

“Common Sense and Other Heresies” (Second edition, 2011)

Prolegomena

In 2000, when the first edition of this book, “Common Sense and Other Heresies”, was published, Vít Klemeš decided not to publish any more hydrological papers and not to interfere with hydrology in the 21st century.¹ Therefore, one may think that the collection of papers reproduced in this second edition is somewhat outdated as little new is included. But we know now, better than earlier, that Vít was both classic and innovative. Reading his papers continues to be a refreshing, enlightening and inspiring experience.

In fact, in the last ten years of his life (he died in 8 March 2010 at the age of 78) Vít did not cease his creativity. He just felt free to widen his domain of thinking, reading and writing, or, better, to elaborate further and express publicly what he had done during his life. For Vít differed from typical overspecialized modern scientists and resembled more an ancient philosopher. In addition, he was a conscious and active citizen of the world, having strong positions on all contemporary political, economic and even religious affairs and problems. Perhaps the fact that, following the Soviet-led invasion of Czechoslovakia in 1968, he, together with his wife Marie and his two sons, decided to leave his mother country and move to Canada made him more sensitive to political and human issues. His book entitled “An Imperfect Fit: Advanced Democracy and Human Nature”, published in 2004,² summarizes his reflections of this type. No doubt, he was happy to work on this wider scientific, philosophical and political domain: “*There is life after hydrology!*” he exclaimed.³

Reading “Imperfect Fit” we can see the extraordinary richness of Vít’s reading sources, from the Bible and Homer,⁴ to Plato and Aristotle, and to modern philosophers such as Karl Popper and Isaiah Berlin. We can expand our own knowledge of the fields discussed by Vít and perhaps follow his approach to found our professional research on a sound philosophical basis. Take, for instance, Vít’s quotation from Isaiah Berlin:⁵ “*We must listen to history, which is ‘experimental politics’, that is, the only reliable teacher of this subject: ‘She will never tell us the opposite of the truth’. One genuine experiment blows up hundred volumes of abstract speculation*”. Substitute ‘hydrology’ for ‘politics’. Is not this the philosophical basis of Vít’s paper “Operational testing of hydrological simulation models”?⁶ The latter is Vít’s most cited paper and one of the super-hits of *Hydrological Sciences Journal*. But, despite this positive sign, it is doubtful if the premise that history will “*never tell us the opposite of the truth*” has been assimilated. For example, the debate as to whether climate models (and in

¹ The first thing he mentioned when he wrote to me for the first time (8 Aug. 2003) was his “*resolution to stop reading and writing about the science of hydrology by the end of the XXth century*”. Later (19 Mar. 2004) he clarified “*I had resolved not to publicly interfere in hydrological science in the 21st century — my deliberately last paper ‘Tall tales about tails of hydrological distributions’ was published in 2000*”.

² A preview of this book can be seen in <http://books.google.com/books?id=IJnFojBvksQC>.

³ Quoted from his personal message (28 Feb. 2004) on the postcard announcing his book.

⁴ I was amazed to read in his second letter to me (18 Oct. 2003) “*Can you tell me the source where the episode of the Trojan horse comes from? I thought it would be at the end of Iliad but it is not*”.

⁵ From p. 24 of “Imperfect Fit”.

⁶ *Hydrological Sciences Journal* 31(1), 13–24, 1986, also included in this volume, Section 2.4.

turn, hydrological models that use their outputs), which supposedly predict what will happen in a century, have been properly tested against reality or not, is still ongoing.⁷ Some claim that such models, despite possible disregard of historical reality, are useful because of the underlying “noble ends”, e.g. to support policies to save the planet. However Vít warned us: “*The more the reality diverges from the way prescribed by the ideology, the more ruthlessly it is forced in the prescribed channels and the more brutal are the means by which the noble ends are pursued*”.⁸

