

Speaking of David Wheeler

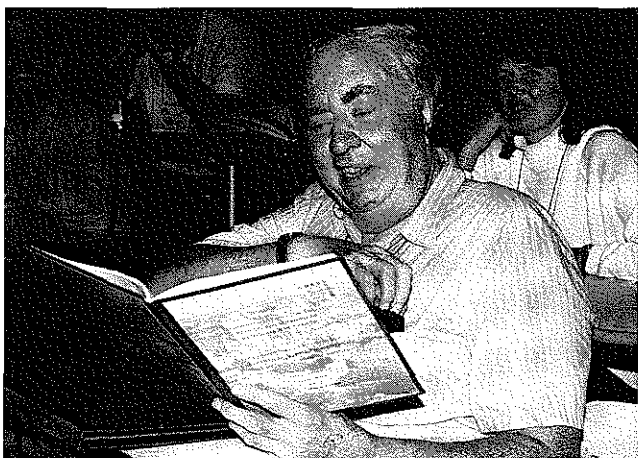
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I knew and worked closely with David Wheeler for a long time (more than twenty years) and he became a very close friend. I have spent considerable time thinking about what I could write that would do him justice and have concluded I can't. Not yet anyway. I looked through a lot of my papers from doing research with David and did a lot of remembering.

Four things stand out for me at the moment:

- *his insistence on the importance of the epistemological and historical in addition to the psychological, at a time when these were not so fashionable;*
- *his recognition of his 'complementarist' stance (things are neither this nor that),*
- *his respect for students and their mathematical productions;*
- *his enjoyment of empirical research, even though he came to it relatively late in his life (it post-dated his move to Concordia University in 1975)*

He considered himself very fortunate in life and especially in his work



(photo: Marty Hoffman)

Subsequent to sending the above to David Pimm in response to his request for a piece for this issue, he and I met for a conversation about David Wheeler at the 2001 CMESG annual meeting in Edmonton, which enabled me to fill out some of these points. Below is an edited transcript of our conversation.

The conversation

LL: In the meantime, I found the project report. [1] Here's what he said (pp 11-12) about a complementarist epistemology.

History and pedagogy tend to take simplistic, static,

views of human knowledge, though one would think that they, above all, would appreciate its complex and dynamic character. Neither history or pedagogy, though, as we have suggested, gives us much insight into algebra. The reason may be that neither knows how to discuss and investigate the relation between formal systems and meaning. To handle this kind of question, we need a complementarist epistemology, i.e. an epistemology which can study dual or polar relationships – e.g. structure vs. product, reference vs. meaning – while keeping in mind the fact that such antitheses or dichotomies are generally context-dependent and not distinctions which are independent over time. “Is algebra universal arithmetic or a symbolic system?”, from this standpoint, is not a question with a definite once-for-all answer but a question whose answer will depend on the social context in which it is raised. A choice between alternatives is not necessary: algebra is both a ‘universalisation’ of arithmetic and a symbolic system whose rules are not restricted to the rules of quantitative arithmetic.

The complementarity principle is thus the methodological counterpart of the historical fact that theoretical understanding is no longer based on any universally fixed ontological interpretation but deals with objective reality on many different levels (Otte, 1985).

DP: Did you ever work with David interviewing students? What was it like working with him in a pair?

LL: Well, very relaxed. Generally I did the ... I like to think of it as the legwork: setting things up, going into schools, talking to the math department head and getting permissions, and so on. He participated in most interviews, but first we tested whole classes, actually close to four hundred students, in whole classes, with the types of problems we were using, exploring ideas about generalization and justification in algebra. But we also used the test papers to decide who to request interviews with. It was usually those students who wrote a lot. He probably thought they also might talk a lot.

What was it like? Well, I think the first thing was, having done a lot of research since, and knowing how stressful it can be for some people to go out into a school, it was very relaxed. It was like this is the most ordinary and natural thing in the world, to go in and ask students to talk about their thinking. So these students would be booked to arrive at a certain time, we'd be together in a room with a tape recorder and in they'd come. The first thing I found was, not only was it relaxed and quite natural, but the student was made to feel comfortable, David had a way of putting them

at their ease and getting them to talk.

When you think of it, he looked quite scary. He was a huge person, someone out of a Dickens' novel. And these kids were fourteen or fifteen, in with a total stranger, and could have found that quite intimidating. But they would open up and talk their heads off. And he had also – and it wasn't a 'technique' as such, it was genuine – he also communicated to them that what they said was really interesting. He respected students' mathematical thought. And there was no sign that maybe it was incorrect: I don't think students ever got that from him.

