Joan L. Richards

Of Medical Sociology and Victorian Mathematics

I was born in Boston, Massachusetts in 1948. I received my BA in History and Science from Radcliffe in 1970. In 1981 I got a Ph.D. from the Harvard History of Science Department. I taught at Cornell from 1978 to 1982. Now I am an Associate Professor in the History Department at Brown University. My book, *Mathematical Visions: The Pursuit of Geometry in Victorian England* was published in 1988. I edited, with Mary Jo Nye and Roger Stuewer, *The Invention of Physical Science* in 1992, and have written many articles on mathematics and culture in nineteenth-century England. — Address: History Department, Box N, Brown University, Providence, RI 02912, USA.

My goal for the 1995-96 year at the Wissenschaftskolleg was to write a book on the study and practice of mathematics in England in the first half of the nineteenth century. To those who asked why I would come to Germany to do such a thing I replied from a Newtonian view in which time and place are mathematizable and hence homologous: it did not really matter where I was to do my work, what mattered was that I have the time to do it. My experience in Berlin has shown me how very naive this answer was: both in its assertion that place does not matter and in its assumption that time can be granted. Living in Germany has challenged me in absolutely fundamental ways, and I have had very little time to do my work.

The actual, as opposed to intended, defining theme of the year first presented itself as one of life's minor irritations; within the first month of our arrival in August, my ten-year-old son, Ned, fell at school and hurt his left elbow. From this small beginning flowed an all-consuming saga of misdiagnosis, emergency surgery, routine surgery, heroic surgery and, seven months of at least daily physical therapy. The German chapter ended only when the now eleven-year-old child flew home to America in early July. To the degree that one allows a left elbow to define such things, the doctors are clear that he will always be "behindert," though perhaps another operation in five years will somewhat improve the restricted motion in his arm.

For me, who arrived in Germany linguistically prepared by a twenty-year-old course entitled "German for Reading Knowledge," this scenario has meant a total-immersion crash course in German language and culture. Struggling through Ned's problems in a German hospital peopled with a host of German doctors, nurses and physical therapists has demanded a radical reconsideration of assumptions about a whole range of issues including motherhood, professionalism, patriarchy, hierarchy, technology, prediction, certainty, knowledge and understanding. Time and time again, I have been brought up short as I negotiated the terms of my son's health with the German medical establishment. In the end, the book I wrote is not about Victorian mathematics but rather about an American mother and child in a German hospital.

At one level the manuscript I have produced represents a pragmatic response to an unexpected challenge — a way to maintain some kind of distance from and control over the situation in which Ned and I found ourselves. On another level, though, its narrative form represents an experimental response to a new perspective that has grown from those experiences; a perspective that is of paramount importance to the way I view the history of science in general, and of mathematics in particular. I have been radicalized by my experience in Germany — I have seen for myself how absolutely fundamental particular socio/cultural forces are to our constructions of reality. A child's left elbow would seem to be an objective thing, with unambiguous epistemological boundaries, but Ned's this year has been the precipitate for a very complex, ever-unfolding set of social and intellectual processes. As I have participated in these processes it has become increasingly clear how much peoples' knowledge of the elbow, their sense of what it is and can be, reflects their positions and roles in a social structure. It has been one thing to Ned, something else to his surgeon, something else to the insurance company, to the physical therapists, to the nurses, to his mother. I have come to question why we insist on interpreting the arm as a single objective thing that the various people involved view from sometimes very different perspectives. During the course of my months at the Oskar-Helene-Heim, I began to see the conviction that there is a real elbow, transcending our relations to it, to be itself a complicated assumption with a variety of social uses.

1 can perhaps illustrate the issue by pointing out the problems with the single significant difference Western philosophers would tend to allow in our knowledge of the arm; the difference between the arm as it is known subjectively by Ned and the arm as it is known objectively to the rest of us. In practice, though, this distinction is not clear. As I sat by my son's hospital bed, I had to deal with the status of the arm as known

by Ned's mother. **I** was deeply involved in the arm, its pain and its function, in ways that were not objective. I learned that I had some fundamental disagreements with the way Germans construed my subjective maternal involvement, but we agreed that it existed in some form. On the other hand, since I am a reasonably calm and well-educated adult, the elbow was also an objective entity to me; I was able to consider it as pictured in an **MRI** or an x-ray, even to move it like a door on a hinge when it was anaesthetized. Since the involved mother and the educated adult were one and the same person, the objective/subjective distinction came to seem artificial.

