experiments which we performed were really the first ones with very short light periods. Of course, PGA was at that time known, but it was not very well known what happened after these very first steps and whether PGA is really the first product or whether it has a precursor.

VM: What did you find?

HM We found that there is a strong influence of the CO_2 but these were experiments which we could not perform in Berkeley any more. But we tried to do these experiments when we returned to Germany.

VM: You said there was a strong influence of CO_2.

HM: There was a strong influence of CO_2 and we had the impression that the pressure of the CO_2 had a strong influence on the incorporation.

VM: I don't remember that work. Can you remind me what you found? You did that when you came back to Germany?

HM: When we came back to Germany we did these experiments with mass spectrometry to see the influence of the CO_2, how fast is CO_2 incorporated, how is the isotope discrimination in these experiments, what do we see with the oxygen which comes out. Here we could repeat these experiments with stable oxygen isotopes.

VM: When you came back here, did you build for you the same sort of facilities that had existed in Berkeley? The chromatography and the radioactive stuff, and so on.?

HM: Practically, yes. We started with these experiments and built it up here because we could use these types of experiments in the courses with the students and later on we could make the other experiments with mass spectrometry in other departments of the university. We never had our own instruments.

VM: If we can come back to Berkeley. I'd like to talk a bit later about what you did in Germany when you came back here. Did you spend all your time in Berkeley working on this problem of short-time photosynthesis experiments?

HM: Yes: it was practically the problem which we worked on all the time. We tried to find the time to discuss with as many colleagues and look around to other groups which at that time were working in Berkeley so that we learned as much as possible from the problem of photosynthesis.

VM: I'm not sure that I remember this correctly, but I have a feeling that you used phosphorus as well as C^{14}, radioactive phosphorus as well as C^{14}.

HM: No, we have never worked with radioactive phosphorus. We worked just with C^{14}.

VM: OK; I must have got that bit wrong then. Who were your collaborators, talking collaborators, discussing collaborators in the lab. in Berkeley?

HM: The discussing colleagues were mostly Helmut Simon and Otto Kandler. They were at the same time in the laboratory and they were working in a very related field of experiments so we that had a close contact just to these. We had, of course, discussion with the other guests of the laboratory like Chris Van Sumere, Bob Rabin, so that we learned what their special problems are, how they attacked these problems and they knew other literature citations than we knew. So I must say that during this year I have learned very much in the whole field of the influence of photoreactions on plants.

VM: When you first came to the lab., was the atmosphere generally relaxed — what I remember as a relaxed atmosphere. Was that the same sort of atmosphere that you had already experienced here before you went to America or with this sort of thing new for you?

HM: It was new for us because this group was much bigger and more experienced, I must say, than it was at that time in Göttingen. We were a smaller group which was concentrated on related fields of photobiology and we were at that time restricted with our techniques. At that time we could not buy radioactive materials here and we had not very complicated instruments. We had to work with manometry and other techniques which we could forget about during our stay in Berkeley. That does not mean that we did not apply them afterwards again because at the university we had to teach students and we had not time to spend all our effort to research. That was quite a difference and quite an experience for us in Berkeley. So we could use the time much more economically than we had in the university.

VM: Of course, before you went to America you were already teaching in Göttingen.

HM: Yes, I was teaching plant physiology. I had studied botany and physics, especially, I must say, physical chemistry, and so I always tried to work in a field in which I could apply the experience of physical chemistry and of plant biochemistry.

VM: What sort of relationship did you find you had with Calvin himself? Did you see him a lot? Did you discuss technical details with him a lot?

HM: I saw him a lot. We could discuss all these problems with him. He was interested in these other photobiological questions too so that we had a great profit from this stay in his laboratory.

VM: Did you find him a personally stimulating person? I know he had many ideas but many of his ideas were not that good. Some were good and some were not good. How did you find him?

HM: I find him very encouraging. I must say that because in the university at that time the personal contact to the heads of the laboratories was much poorer.

VM: In Germany?

HM: In Germany. So everybody had a small group of its own. But here we had guests from all over the world and that was very encouraging. And Calvin himself was interested to hear what had happened in related fields.

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VM: What do you remember of the social activities in which you were involved in Berkeley? You said you travelled. Presumably there was social mixing with people in the lab., maybe people outside the lab. How did you...did you spend all your time in the lab., or was there some of your life outside as well?

HM: I liked the climate very much and, since we had no car, somebody from the laboratory came over the weekend and picked us up. And so we made tours together, looking around, so that in California I could visit several interesting places which we would not have seen alone.

VM: Many of us remember evening activities with mixing in people's homes: did you involve yourself with that as well or were you always working at night?

HM: We were not always working at night. But we had not the facilities to invite parties to our rooms but we met outside the laboratory, too. I cannot say that we had spent all the time just in the laboratory. We really used this first experience in the United States — afterwards we had been there several times but this was really the first impression — how a good group can cooperate and what (*indecipherable*) discussion can bring.

VM: You remember, of course, the seminars there and presumably you also contributed to the seminars. Were these sorts of seminars new to you? Were these the sorts of seminars that you had previously experienced in Germany?

