

Paul Melchior Medal 2016 Awarded to Trevor F. Baker

Walter Zürn

Black Forest Observatory (Schiltach),
Karlsruhe Institute of Technology and University of Stuttgart
Heubach 206, D-77709 Wolfach, Germany,
e-mail: walter.zuern@partner.kit.edu

In 1973 two short papers appeared back-to-back in NATURE. The first one by King and Bilham provided a new physical mechanism for anomalies in measured tidal tilts which had been observed at many places in Europe: strain-tilt coupling due to local inhomogeneities in the immediate vicinity of the instruments. The second paper by Baker and Lennon discusses in the light of these new ideas the anomalous results from the Bidston and Llanwrst observatories and general consequences for exploitation of tidal tilt results. Both groups agreed that this mechanism with high probability could explain the dispersion of tidal tilt results in Europe. This was the start of a paradigm shift in Earth tide tilt and strain research which took about ten years to be completely accepted. Trevor was probably one of the first two or three people who realized that systematic local effects beyond instrumental problems affected these measurements significantly and seriously.

Also in 1973 the Seventh International Symposium on Earth Tides was held in Sopron, Hungary. Only very few people had read these papers, among those obviously Robert Lecolazet. On the second day TFB gave his talk on "Spatial Coherency and Tidal Tilts" (this paper was submitted to the meeting organizers in September 1973, but unfortunately the Proceedings volume did not appear until 1976, see Baker and Lennon 1976). This was TFB's first talk at an international conference. About 2 m from the speaker in the front row in the small room sat Paul Melchior and Robert Lecolazet, the two most eminent figures in the field at the time. At the end of the 20 minute talk Lecolazet stood up and thrust a manuscript by Lecolazet and Wittlinger into the speaker's hands, in French with about 40 equations, not much text, and a figure depicting a circular tunnel. He then spoke for a few minutes in French. TFB then asked him politely, whether he could repeat his comment in English. Lecolazet then said he had a bright mathematician working with him and that in this paper they had proven that the cavity effect does not exist. Because of the figure of the circular tunnel in the French paper, TFB said instantly (and boldly) that the mathematics in the paper must be wrong. Lecolazet was surprised that TFB could make a statement like that so quickly. TFB explained the "Gedankenexperiment" of a sheet of rubber with a circular hole. If that is stretched in one direction the hole will become elliptical and that therefore there must be an error in the math of that paper. Lecolazet sat down immediately to TFB's relief. Several months later TFB received a revised paper from Lecolazet (Lecolazet and Wittlinger 1974) with an apology and the statement that they had found their error. It was also the start of Trevor's career in Earth tides and I think he won the respect of all in the audience (including the eminent figures) on that occasion. Subsequently he became a towering figure in the field himself. Twelve years later a former president of the Geodynamics section of IAG gave his salutation address at the Madrid symposium by reading word for word from a paper Trevor had written shortly before without mentioning the name Baker. Unfortunately I have to admit that he was a German.

After receiving a PhD degree in nuclear physics from the University of Manchester Trevor had joined the Proudman Oceanographic Laboratory in Bidston (outside of Liverpool) in 1969 and started working with Geoff Lennon on Earth Tides and Ocean Tidal Loading, which is a prominent signal at Bidston and Llanwrst. His first published work was on the cavity effects as described before. Soon after that Geoff Lennon moved to Australia and essentially disappeared from the scene of Earth Tides and Trevor became the leader of the small but scientifically very efficient group at Bidston.

Trevor quickly acquired high status in the Earth Tide community. He was a much wanted orga-

nizer of sessions on Earth and Ocean Tides at international meetings, including several Earth Tide Symposia. The most prestigious of these invitations was to the meeting on Mathematical Geophysics 1990 in Israel which was held in honor of Chaim Pekeris and which some of you attended due to an invitation by Trevor.

Trevor was also a much wanted member of international committees and working groups on Earth and Ocean Tides, theoretical tidal models, Geodesy in the UK Royal Society, space geodesy, sea level and ice sheets, intercomparison of absolute gravimeters, GPS and tide gauges. He served as vice president of the Earth Tide commission from 1989 to 1997 and was a member of the directing board of the International Center for Earth Tides from 2002 until 2008. He was appointed visiting professor at the universities of Nottingham (1995 to 2007) and Liverpool (2001 to 2007). He spent a most remarkable year (1973-74) as a visiting fellow with Chris Harrison and Bill Farrell at Boulder, USA.

Most of you are familiar with his numerous high quality publications and many of you keep referencing them. I do not want to give a full list of them here but mention only some work which struck me as being influential. He and his group were the first to exploit the local elastic effects for obtaining local geological information by installing an array of borehole tiltmeters around an intrusion in the Lake District (Great Britain). At some meetings Trevor pointed out that there is no use in interpreting details of less than a percent in gravity (for tilt and strain less than a few percent) in the tidal records when uncertainties from noise levels, calibration errors, and errors in the ocean loading corrections are at the level of one percent each. Instead he and his group made huge efforts to improve the accuracy of tidal gravity measurements and were the first to achieve accuracies of about 0.1 %. Thereby they detected that the factory calibration of LaCoste-Romberg Earth Tide gravimeters is off by up to 1.5 %. They installed their well-calibrated instruments at several places with largely different local crusts, mainly because there were claims around that large effects were detected with much less accuracy. Trevor was always trying to push the community into establishing the instrumental quality for using Earth tides to retrieve information on the deep structure of the Earth, i. e. get enough calibration and transfer function accuracy. He also very early recognized the high potential of dense GPS-networks to study the deformation of the crust by earth tides and especially ocean loading tides. And right now he is very proud of being part of a team who clearly was able to identify anelasticity effects in the asthenosphere affecting the ocean tidal loading deformations as measured by GPS in England and France.

Trevor's research papers usually provide excellent reviews of the state of the art and there are several of those who reset the stage from which to continue, for example his 1989 paper on "European Tidal Gravity" and his 2003 paper on "Validating Earth and ocean tide models using tidal gravity measurements" with Machiel Bos. One important contribution (at the New York symposium) was his paper with Alcock on temporal variations of ocean tidal M_2 -amplitudes in the North Atlantic. With Fratrepietro and others he studied ocean loading caused by a storm surge in the North Sea and identified in the record of the SG at Membach. He also wrote one of the finest introductions I know ("Tidal Deformation of the Earth" in "Science Progress"), which was always the first literature I presented to students when they started to work on Earth tides.

At the personal level I met Trevor for the first time at the Bonn symposium and quickly learned that when he starts to make a statement I better listen. In the following years ocean loading computations were not as easily available as they are now (the Schwiderski models were not around until the early 1980s) and Trevor helped me many times to get the numbers for my studies. I enjoyed meeting Trevor at all Earth tide symposia between 1977 and 2008 and at many of the intermediate meetings at Bonn and Jena organized first by Manfred Bonatz and later by Gerhard Jentzsch. In addition, almost 20 years apart, Trevor spent two long weekends at the Black Forest Observatory, the first with Klaus Schüller and the second with Tadahiro Sato, both of which were scientifically extremely rewarding

for me. I always had to look up to Trevor and this is not only meant in a physical sense and I always learned a lot from him.

To sum up, I think Trevor is a very fine scientist with high ethical standards and has served this community in many a way for almost 40 years. I think he is also an excellent example of an English gentleman. Anyway, he very highly deserves to be rewarded with the Paul Melchior Medal on this occasion. I wish him and his wife Susan a healthy and exhilarating future and want to thank them both for their friendship over so many years.