

AN INSTRUMENT MAKER AND A SCIENTIST TALK ABOUT THEIR PASSION FOR VIOLIN PHYSICS



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**IN 1984 GREGG ALF AND I VISITED ANN ARBOR, MICHIGAN, WITH** thoughts of setting up shop there. A University of Michigan professor took us to the laboratory of his colleague Gabriel Weinreich, a physicist who was researching violin acoustics. I'd only recently become interested in the subject and I had no real background in science, so the idea of collaborating with Gabi didn't immediately occur to me. But after I'd moved to Ann Arbor, Gabi would call me from time to time when there was something interesting to see at his lab, and I would call him when I was stumped by some aspect of violin physics. It's such a pleasure to sit down with him and talk for hours about how violins work. I could not have asked for a better mentor.

A year after meeting Gabi, I tried to write a brief account of violin acoustics as I understood it, an exercise that developed into a love for writing. Gabi himself is a fine writer who has fascinating things to say about a remarkable range of subjects. I sometimes send him pieces I'm working on for feedback, and when he was writing his memoir, *Confessions of a Jewish Priest*, he sent me chapter drafts. Reading those, I learnt a lot about his life. He was born in Vilna, Lithuania, then a centre of Jewish culture. When he was eleven, he and his mother took a train across Siberia to escape the Nazis. This resonated with my background: my father was a Viennese Jew who managed to get to England before the war, but who lost much of his family in the Holocaust.

I have learnt many surprising things about Gabi – his composition lessons with a former pupil of Rimsky-Korsakov, and how he started as a Jewish atheist and became an Episcopal priest. I was raised Catholic but lost my faith, so I was very curious to find out how a first-rate physicist might reconcile science with religion. As Gabi puts it, the conflict is not between science and religion, but between bad science and bad religion. On several occasions, when I've been faced with a difficult decision in my life, I've gone to Gabi for advice. He helped me a great deal each time. With his combination of wisdom, compassion, and personal warmth, I have no doubt that he is an excellent priest.

A few years ago, I bought a piece of electronics that conveniently did some things Gabi and I had long been interested in trying to do. We soon began collaborating on a project, the goal of which was to get an electric violin to sound like an old Italian one. Soon, Gabi was writing computer programs for measuring, analysing and modifying violin sounds. Recently, he seemed a bit frustrated with our rate of progress, but I must say the pace seemed perfect to me – it gave me time to learn the underlying physics bit by bit. At 54, I'm now about the age Gabi was when we met. He still seems very much the same person – curious as ever, and always eager to learn something new.

**ALTHOUGH JOSEPH'S KNOWLEDGE OF PHYSICS IS FRAGMENTARY** and recently acquired, his ability to think like a physicist is remarkable. This is something that caught my attention when I first met him about 25 years ago, shortly before I was ordained a priest.

Joseph won the MacArthur Fellowship – the so-called 'genius award' – in 2005. The \$500,000 grant means he doesn't need to make as many violins to make a living, giving him more time to do 'stupid' things, and by that I mean science. Being a professional physicist I don't have that limitation – I've always been allowed to do stupid things. But lately we've been able to exploit the symmetry between us more fully and we have a fairly intense collaboration.

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Every two or three weeks, I visit Joseph's 'shop' – he calls it a shop but I'd call it a laboratory – for a few hours and we share results. He builds the equipment in part to my specifications, and draws from other sources too (he's not that stupid!). But he does this by piecing together beautifully shaded pieces of wood; I'd use uninteresting aluminium. For me, the instrument is a functional thing.

Physicists can't disagree: if they do, they have to find out why because there is only one physics. So when Joseph and I have conflicting views, we can't just leave it at that because this is how we learn. He might ask, 'Why doesn't it work this way? You say it's going to do "a", but why isn't it going to do "b"?' Or might I ask him, 'Why can't you build a violin this way?' Sometimes the answers are obvious; sometimes they make us think.

Joseph is logical, yet very funny. I once attended a concert with him and Gregg in which the violinist was supposed to be playing a Stradivari. We sat a long way from the stage but as soon as the violinist appeared, Joseph looked puzzled and said, 'It's not the right violin.' When I asked him how he and Gregg had reached their conclusion so quickly, Joseph explained that a violin is roughly the size of a human face and just as audience members can tell if the wrong violinist appears on stage from their face, he can recognise the violin.

We've had many personal discussions over the years: I think Joseph at times asks me things based on my role as a priest. He's very understanding and I often ask his advice on personal issues, too. Our friendship has only changed in the sense that we've become closer; he's more a member of the family now. **Interviews by Nick Shave**