It seemed artificial to me because the two perspectives existed seamlessly side by side within me, but **I** could easily see the social uses served by maintaining a sharp divide between the subjective and the objective. One obvious use was to provide the doctors with shields against the complexities of human interaction. Their status as objective professionals allowed them to ignore as irrelevant their feelings and judgments about Ned and me. Nonetheless, even the most simple and declarative of their statements, "After the operation your child will be in pain," were necessarily permeated with judgments about motherhood, childhood, and pain. The significance of these hidden judgments was particularly evident when they were handed across a cultural divide, in this case the divide between German doctors and an American mother. Although ostensibly communicating on an inter-cultural objective plane as we made decisions, we often misunderstood each other entirely because we did not know each other's views of things like what was reasonable behavior to expect from a child in pain.

The subjective involvement of Ned's doctors was not just in relation to Ned, me and pain. Often their passions ran as high as mine as they contemplated Ned's recalcitrant elbow itself. Certainly, as the magnitude of his error and its consequences became clear, it became highly charged for the doctor who first saw it. It was something very different for the charismatic and ambitious surgeon who saw us next. The sheer joy of the technical challenge combined with a deep desire to redeem our experience of German medicine led him to risk a great deal in hopes of reversing the damage done. Insisting that there is an objective elbow that the doctors know cannot erase the powerful effects of this kind of involvement. It does, however, allow us to ignore it. This means we can assign very different values to different views of the elbow; the doctors' visceral responses are deemed insignificant and can be masked by the privilege of professional objectivity, the mother's are assumed to be overwhelming, and devalue her perspective to the realm of the subjective and personal.

The common view of objective knowledge would claim that it focuses on and describes precisely those aspects of reality that transcend such individual social embeddings; that whatever differences of perspective might exist, the objective world is the constant reality behind the viewers' distortions. As the very vocabulary of this position suggests, sight is the privileged sense for this view of objective reality. However, Ned's elbow immediately challenged the adequacy of sight as an arbiter of the real. The initial x-rays showed no damage at all, so the doctor concluded that the swelling and pain merely indicated a "starke Prellung." Subsequent x-rays were equally clear and clean. Therefore Ned's complete inability to move his arm became a construct of Ned's imagination, totally subjective because in contradiction to objective evidence. "Be brave!" he was told. The forces ranged to support the subjective/objective distinction in this case were formidable. It was only when I brought in a friend for moral support that Ned and I were effective in our challenge to the medical authority and allowed to take his file to someone else for another opinion. Unfortunately, by the time the doctor reluctantly expanded his definition of objective reality to include Ned's experience of it, the damage was irreversible.

The fact that my thoughts on the nature of objective and subjective knowledge were hospital-based is relevant to the whole picture; the world looks very different from there. My attempts to understand the German hospitals through a veil of linguistic and cultural semi-darkness led me to a new appreciation of the tremendous power of individual circumstance to mold our reality. Normally, we try to eliminate the influence of particular experience by firmly separating the professional and objective from the private and subjective. Being forced to play out a major crisis among strangers in strange places, however, has forced me to confront the ambiguities of this separation: the book I wrote this year does not respect it. Instead it uses the interplay of the subjective and objective as the starting point for a new kind of thinking and writing.

Both before and during this year I have done considerable reading and research in the history and sociology of science, attempting particularly to understand and respect the specificity of Victorian culture. Still, it took my experiences with Ned's left elbow to make me appreciate the degree to which our perceptions of the real and the known are social products. In the last three months, I returned to my work with Victorian mathematicians, asking a host of questions I would not have considered before: how did they construct their lives so that they could believe they lived in a world in which time and space were homologous? How could they believe that logic and demonstration could simply cut through inter-cultural differences?

I have not written what I intended to write, nor did I learn what I intended to learn, but for me this year has been far from an intellectual waste. The Wissenschaftskolleg has been a constant and supportive presence; the lunches sustained me through the darkest and coldest of days. Both the staff and Fellows were ever-patient with my struggles to deal with Ned's problems, at first practically and then, over time, intellectually. In the end, two groups of erstwhile strangers, the medical staff of the Oskar-Helene-Heim and the people of the Kolleg, have made this German year an enriching as opposed to a demoralizing one. When all is said and done, I have changed profoundly and learned a great deal.