He'd push them to tell more and continue on, and it was always the student who'd say, "Oh, wait just a minute, that's not right". Then David wanted to know why they thought it wasn't right. So it was him simply having a very gentle and easy conversation with these kids, and they really said things I'm sure that a teacher wouldn't hear in a year, because someone was interested in what they were doing.

DP: And was not interested in correcting them.

LL: I remember one boy in the classroom, in a black leather jacket at the back rocking on the back two legs of his chair. And he was amazing, an absolutely wonderful interview, with a lot of exciting mathematical stuff happening. And afterwards the classroom teacher said, "Why did you want to interview *him*? He's my worst student." Sometimes, as in his case, these were the kids that never bothered memorizing their multiplication tables or anything, so they had to be original and come at things from first principles. And the kids were never embarrassed or shy. We had one or two who didn't say a lot, but that was quite rare. Most of them were quite happy to tell us everything they thought.

Also David enjoyed them on a sort of personal level, he'd get a real chuckle out of some of them. Someone would really bomb on an interview on occasion, in the sense that they said a lot but it was really not very mathematical. And then afterwards David would find some thing about them and say, "I'm sure they'll go a long way" or "I can see her as a politician". And the kids picked this up, that there was always something he found delightful in them.

I would imagine that kids came out of his interviews feeling good about themselves and their math, that they'd *done* something, mathematically. And often the interview would start with the student coming through the door saying something like, "I'm really no good at math, I hope you're gonna help me, I can't do anything on my own". And they'd end up doing something and being very excited.

DP: And is this a trait you found went over into other parts of his life as well?

LL: Yes. You sometimes hear people say they got these devastating letters from him, and I've seen some of the letters he wrote, about how their articles just would not do. But on the other hand, in his relationships with people, even people that he wrote these letters to, even me when I've been, you know, *scolded* by him about something, for him that was . . . it wasn't *negative*. It wasn't negative feedback. He felt this should be most welcome by people. When he read people's articles, he always found good things. And sure he recognized this isn't appropriate or there's a problem with that, but he always gave some positives.

He would have some fights with people, and expect them

just to go on as normal, didn't expect them to bear a grudge. I think he expected to have a good time with them next time he saw them. But in general he was that way with students too. I took a course with him, I was his student as well. And there was a lot of British understatement, that way of throwing compliments underhand, but there was *always* that support. Very understated, but you knew very clearly it was there.

I think he was that way with people in general. He never wrote anyone off or felt somebody wasn't worth spending time with. And so with kids, they picked that up: adults were a little slower. He was always glad to have had this talk. And I think with all of us, sometimes we couldn't see past that, see past the teacher in him saying, "You've got to fix this up". Because he was very much a teacher too: always, even in his relationships with friends, I don't know with you maybe, but there was always a little lesson to be learned.

DP: Oh yes, he offered me various lessons of different sorts at times. Have you a recent example of this?

LL: Well, even just before he died, he'd work on these cryptic crosswords, and I didn't know what they were about. I've never done crosswords. He wanted to show me how he did things, and actually took the time to explain how to go about finding the word and the links. And I got a couple. I think he was hoping I might take this on. But that immense patience, even when, you know, the very last time . . . There was always this, "Oh, if you're interested, then I'll . . ." about him.

DP: I always had the sense of a very strict adherence to that essential if *you're* interested. His interest wasn't forced on you. I remember from an early *FLM* [5(1), p. 14], one of those small filler quotations, Ralph Boas saying:

Teachers are often urged to show enthusiasm for their subjects. Did you ever have to listen to a really enthusiastic specialist holding forth on something that you did not know and did not want to know anything about; say the bronze coinage of Poldavia in the twelfth century or "the doctrine of the enclitic *De*"? Well, then . . .

I can just see David nodding vigorously in fervent agreement with Boas' emphatic "Well, then".

LL: So there was that, in answer to your short question about what the interviews were like. Research in general was rather like the interviews. It was a case of what is more natural to do than research? Although David had a whole analysis and talked and thought about methodology and about what the problem was – and he had a great command of the literature – that wasn't what dominated. It was we're going to do this simple thing, which is just go into school and ask kids what they're thinking. And that was about the size of it. And let's get some problems that will bring out what they're thinking about algebra and what they're thinking about the role of algebra in generalization and how algebra is used for justification. Will they use algebra? Will they use other things? How will they use it and what sort of faith do they have in algebra, the tools and so on. But it was just here's some questions, what do you think of these, let's try them out and if they get them talking, well then those are good questions. And we want some other similar ones because we don't want to use the same ones. And this one

will bring out something else. But it all seemed extremely simple.

So I got into research thinking this was the simplest thing in the world. I discovered with some other people it's very complex. But it was that sort of attitude, just, what else should we be doing? Finding out what kids really think, and letting everybody know. So you write it up. I mean that was very important, that things be written up and diffused. Because otherwise you might as well not bother.