Vít’s hydrological papers are not prescribed by extra-scientific ideological ends or even intra-scientific research trends and fashion; instead of being trendy, overspecialized, overmathematized, they are deeply philosophical. A neat criticism of the contemporary overspecialization combined with lack of philosophical knowledge, which should be the basis of scientific methodological principles, has been recently offered by Hugh G. Gauch Jr. in his book “*Scientific Method in Practice*”.⁹ He claims that our heritage, ranging from the time of Aristotle to the present, includes twenty-two centuries of philosophy-rich scientific investigations, followed by the aberration of the 20th century with philosophy-poor contributions. In summary, he emphasizes the need to inject appropriate Ph. into Ph.D. studies in science.¹⁰ In the same spirit, Vít stated in his paper “*Conceptualization and scale in hydrology*” in 1983:¹¹ “*anybody who can write a computer programme can get a Ph.D. in hydrology nowadays*”. (This was undoubtedly true in 1983, but today, with the over sophistication of computer programs, even running one, rather than writing, may produce a Ph.D. in hydrology). In addition, Gauch emphasizes the role of Common Sense as the foundation of the edifice of knowledge, an edifice which he schematizes with six levels, i.e. (starting from the ground) Common Sense → Philosophy → Philosophy of Science → Scientific Method → Scientific Specialties → Technology.

Common Sense was certainly Vít’s leitmotif in his papers, and is also reflected in the title of this book and his Preface to it, where he cites Alden Foster, stating “*Common sense is always a prerequisite to the application of any mathematical theory to practical work*”. I share Vít’s belief—as implied in the book title—that Common Sense is nowadays so uncommon as to regard its practise as a heresy. Throughout history, heresy, the departure from orthodoxy and catholicism,¹² has certainly had a negative meaning. Still today, people are scared of the risk

⁷ Cf. the very recent discussion in *Hydrological Sciences Journal*, i.e.: (a) Editorial: Kundzewicz, Z. W. and E. Z. Stakhiv, Are climate models “ready for prime time” in water resources management applications, or is more research needed?, *Hydrological Sciences Journal*, 55(7), 1085–1089, 2010. (b) Opinion paper: Wilby, R. L., Evaluating climate model outputs for hydrological applications, *Hydrological Sciences Journal*, 55(7), 1090–1093, 2010. (c) Research paper: Anagnostopoulos, G. G., D. Koutsoyiannis, A. Christofides, A. Efstratiadis, and N. Mamassis, A comparison of local and aggregated climate model outputs with observed data, *Hydrological Sciences Journal*, 55(7), 1094–1110, 2010.

⁸ Page 208 of “*Imperfect Fit*”.

⁹ Cambridge University Press, 2003.

¹⁰ Here I quote J. R. Miller from the Foreword of “*Scientific Method in Practice*”.

¹¹ This is his second most cited paper (but not included in this volume), in which he introduced the so-called ‘downward’ or ‘top-down’ approach to hydrological modelling. To Vít’s surprise (and ignorance, as evident from his email of 14 Jan. 2005), long after its publication, this paper inspired an international workshop whose proceedings (11 papers) have been published as a special issue of *Hydrological Processes* (17(11), 2003, edited by M. Sivapalan, L. Zhang, R. Vertessy and G. Bloschl).

¹² Here both these terms are used with their literal Greek meaning, i.e., orthodoxy: right opinion; catholicism: universalism, something close to the modern notion of “consensus view”.

of being characterized as heretics, even within the scientific community (typical examples can be found in the climatological community). Vít's message is that heresy can be positive when orthodoxy is problematic and, in particular, when science is reduced to dogma. It takes courage, which Vít had—and also advised us to find: “*be brave, be proud, be heretics if necessary, and above all, use your common sense*”.¹³

A heretic's path is very often lonely: Most of Vít's publications are single-authored. Vít was not offered any authoritative and influential professor's chair¹⁴ and, therefore, he did not have students to contribute to his research and continue it—although he had numerous keen admirers to whom I belong. The famous Irish hydrologist, J. Eamonn Nash wrote to Vít: “*It is all the more disappointing that a man of your clarity and insight has not been snapped up as a Professor of Hydrology in any of the many institutions teaching hydrology in North America*”.¹⁵ This letter was Nash's reaction to Vít after reading his paper “*Dilettantism in hydrology: transition or destiny?*”¹⁶. The following extract from the Introduction of this paper expresses Vít's position on conventional wisdom and its strength: “*The identification of misconceptions [common in contemporary hydrology] did not make them vanish, nor did it prevent emergence of others, nor did the revelation of their consequences have a strong retarding effect on their proliferation. Fighting them has been as difficult and frustrating as combating the legendary Hydra: as soon as one of its heads is struck off, two shoot up in its place.*”

