Another highlight must be the period, in the 1930s, when Church, Gödel, Turing and others produced their results on undecidability, incompleteness, etc. This destroyed for ever Hilbert's dream of using logic to build a completely sound edifice of pure mathematics, but it also opened up a whole new area of common ground between these two subjects, and eventually computer science.

Finally, for a single personal achievement, I must include Andrew Wiles's courageous assault on the Taniyama-Shimura Conjecture, with its stunning corollary of Fermat's Last Theorem. To be able to announce, during an undergraduate lecture, that what was last term a major unsolved problem was now, apparently, a theorem, has been one of the great pleasures of my teaching career. However, I suspect that Wiles's greatest achievement has been to draw together so many different branches of mathematics, a theme that has dominated the last few decades of this century.

Gareth Jones's research interests lie in the field of group theory and its applications. He is the author of about 45 research papers, and books on Complex Functions (with David Singerman) and Elementary Number Theory (with Mary Jones).

An Interview with José María Montesinos

I still remember the talk you gave during the fifth GMEL conference, in the summer of 1985. Was that your first time in Portugal? Have you been back since? If I am not mistaken, you are of Portuguese origin?

No. In 1972, I was in Lisbon for the Jornadas Luso-Espanholas de Matemática, where I gave a talk based on the work in my Ph.D. thesis. There is an amusing little story about that talk, of which I only became aware around two years ago. I heard it from a friend at a Spanish university, who is approximately my age. This friend was at my talk with some fellow students and a professor who was their supervisor. At the end of the talk, the professor gathered his students together and told them:

- Don't believe a word he said! This guy is a bluff!

It's lucky that I only heard about this two years ago. If I had known about it at the time, my career in mathematics would probably have ended there and then. This anecdote shows, among other things, that low dimensional topology was completely unknown in Spain at that time, as I assume it was in Portugal.

I returned to Portugal in 1982 for a course on the theory of knots and manifolds at the University of Oporto. I attended the GMEL conference in 1985 and I am here again now.

My father is from Calabor, a village on the border, very near the Portuguese village of Montesinho. My surname clearly stems from the name of that Portuguese village and the villagers in Calabor recall that Calabor once belonged to Portugal and was exchanged for a Spanish village in the 17th century when the frontier was being altered.

José María Montesinos

I can therefore claim to be, in a manner of speaking, Portuguese.

We met last year, that is, in 1997, at Royal Holloway. During a coffee break just before a talk by Roger Penrose, you told me about how you came to do your Ph.D. thesis on low dimensional topology. It's such an interesting story that I would like you to share it with our readers.

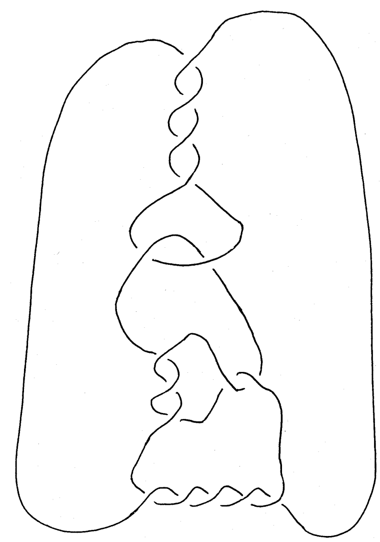
One day I received a draft order to join the army on the very next day. I was expected to report to a small town that I couldn't even place on the map! It turned out to be a small village in the Córdova mountains. Before setting out, I managed to find the time to go to the library of the Complutense University, where I hurriedly looked for a book that I could take with me. I casually picked up R. H. Fox's "Knot Theory". I was at once fascinated by it, especially because it seemed very concrete. So I took it with me and read it quickly often while lying under a cork tree.