DP: So finding out for his own curiosity was not what it was about?

LL: No no. He was very much the teacher on that one, and the teacher of teachers: you have no business doing research if you don't publish articles, research reports, etc. Because otherwise you're wasting the students' time and your own. Don't keep it to yourself. So there was that side of it which was also quite natural for him, although I think he found writing harder than I did. He probably had a lot higher standards! But there was never that sense of, "If it's going out under my name, it's got to be..." He did his bit and I did mine. He didn't try to change what I'd written.

That was another aspect of his respect for fellow researchers and colleagues too, when people asked him about research he would refer them to me. He said, "Oh well, Lesley did a lot of that. Why don't you talk to her?" In fact, he sometimes said, "She did all the work. Ask her. I don't know."

Then there's the other important thing, presenting papers. I know grad students who do it for political reasons, social reasons, getting a job, you must circulate, you must publish, etc. But that wasn't why for him. It wasn't for your C.V. It was just sheer duty. You have the good fortune to have a research grant to do this and it is your duty to make sure that the results of this research are diffused. I don't think he ever bothered about his C.V.

But he saw research and publishing as that's what you're paid for. How fortunate we are to be paid for doing this wonderful job, he would say, which is listening to students and working with them, being a professor. He thought one should almost do it for free. You know, it's the most delightful job in the world, and to think they pay us for it. The sense of being very, very fortunate to do this. Which I don't see quite as a calling. More people feel they're on a treadmill, or not getting paid enough. But he was always oriented towards 'I think I'm going to be excited'.

DP: What are some of the things that you think you learnt from him? He was always a teacher.

LL: Well, he was the kind of teacher who didn't give you formulas. So if you have a teacher who tells you, "This is this and this is that, and this is what you must remember", then you tend to be able to ream off principles but still have no idea of actually what to do. It was, I think, more an attitude to children doing math, adults doing math. He certainly opened my eyes to the mathematics people do. And to get rid of the 'right and wrong' stuff completely. This is a fellow human being who is struggling with a mathematical problem, and this person's no different from you or I in that we struggle with mathematical problems in the same way. And part of that orientation for me came out of an exercise he had me do. In the first problem-solving project, we both

did introspective interviews. So we took a problem that was new for us and we turned the tape recorder on and we took notes...

DP: On each other?

LL: No, on ourselves. And we tape-recorded it and transcribed it, a self-analysis of each of us doing certain problems. And that really opens your eyes to your own blockages and your own problem-solving process. And we always get our way, particularly as math teachers; we get to tidy things up when we've done them. But alone with a problem that's difficult for us, we're in just the exact position as students in school. You become more attuned because you've heard yourself, and that's really a strength. You hear the students more, and you pick up things you might not have picked up on. And certainly teachers who are mostly in a right-and-wrong mode, they're filtering everything that comes in from the students in terms of right and wrong and trying to get to the right in the class. That's completely gone, and what you're doing is developing the ability to follow the chain of reasoning of someone else, which is not easy, particularly when you have your own chain of reasoning on a particular problem. Learning to listen, I suppose, and to follow someone else's meanderings. And to hear the little key words that give a lot of information.

DP: What were some of his strengths, some of his weaknesses that made him who he was?

LL: I feel a little uncomfortable talking about that, because it involves lining up judgements, and he was never about that. He never did that with other people.

DP: That surprises me you saying that, because for me his whole essence was that he did. He was actually very clear about his judgements of something being good or not. There wasn't the moral criticism along with it that often, but it seemed to me the judgements were there all the time.

LL: Yes, maybe. But I guess it's more like a slippery slope, in that there's some moral thing. It's easier for me to talk about who he was, what he was like. He was very British to work with. There was very little personal. We talked about our work and private lives were private. He never showed any particular interest. I mean if I mentioned something about my family, which was getting bigger and bigger, he would respond - but he didn't ask any questions. He didn't encourage that, and vice versa. It was clear that we were there for the work. And even when we went out for lunch or something, we didn't talk about the arts or politics. There might be a mention of something and that was laid to rest fairly quickly. I appreciated that.

DP: The clarity of it?

LL: Well, yes there was the clarity of it. But also the unusualness of it. Even with colleagues, they're asking you something about your life outside of work and you can get into social relationships with colleagues in which you never discuss work. It becomes something else. That was always very clear with David. In later years, we became friends, and that was different. But still even then, I was looking back at my emails from him and I just had to throw in a one-liner about something work-connected and I got two pages back. And thoughtful stuff.