In turn, a lonely researcher challenging conventional wisdom is often treated as a curmudgeon or even a crank. However, Vít was very well prepared: his powerful reasoning rooted in Common Sense and philosophy, his vigorous use of mathematics and physics, his knowledge in technology and engineering, and even in foreign languages, did not allow his marginalization. In contrast, his work has been recognized and honoured by several prestigious awards. In a humorous attitude comparable to Vít's, David R. Dawdy, in his citation on the occasion of presenting the Award from the American Institute of Hydrology (1995) to Vít, said: “*I have always prided myself on being the curmudgeon of hydrology, so it is with much regret that I must bestow on Vít the title of Chief Curmudgeon of Hydrology as well as the Ray Linsley Award*”. And this was the third in a series of three awards bestowed on him: In 1993 he received a Gold Medal from the Slovak Academy of Sciences and in 1994 the prestigious International Hydrology Prize jointly awarded by the International Association of Hydrological Sciences (IAHS), the United Nations Educational Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO). The then IAHS President, Uri Shamir, on the occasion of Vít's award stated “*He has been known in the*

¹³ From his talk “20 years later: What has changed – and what hasn't”, *XXIV General Assembly of the International Union of Geodesy and Geophysics*, Perugia, International Union of Geodesy and Geophysics, International Association of Hydrological Sciences, 2007 (available on line at <http://iahs.info/perugia/2007IAHS20YearsAfter.pdf>).

¹⁴ However, he obtained a position of associate professor at the University of Toronto for a four-year period (1969-72) after his move to Canada. He also held visiting professorships or guest lecturerships at different times, e.g. at Caltech in the USA and ETH Zürich, Switzerland.

¹⁵ In a letter to Vít (25 Mar. 1987), quoted in Vít's paper on “Apocrypha” (see footnote 19). The letter has been reproduced in an “Annotated copy with background materials (‘hidden’ references)”, which Vít sent to me. When I asked Vít if I could make his “Annotated copy” publicly available on line he replied: “*Let's agree on a default solution: when I take residence on cloud no.17, release to individuals on request is OK.*”

¹⁶ This is Vít's third most cited paper and is included in this collection, Section 1.1.

hydrological community as one 'who keeps us honest' and one 'who tells it like it is' without being blinded by passing fashions and flashy new technologies".

But IAHS's relationship with Vít was much deeper and longer than this. Its peak was in 1987–1991, when he was President of the Association. Just after his election in 1987, he began the, now traditional, President's communication with IAHS members through the IAHS Newsletter. In his first "President's Page"¹⁷ he envisaged the Newsletter as the "*best fit to become the so far missing forum for crystallization of ideas and opinions*". He defined the focus of IAHS as "*the development of hydrology as a strong geophysical (earth) science and the promotion of sound applications of this science on solving practical problems*". Not surprisingly, his message instigated a strong debate between him and Uri Shamir¹⁸, who would later succeed him as President of the Association. Apparently, Vít's tenure of the IAHS presidency helped him better understand the interaction of political and scientific activities. He himself relates two relevant stories in his last paper published in a scientific journal, that is, "Apocrypha, or 'things that are hidden'—personal experience with 'hidden' impacts over the past 50 years".¹⁹ In the first, he explains how he was "*decriminalized for two weeks*" (from his crime of moving to Canada, penalty two years in prison) by the Czechoslovakian government in order to open, as the IAHS President, the International Symposium on Mountain Hydrology convened by IAHS in Czechoslovakia in 1988. In the second, he relates his position on the "Beijing massacre", which has been now (cf. Wikipedia) downgraded to "Tiananmen Square protests of 1989".

The interaction of science with politics was the subject of his last (to my knowledge) talk at a conference, in 2008, which was entitled "Political pressures in water resources management: Do they influence predictions?"²⁰ Two quotations from this talk are characteristic of his views: (a) "*[P]olitical pressures often set the agenda for what is to be (or not to be) predicted, and sometimes even try to impose the prediction result thus transforming prediction into prescription.*" (b) "*Well, how anybody in his right mind could propose wasting precious resources on such petty things when political pressures command their use for the noble cause of saving the planet from Climate Change? But, could it not be that the present climate-change-impact models and all sorts of Al-Gore-ithms aimed at helping this noble cause will repeat the history of the noble causes of the past, like the previously mentioned environmental quality models or the ill-fated 'socialist model' meant to save the planet by imposing a 'climate change' on the social fabric itself?*"

I earlier mentioned Vít's three most cited papers. I wish to mention a fourth one, "The Hurst phenomenon: A puzzle?"²¹ The importance of this paper, particularly to hydrological stochastics but with significance far beyond hydrology, relies on the fact that it proposed a conceptual explanation of the omnipresent "Hurst phenomenon". Vít showed that natural change, rather than the mathematical concept of infinite memory, is the basis to understand

¹⁷ *IAHS Newsletter No 31*, available on line at http://iahs.info/news_frm.htm.