HM: No. The form of the seminars was quite new for us. In our universities in Germany seminars were long prepared or there were invited guests which were just travelling

around and were invited to talk about their activities. Seminars like those which we had in Berkeley were, at that time, unknown to us.

VM: How long did you stay there in that lab.?

HM: We stayed a full year.

VM: Then you came back to Germany to the same position in Göttingen?

HM: First to the same position in Göttingen and I could not find my old group because part of the students had already finished in the meantime. But we tried to copy a working group as we had seen this in Berkeley.

VM: Difficult?

HM: No, that was not difficult.

VM: How long did you stay in Göttingen before you left?

HM: I stayed until ’61. In ’61 I came here to Tübingen to build up a new group.

VM: You came with a position to Tübingen where you could really build your own research activities?

HM: That is right, yes.

VM: You have been here ever since, which is now 36 years?

HM: That is right. In that time we are here. Here in Tübingen was very active group working in the same field as the group in Göttingen. They were interested all in photobiology but in these aspects like photoperiodism and photosynthesis was new here. So I had to introduce the techniques and in seminars and in lectures all the special things which we had learned and we tried to develop this here even further.

VM: When you first came here in ’61, you came as professor?

HM: I came as professor, yes.

VM: And Director of the Institute?

HM: Yes, Director of the Institute of Plant Biochemistry.

VM: So you really were in a good position to develop in the ways you wanted to go in at that time?

HM: That is right. We had pretty old rooms at that time, and for the students it was a new field of science, so it took a little bit of time to organise such a group. But after a couple of years I had a very active group here.

VM: What was the funding position like in Germany at that time? Was it reasonably easy to get research money?

HM: We had at that time the Deutsche Forschungsgemeinschaft and we could apply for research grants there and this was the main source. What we received here from the local government was just to cover the costs for courses but not for research. For all these special problems, we had to apply for money from the Forschungsemeinschaft.

VM: It was reasonably successful. You could expect to get funds?

HM: At that time it was rather easy: if you had a good project, you received the money.

VM: How big did your own research group become here in Tübingen?

HM: With the active students which were performing the experiments for their thesis, we were at least together about twenty persons.

VM: That's a significant body of people.

HM: Yes.

VM: What sort of contact did you maintain with the Berkeley group? Did you go back there on occasion?

HM: No, we could not go back except for a short visit. But we exchanged our reprints. We wrote letters and we kept contact with those guests which were there at the same time as we studied in Berkeley. We exchanged our experiences and we visited each other, for example with Chris Van Sumere in Belgium — that was a contact which we tried to keep.

VM: Looking back all those years ago, what do you think were the most important contributions that the Berkeley experience made to your own development?

HM: If I look back, I think for my own development it was to learn these close contacts, I may say the permanent discussion in the group. When the results of Calvin's experiments which, at that time, were very exciting, so everybody tried to use the techniques which he learned and to keep the ideas which he picked up during his stay in the United States and transferred these to his own group. So we worked in the field of photosynthesis with quite different techniques sometimes, but always looking to the path of carbon, if I may say so.

VM: Did you find that your own personal way of working changed as a result of being there? The relations that you might have developed with your colleagues, with your students, were you influenced by what you had seen in Berkeley? Was that a factor, do you think, in what came later?

HM: I think that was not the main influence. You always try to keep good connections to colleagues, not only in the own department but with related departments in chemistry, in physics. It was the technique and it was the richness in ideas, I must say, which impressed me.

VM: Many people have talked about the influence of that particular building in Berkeley, the Old Radiation Lab., on the way the group actually operated. Do you feel that had any reality?

HM: I must say that the building which we found here was not better than the Old Radiation Lab. in Berkeley. What I observed here during the development of the new university campus, I must say that it is close connection in a group which is much more effective than living in a very modern building where everybody has his own rooms, separated from his colleagues.

VM: So you liked the idea of ORL?

HM: I liked the idea of such a group, yes.

VM: You visited the round building at some stage later on?

HM: Yes, I have seen the round building later on.

VM: How did that strike you as a building?

HM: Well, I was not very impressed. When I remember this Old Radiation Lab., I compared this round building with the buildings which we have here in the campus and which we have in many other German universities. This typical atmosphere of the Old Radiation Lab. was not transferred to this new building.

VM: It is, of course, always difficult to make a change between the old and the new and retain the flavour.

HM: Yes.

VM: When were you last in Berkeley and made contact with these people?

HM: I suppose it must be about ’85’ we came back from a round trip where we visited Mexico and so I could not spend very much time. It was just the impression how it looks now on this campus.

VM: Barbara, you haven’t actually said anything in English all this time. Won’t you like to say just something?

BM: Yes, I would like only to say that it was a big family in Berkeley and that is what I thought the best thing I have ever seen when I was working together with Helmut in another lab. or in our own lab.

VM: Well, I think many of us who were in Berkeley at that time feel like that. I am very grateful that you spent the time and that you have tried a little bit again to relive those times forty years ago. Thank you very much.