

Tripreport E.W.Dijkstra, Marktoberdorf 24 July - 6 August 1978.

I travelled to and from Munich by what I consider as Europe's most civilized way of transportation: by sleeper. In Eindhoven I went aboard the train on Monday evening; the next morning I had to change trains in Munich, and I arrived in Marktoberdorf at 9.21 . On Saturday evening the 5th of August, Manfred Paul took me in his car to the centre of Munich, I boarded the train late in the evening and arrived on Sunday morning at 10.15 --the Britannia Express was 17 minutes late-- I was back in Eindhoven. On the Monday of my departure I did not feel too well, and, consequently, I did not have a very good night on the train, but I had the whole Tuesday in Marktoberdorf to recover; on the way back I slept beautifully.

Over the years The NATO Summer School in Marktoberdorf has become very definitely one of the highlights in my professional life as a lecturer: it is a real challenge! One has the opportunity to address an international audience of nearly a hundred young computing scientists, all of whom have come to Marktoberdorf with high expectations, and one has to try not to disappoint them, in spite of the fact that the expectations are as mixed as the audience itself and despite the handicap of possible language barriers. I knew from previous experiences that it takes a couple of days before one gets any feedback from the audience --in the beginning the participants are just overawed and uncertain what to ask for-- ; hence I had prepared the first three of my eight performances under the assumption that they would have to be delivered primarily as monologues, hoping the best for the remaining five. I devoted the major part of Sunday to the preparation of my fifth lecture, the one on Monday morning, but misjudged the amount of time that would be needed for its presentation. The other seven, however, went like clockwork, exactly as planned; my eighth lecture --on the morning of the last day of the Summer School-- was a little piece of logical fireworks that went off, beautifully beyond my wildest hopes! As must be clear from the above, I am more than moderately pleased with the way in which I have been able to contribute to this year's Summer School; I would like to add that part of the credit goes to the audience that seems to get better at each next Marktoberdorf Summer School, an improvement that seems to be the combined effect of a growing fame of that institution and the rising level of academic computing science education in general. (In view of the hard time universities are having in general, particularly the latter aspect is very encouraging.)

Have the speakers the problem of coping with a very mixed audience, the participants have a similar problem in dealing with a very mixed set of lecturers. Even the superficial observer must be struck by the vast differences between the --almost national-- styles of using the overhead projector when the foils have been prepared: with the same number of foils per lecture, the contents per foil can range from more than 20 lines of formal text to a few catchwords --each preceded by a dot!--, which are then read aloud by the speaker. (Personally I much more prefer not to prepare the visuals in advance, as prepared foils are more a burden than an aid.) A slightly more subtle difference is reflected in the speakers' conceptions of what a lecture should achieve. The most profound difference, however, lies in the different conceptions what computing science is really about. As a result the inexperienced participant is severally disappointed by many of the lectures; it is only after second consideration that these --as I said: almost national-- differences begin to tell their own story. Luckily, as the Summer School progresses, the majority of the participants discover that the official program of 56 lectures is not the main thing:

the real exchange takes place when one is supposed to dine, when one is supposed to chat over a cup of coffee or a glass of beer, or when one is supposed to sleep. (I was pleased to hear that, in the dormitory, discussions often continued until three o'clock in the morning!)

Yet, the official program of lectures should be more than a mere pretext for being together and, therefore, should be judged as more than just that. A general criticism, voiced by almost all, was evoked by the very unbalanced composition of the program, in which 16 hours were devoted to the same project and its offspring: 8 hours by Bauer --who, to complicate matters, was also the first director of the Summer School, in which capacity he had been largely responsible for the composition of the program-- and 4 times 2 hours by his assistants (Partsch, Pepper, Wirsing, and Wßssner, respectively). Even if these 16 lectures had been perfectly presented, it would have been too much of a "Munich ego trip". This condition not being met and, in addition, the relevance of the Münchener CIP Project remaining subject to serious doubts, the program was seriously damaged by this lack of balance. Typical is the reaction of the participant who, after the first days of exposure to all this, became --both intellectually and morally-- so depressed that, in order to regain his sanity and mental composure, decided not to attend the lectures from the Munich crew anymore; he told me this a few days after he had taken that decision, adding happily "and now I feel much better again...". The story is recorded as it demonstrates in a nutshell the scope of the obligations of a speaker addressing a demanding audience.

We had two speakers, Pair and Griffiths, from the University of Nancy, France. Had the German presentations a tendency to suffer from "over-preparation", the French ones certainly suffered from "under-preparation". We can only give them the benefit of the doubt by assuming that French university life is exceptionally hard on its professors, as neither of them --both of them were expected to fill three slots-- had anything even vaguely resembling lecture notes that were prepared well enough to be handed out to the participants. In his first lecture, when talking about formal specifications, Pair made a laudable effort by grafting his example on the problem I had dealt with three days before; regretfully enough it transpired another two days later, that he had not understood my solution. And Griffiths seemed to have run out of material when he had still one lecture to give; he gave it all the same.