¹⁸ *IAHS Newsletters No 32 and 33*, also available at the same web site.

¹⁹ *Hydrological Sciences Journal*, 53(2), 488–494, 2008.

²⁰ *International Interdisciplinary Conference on Predictions for Hydrology, Ecology, and Water Resources Management*, Prague, 2008.

²¹ *Water Resources Research*, 10(4), 675–688, doi:10.1029/WR010i004p00675, 1974, included in Section 2.2 of this collection.

the origin of this natural behaviour. I have personally cited this paper many times²² and, in general, it is one of the well cited hydrological papers. However, compared with Hurst-related papers from other disciplines (e.g. in informatics and economics), the number of citations is clearly unjustifiably low. But for Vít, the hunting of citations was not an incentive. Rather, he was driven by the search for the truth. This is evident in his paper on “Apocrypha”, while in his “Political pressures” talk he stated: “*I have never seen this [...] paper²³ cited, while the paper that I had originally criticized has become widely cited and itself became a model for a whole generation of similar models.*” Vít also cared about the dissemination of the truth, including that contained in papers produced by other authors, as well as the faithful attribution of scientific ideas to those who proposed them. A testimony of this is his translation into English of “Two early Russian contributions to the theory of the stochastic reservoir”.²⁴

I have also mentioned some of Vít’s 21st century contributions, which are mostly focused beyond hydrology, are not journal papers (except one), and are not included in this volume, but can be accessed online.²⁵ I cannot refrain from strongly suggesting reading his “An unorthodox physically-based stochastic treatment of tree rings”. I regard it a ‘must’ for hydrologists and geoscientists beyond hydrology. It demonstrates Vít’s heretic humour and is illustrated by great photos of him, which also allow us to imagine his good relationship with nature and real life, and his tenderness for his family.

I started this foreword by quoting Vít’s wish not to interfere in hydrological science in the 21st century. I conclude with my wish that Vít and his legacy greatly interfere in hydrological science in the 21st century. In this respect, I think that this collection of his papers is destined to be a substantial contribution to the progress of hydrological science.

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²² My initial misquotation of this paper in 2002 was very fortunate for me as it triggered Vít’s reaction with a severe letter and, in turn, produced a series of discussions, full of fruitful disagreements and agreements, including an in-person “Socratic dialog”, as he called it, on the island of Cephalonia, Greece, in 2005.

²³ Here he means his 1983 joint paper with J. Nĕmec, “Assessing the impact of climate change on the development of surface water resources”, *II International Meeting on Statistical Climatology*, 8.2.1-8.2.8, Instituto Nacional de Meteorologia e Geofisica, Lisbon.

²⁴ *Journal of Hydrology* 172, 351-354, 1995. The two papers are: (a) Kritskiy, S. N., and M. F. Menkel, Generalized methods for runoff control computations based on mathematical statistics, *Journal of Hydrology*, 172, 365-377, 1995. Translated by V. Klemes from the Russian original "Obobshchennye priemy rascheta regulirovaniya stoka na osnove matematicheskoy statistiki", *Gidrotekh. Stroit.*, 2, 19-24, 1940. (b) Savarenskiy, A. D., A method for runoff control computation, *Journal of Hydrology*, 172, 355-363, 1995. Translated by V. Klemes from the Russian original "Metod rascheta regulirovaniya stoka", *Gidrotekh. Stroit.*, 2, 24-28, 1940.

²⁵ Links to these works can be found at the end of the IAHS web page <http://iahs.info/history/klemes.htm> or located via the search utility of the IAHS Publications Database, <http://perekos.free.fr/indextopEN.htm>. In addition, I have gathered all the new contributions that he sent me at the web site <http://itia.ntua.gr/en/documents/?title=&authors=klem>. The site contains also some older contributions including two videotaped talks.