Yes, there was that side of it, which was very pleasant, because as an overworked mother of a large family with a lot

of social involvements and union work and everything, it was like an oasis where I could be guaranteed none of that would come in. We would talk about math and math education. And with his British understatement too, British humour

So, strengths and weaknesses. Well, some people might think that was a weakness. Lack of the personal. But in my case that was a strength. I appreciated it, and maybe he picked that up, that I needed a little world of mathematics. Maybe not. I also think he was a very private person, and respected other people's privacy. I don't know. Do you think that?

DP: I have a sense of him being a very distributed person, with very, very clear boundaries. So this particular thing he would talk about or do with that person (meals, murder mysteries, music, movies, for instance) and this particular thing he would do with this one. A sort of complementarity in his own life in some ways. I felt it was just very clear who any individual was in relation to him, and the range of things that they offered, that he offered.

LL: I think the determining thing in our relationship was, I was his research assistant and although he treated me, workwise, as a colleague, I always considered myself his research assistant. Occasionally, as our relationship turned into a friendship, I used to think, "Jesus, the definition of research assistant is getting wider and wider", a research assistant who goes to get the groceries and picks up the videos? And I thought to myself, where was *this* in the contract? But I was comfortable in that helping role because of the initial basis for our relationship, which was research assistant.

DP: I remember the first time I met him, at ICME IV in Berkeley, I mentioned it at the CMESG meeting, feeling myself being ushered into his presence by Bill Higginson. Of course, it was over a meal; of course, it was lobster. And at twenty-seven years of age, I had this extraordinary sense of being presented at court, which I've never felt before or since with anyone else. When did you first meet David?

LL: I'd decided I'd like to take a year off and just do some thinking and reading and be in a place where I could do this. I'd been to University of Montréal and McGill, and was then going to see what Concordia had to offer. The first time I went in, someone said, "David Wheeler's in charge of the program. Go and talk to him." Which I did. I just walked into his office. He stood up, and it was this unfolding. Sort of up and up and up and up. This huge man. I felt totally relaxed and that was that.

DP: Some sense of connection at first sight. He had an enormous presence.

LL: Yes, and also instead of saying, "This is what our program is", he said, "What are you interested in doing?". So I blabbed on about things, and he suggested, "Why don't you look at our program and make yourself up a program?". So I decided what I wanted to do, and they had some requirement about some computer courses, an absolute requirement. And I said, "I'm not really interested in that." And he said, "Oh, okay. So we'll take that off." This was despite it being compulsory. And then he said, "You know, we've got this research project. We've just got the grant on this problem-solving thing. And we could give you a bit of



(photo: Marty Hoffman)

money if you're interested in that." And I never really looked back.

It was simple, I don't even remember filling out forms. And I'd had the experience elsewhere, where they'd talked at you for half an hour, talking about what I'd have to do in the program. And I'd said on that occasion that I'd actually *taught* half these courses. And the response was, "Well, you'll have an easy time then, won't you". It was like, you're going to get a master's as easily as possible: no appreciation of my wanting some time, some space, some people to talk to, a community to join.

DP: And to learn something.

LL: So, I just knew as soon as I'd met him that that was where I'd go. And he immediately got talking about ... got me talking about my stuff, and then he'd throw in things and so on. In the first five minutes he knew where I was coming from, what I'd done, what I'd read.

DP: In a sense, that's how he taught; I felt basically he taught through eliciting and then working on what other people thought.

LL: Yes, he made it seem easy because everything was just "Oh, that reminds me of . . . there's this article ..." But he didn't snow you under. It was just, "Oh, you might find this interesting". And it was also an oblique way of introducing you to the math education community.

I'm now in a position of running a master's program and I think I've learned some lessons from him (though whether they were the ones I was supposed to is another matter). One is as soon as someone comes in to try and get them to talk, find out what they're looking for. Another thing is introducing students to the math education *community* rather than math education by itself as an abstract entity.

Eight years ago, I taught a course at Concordia on *didactique*, and instead of organizing it around themes, I organized it around people: *didactique d'algèbre*, naturally. Both the context and who the people are, where they are geographically, so students could get a feel for the community and I was also trying to get them to meet the actual people, which was so much his way of looking at the academic world he had done so much to help create.

DP: For someone so essentially private, David was an immensely gregarious and social individual. He created

communities around him, whether through this journal or the Canadian Maths Education Study Group (or the ATM earlier in England), via a prodigious email correspondence, by talking with the people he saw at maths education meetings or, later on, those who came to visit him in Vancouver. The joy and zest for living he generated through his own life, and thereby brought into the lives of those around him, was quite phenomenal. It will be a long time before we shall see his like again.

Acknowledgement

I would like to thank Carolyn Wagner for transcribing the tape of this conversation.

Note

[1] Lee, I. and Wheeler, D. (1987) *Algebraic Thinking in High School Students: their Conceptions of Generalisation and Justification*, Montréal, QC, Department of Mathematics, Concordia University

