Some of my recollections about Joël Scherk

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Joël Scherk was first my classmate here at the École Normale, then, when we began to work together he became a friend, and we followed completely parallel careers until his was brutally interrupted more than 25 years ago already.

In fact, I may say that we were more than friends, rather something like twins: indeed we were born to physics together: Claude Bouchiat and Philippe Meyer had put us to work together on our "thèse de troisième cycle" which we defended together with the same examination board within one hour of each other in 1969 (we repeated this for our "thèse d'État" two years later). We were hired together in the CNRS that year, and in the course of the following years, we were always promoted together. Claude and Philippe had this excellent idea, that we would complement each other in a fruitful way, in spite of, or thanks to, our different personalities. This is for me an opportunity to thank them; working with Joël was from the start a great pleasure: his kindness, his calm temper, his level-headedness, his thoughtfulness, which did not exclude enthusiasm, hid a nature much more anxious and tormented than mine. He had a remarkable capacity to leave aside personal difficulties and worries to preserve his efficiency in research. I had this pleasure of collaborating with him first for two years in Orsay, then we left together for the United States in september 1969.

There, in Princeton, we immediately realized that being an alumnus of the École Normale did not mean much, which was rather stimulating! We ended up sharing a corner of the attic of the old Palmer Lab, and it was a great luck, at least for me, that we were two together to face this relative solitude. We quietly pursued our collaboration on dual resonance models, as string theory was known in those days. After three months, thanks to the properties of elliptic functions, we had understood how to handle the superficially catastrophic divergences of the theory, and our situation improved dramatically: David Gross and John Schwarz proposed that we should work all four together, we were treated as colleagues, and we moved to a nice office

in the brand-new Jadwin Hall.

Here is another memory from these first days in the US. That year, the first common informal seminar between the Institute for Advanced Study and the Physics Department of the University was given on campus by David Gross on scale and conformal invariance after the recent discovery of partons at SLAC. When he wrote the formula for the transformation of a wave vector $\psi(x)$ under a Lorentz transformation Λ

$$\psi(\Lambda x) = \Lambda\psi(x),$$

Sam Treiman interrupted him, asking

– Wait, isn't it rather $\Lambda^{-1}\psi(x) = \psi(\Lambda x)$?

and Murph Golberger jumped in

– No, it is $\psi(x) = \Lambda\psi(\Lambda^{-1}x)$

(I do not guarantee the exact sequence of formulas!). And a heated discussion went on for a few minutes on this point which one is supposed to learn as an undergraduate, people going to the blackboard and erasing what they did not like to replace it by their versions! Joël and I were sitting together at the back of the seminar room in Eno Hall and we looked at each other in bewilderment, struck by the openness of this behavior: in France, at least in those days, nobody would risk showing his doubts about such an elementary point, and there we were, watching these great names arguing without fear of ridicule. That day, we learned something very important, much more important than the physical content of the seminar: never, never be afraid of asking a question, however stupid it may seem, almost certainly somebody else has the same question.

Still another memory: we flipped coins and it fell to me to present our results at this weekly seminar a couple of months later. When I wrote the famous formula for the Jacobi imaginary transformation applied to the partition function (in a form that would make it as impressive as possible, of course):

$$f(w) \equiv \prod (1-w^n)^{-1} = w^{1/24} \left(-\frac{\mathrm{Ln}w}{2\pi}\right)^{1/6} \exp\left(-\frac{\pi^2}{6\mathrm{Ln}w}\right) f\left(\exp\left(\frac{4\pi^2}{\mathrm{Ln}w}\right)\right),$$

Barry Simon couldn't refrain from exclaiming: "This is impossible!" Coming from him, this gives you an idea of the state of our mathematical knowledge in those days...

Then our ways parted geographically, myself returning to Princeton on a recurrent basis, Joël going to Berkeley, then CERN, the ENS, NYU, Caltech, Cambridge, and we only worked together once in a while. The collaborations he had in these great places, as well as his own contributions were extremely fruitful, characterized by a mixture of beauty, simplicity and depth. One of the most important was probably that he was the first one to grasp the importance of the relationship of quantum field theory with string theory, and, with John Schwarz in 1974 the fact that this could provide a framework for the unification of gravity with the other interactions although ten more years were to pass before their breakthrough would get the attention it deserves.

When I came back from the States for good in 1977, resuming an active collaboration with him was one of the appeals of my return. But unfortunately the spell was broken: his illness had swept away the barriers he had erected between it and his professional activities, and, completely helpless, we felt him drifting away little by little, until the day of his death. I am sometimes tempted to wonder where we would be, me in particular, both scientifically and personally, if this disaster had not happened. But we cannot rerun the course of history, and we are only left with our memories. I would just like here to thank Joël for the extreme quality of those he left me, and also thank you, my friends of rue Lhomond, who were also his friends, for having given me on this day the opportunity to evoke a few of them.