By the end of the military camp I had contracted tuberculosis, probably as a result of the lousy food and of the generally hard conditions. While in hospital, I began to give some thought to a problem stated in another book mentioned by Fox. I was released from the hospital and later solved that problem, and found that there was enough material there for a Ph.D. thesis. All the tools used in that work had been developed by myself, as I had very little knowledge of topology. Nothing was known at that time in Spain about work in this area. The late professor Plans, who had worked with H. Seifert, therefore suggested that I should send my work to Fox, at Princeton. Fox replied with great enthusiasm and told me that although the same problem had been solved, in a different way, by himself, he would let me publish my results first. I remain extremely grateful to him, for otherwise the beginnings of my career in mathematics would have been very miserable. His generous attitude provided me with much incentive and helped me define my place, in human terms, within the world of mathematics. Generosity towards other mathematicians can play a crucial role in the development of mathematics itself.

Montesinos has become a familiar name in mathematics. We have the so-called Montesinos links, which are the topic of a whole chapter in Burde and Zieschang's "Knots". Could you give us some idea of how you discovered them? Are they easy to describe to someone who is not an expert in that field? Perhaps you could draw a picture for us...

Actually, I had been wondering how to represent Seifert varieties as ramified coverings. I remember quite well how the main idea, which now seems trivial but was by no means such at the time, occurred to me while traveling by underground to Madrid University. The trains on line 1 had old-fashioned carriages from the time of King Afonso XIII. There were two parallel bars on the inside, which the passengers could hold on to. I was holding on to those bars with both hands, and thinking about the mathematical problem, when it suddenly occurred to me that those bars constituted a perfect model for two rotation axes which appear in the theory of what are now known as Montesinos knots.

These things are not easy to describe. I choose to draw one of the simpler ones here:



Today can we speak of a Spanish school in low dimensional topology? Are there any important names other than that of M. T. Lozano?

No. I would say we are just beginning. There is a good Ph.D. student of mine, António Costa, who is interested in Riemann surfaces and branched coverings. He is at the UNED in Madrid and is very brilliant. I have a few new Ph.D. students, in particular Eva Suarez who is quite promising. My student Carmen Safont, now in Barcelona, had a very good student, Jordi Porti, who is now working with Professor Boileau in Toulouse and obtaining fascinating results. Then, not as a student but as a colleague, I had the good luck of meeting Professor Lozano. When we first met in Saragoza, Professor Lozano had already done her Ph.D. in Algebraic Topology and had already become acquainted with low dimensional topology while working on her Ph.D. in the United States. Our collaboration, which has resulted in around twenty joint papers, began in 1982 and I hope it will continue. That collaboration also includes Professor Hilden from Haway, with whom I had worked since 1974. Our collaboration consists in the complete and absolute sharing of our mathematical ideas and everything works well because we trust each other completely. We have a similar, but not quite identical, way of thinking so that we have obtained much better results than if each of us had been working separately, which makes our work even more interesting.

No better way to end than some front-page news. Is your work related in any way to Poincaré's conjecture? If so, have you ever tried to solve it? How likely is it, in your opinion, that an answer will be found in the near future?

Poincaré's conjecture is central to low dimensional Topology. I have been interested in it ever since I finished my Ph.D., although the intensity of my interest has varied.

I have recently received a pre-print from Professor Winkelkemper, who aims to persuade the reader that Poincaré's conjecture is at least as unlikely (that is to say, it would be solved negatively) as the conjecture by Andrews and Curtis. This last conjecture, too technical for me to try to explain it here, is almost universally considered false. Haken, who is well known for his solution to the four-color problem and has tried dozens of times to prove the veracity of the conjecture, has said publicly that he believes it to be false.

On the other side there are people like William Thurston, an outstanding geometer, who has announced a conjecture –the geometrization conjecture– which he believes to be true and which implies, amongst other things, the veracity of Poincaré's conjecture.

The only thing I would dare to say is that it is a very delicate conjecture and that any possible generalization of it is very likely to be false. Hamilton's theorems on the characterization of S^3 through Riemannian geometry seem to show that a solution of the conjecture will be obtained using methods from Riemannian geometry (related to questions from analysis). As a consequence of the work with my collaborators, it can be proved that any 3-manifold admits a metric with constant null curvature, with cone-singularities along a link with angles π and 4π. Perhaps a first step towards solving the problem would be to obtain a Hamilton-type theorem that takes into account these cone-singularities.

I dare not assert whether the conjecture is true or false.