The other four main lecturers --Gries, Guttag, Horning and Owicki-- were from the USA. Gries had 6 slots to fill, and with one exception I think he did so very well: at one occasion he tried to treat a problem more formally than he had ever done before, and in doing so he got kind of stuck. (By conventional standards, therefore, that was not a successful lecture, although I do not exclude that, in its own way, it was very instructive!) The five lectures by Guttag remained well-attended, so the fact that, personally, I found him somewhat slow in reaching his conclusion is insignificant and probably more due to the fact that I have heard him on the same topic before; apart from (misspellings and) a few confusingly incomplete sentences on his foils he used the overhead projector well. Horning had greater problems in reaching his audience. He was scheduled for six lectures, and after the first three I found the audience eagerly waiting for the moment that he would put "some more meat" into them: when turning to the design considerations that had led to the programming language EUCLID he did so at last, and the audience was greatly relieved. Horning

almost hit a cultural barrier by always considering programming as a social activity, in which all economic and educational constraints --even if only of local significance-- are an essential part of the game; in addressing a largely European audience that position, when not made explicit, can easily create communication problems. While listening to the five lectures given by Susan Owicki, the audience applied --whether she liked this or not!-- "women's rules": her speed, conviction and enthusiasm were quite enjoyable, but it was not always as carefully phrased and as thoroughly thought through as quite a few had hoped.

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What did I get from it? Susan Owicki replaced in her presentation the usual verbosity with which the intermittent assertion method is applied by a squiggly arrow --which I did not like very much, perhaps only because it is not on my typewriter!-- with the very helpful pronunciation "leads to". It was the clarity of that pronounceable notation that revealed its semantic fuzziness, as the here crucial distinction between "finite" and "bounded" was lacking. Her notational innovation triggered me to sharpen one of my earlier results from "finite" to "bounded"; in doing so I was very pleased to do away with a reduction ad absurdum. (It was not difficult to do: I could do it in a few minutes and explain the argument during the discussion without any visual aids, I fully owe the incentive to her! Beware of the reductio ad absurdum: when used it is a warning not to be ignored, for only too often it is a symptom of mental laziness! This "little" confrontation will change my thinking habits, for I have decided to be in this respect more strict with myself.)

Another definite personal gain was to find my doubts about the relevance of category theory strongly substantiated. My earlier doubts had already been strengthened by the discovery that they were shared by John Guttag, and he has achieved the first step of raising them above the level of a "gut feeling". I had never actually seen the pompous, but so superfluous edifice one can build around a triviality, until one of the younger German speakers had "algebras" all over the place and started to classify them. All vigorous mathematics is a delightful blend of formal techniques and common sense, and all attempts to replace the latter, where it fully suffices, by the former carry with them a great risk of becoming empty, barren formalisms. Since Peter Landin we are quite familiar with the term "syntactic sugar": analogously, many homomorphisms can be characterized as "semantic sugar". (If I had had more time, I would have devoted at least a whole lecture to Euclidean Geometry, and I would have done so for two reasons: firstly to confront the audience with a type of elegance that is so sorely lacking in most of computing science, secondly to show "the delightful blend of formal techniques and common sense", as too many fail to appreciate its effectiveness: in computing science the "average engineer" who believes that common sense suffices is equally disastrous as the mathematician who has narrowed down his trade to a ballet of symbols --no matter how elaborate the choreography!-- .)

I found much confusion about the proper role of axiomatic definitions: in spite of all that has been said, their function as logical firewall is still not generally understood. Again I observed operational definitions being defended with the argument that "an operational definition is more helpful for the implementor": but then one makes exactly the same error as the poor systems analyst who, instead of posing the problem to the programmer, presents the latter with a (partial) solution. I was further

surprised to observe still such a widespread concern with the fruitless "question" whether the axioms faithfully "capture our intentions/intuitive understanding". I thought (in my innocence, apparently) that among computing scientists, Ludwig Wittgenstein's

"Was sich überhaupt sagen lässt, lässt sich klar sagen; und wovon man nicht reden kann, darüber soll man schweigen."

would have settled that as a null-question. ("What can be said at all, can be said clearly; and on what you cannot talk about, you should be silent.") But many people --a noticeable majority of whom were of Roman Catholic origin-- regarded their "intuitive understanding", though by definition unexpressed and unexpressible, a proper topic for discussion; the ensuing discussions were predictably barren.

It was in this respect that my own talks have partly failed --a failure that did not disappoint me, as it was only too predictable-- . I have dealt with a number of problems, for which I have developed solutions with all the heuristics that smoothly lead to them. I gave all the heuristics in order to show how little hocus-pocus is involved. But those who wanted to see these developments as hocus-pocus continued to do so! They even got Bauer's blessing when, in his last lecture, he placed my contributions in what, apparently, he regarded as "a proper perspective" by referring to methods that might be effective when applied by extremely gifted individuals, etc. I was very cross with him and, in my beard, cursed him in Dutch (which is an extremely effective language for doing so).

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The last lecture of the last day --on Reduction Languages-- was given by one of the participants, John H. Williams (in the process of moving from Cornell University to IBM? San Jose). It was a brilliant lecture, forcefully delivered. In view of the fact that the participants were the best part of the Summer School, we couldn't have wished for a more appropriate closing lecture.

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Let me end with only one example of "spirit". . . When, over a beer, one of the American girls was teased because her English/German pocket dictionary more looked like a pocket Bible, I complained about my experiences in American hotels, where the Gideons have always placed a Bible, whereas a Webster would have been so much more useful. Gary Marc Levin (Cornell University) gave immediately his explanation "The Gideons, you see, they are interested in The Word, but don't care for the others."

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