BSR GOLD MEDAL WINNER

ON NOT BEING A RHEOLOGIST

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I BEGAN my 2025 Midwinter Meeting lecture by saying that I was not a rheologist, which opened a floodgate of similar confessions by subsequent speakers. This claim was sufficiently common for Erk and Kaboolian from Purdue to look into the matter in 2023 with funding from the Society of Rheology. For them, such a claim evidenced widespread "imposter phenomenon" (IP), which reflected insufficiently supportive and inclusive work environments.[1]

IP is not a recognised psychiatric disorder, does not feature in standard diagnostic manuals, and the relevant literature is highly varied in quality and conclusions.[2] Erk and Kaboolian's study based on 151 responses must therefore be treated with caution pending further research. Meanwhile, I suspect that for me and for many others, especially amongst experimentalists, the label "rheologist" is primarily associated with hands-on expertise with rheological instrumentation, analogous to the label "neutron scatterer". So, my denial of being a rheologist has little to do with IP, but is a shorthand for, "I am not an expert with rheological instruments," simply because (in my case) I've never operated a rheometer!

There is historical precedence for this usage. The BSR was founded as the 'British Rheologists' Club' (BRC) after Herbert Lang (Secretary, Institute of Physics) visited George Scott Blair at the National Institute for Research in Dairying, Shinfield, in summer 1940.[3] Lang realised that Scott Blair's difficulties in characterising the flow of bovine cervical secretions (to detect pregnancy) mirrored those faced by Vernon Harrison from the Printing and Allied Trades Research Association in characterising inks. With G. I. Taylor as its first president, the Club was founded "to co-ordinate the activities of Rheologists in Britain during the War, to further the appreciation of the importance

[1] Kendra Erk and Matthew Kaboolian, Rheology Bulletin, 94 (2025), No. 1, 35–36.
[2] Dena M Bravata et al., J. Gen. Intern. Med. 35 (2019) 1252-75.
[3] R. I. Tanner and K. Walters, Rheology: An Historical Perspective, Amsterdam (1998), Chapter 3.

of rheology in industry and to facilitate the pooling of information . . . with respect to problems and new methods of research."[4] Note the emphasis on *methods*. An inaugural meeting was announced for "an informal discussion on a topic to be selected, followed by an inspection of rheological apparatus including some recent developments."

The topic selected was thixotropy.[5] The keynote from John Pryce-Jones of Rickett and Colman (now Rickett and Benckiser) was mainly devoted to his new rotational viscometer.[6] Pryce-Jones' work highlights that without reliable, standardised instruments and protocols, terms such as 'thixotropy' will remain ill-defined, hindering progress of the then new science of rheology.

The instrumentation focus continued. The 1942 general meeting, for example, was on "Design and Standardisation of Rheological Apparatus". Discussions ranged from technical issues to the lack of available instruments due to war-time conditions and the gap between what researchers wanted and what suppliers offered.[7] A 1946 meeting was "devoted to the principles of rheological measurement" for different classes of materials; "research apparatus used by members were exhibited and demonstrated" and "[a]pparatus developed for special industrial purposes were shown".[8]

Such a focus is unthinkable today; but what united BRC members from diverse backgrounds back then was the common challenge of inventing suitable apparatus and protocols for the new science, and of establishing constitutive equations to characterise their new apparatus. *That* was what made them rheologists. So, history is on my side when I say, 'I am not a rheologist!' to mean"I am not an expert in rheological measurements." I am in good company. The Club's first president, G. I. Taylor, could not attend to chair the inaugural meeting. But if Taylor had been there, perhaps his opening remark would have been, "I never thought I was a rheologist!"

The key point, as already recognised by the pioneers,[9] is that rheology is intrinsically interdisciplinary due to the variety of materials studied. As early as 1948, the British Glaciological Society, the BRC and the Institute of Metals held a joint meeting. Scott Blair and Pryce-Jones' techniques were no use for glaciers. Instead, the opening speaker, Max Perutz, a Cambridge physicist and a1962 Nobel Laureate in Chemistry (for the structure of haemoglobin), inferred glacial rheology from crystallographic data.[10] Gradually, then, the substance rather than the means of the science became the locus of disciplinary identity, especially as techniques became standardised among BRC members and they stopped designing bespoke instruments. The BRC became the British Society of Rheology in 1950. Its 1955 conference on interfacial phenomena was recognisably modern, emphasising the science enabled by rheological measurements rather than on techniques *per se*.[11]

Nowadays, a broad range of scientists and engineers interacting with and interpreting rheological data would be perfectly happy to self-identify as workers, and perhaps even experts, in rheology, but not necessarily as *rheologists*. When one of these professionals say, "I am not a rheologist!" they may not be giving voice to inner feelings of insecurity, but may just be making a factual statement of not being experts in technique. It is

[4] No author, Nature 146 (1940) 518.
[5] No author, Nature 146 (1940) 781.
[6] J Pryce-Jones, J. Sci. Inst. 18 (1941) 39-48.
[7] No author, Nature 150 (1942) 271-272.
[8] No author, Nature 158 (1946) 614.
[9] V. G. W. Harrison, Nature 146 (1940) 580-582.
[10] M F Perutz, Proc. Phys. Soc. 52 (1940) 132-135.
[11] E. W. J. Mardles, Nature 176 (1955) 819-820.

certainly in that spirit that I have repeatedly said, "I am not a rheologist!"

Interestingly, the definition of "rheologist" has some bearing on Prof Suzanne Fielding's question after my lecture about potentially fruitful new areas. In response, I briefly remarked on "psychorheology"; let me elaborate. Since Scott Blair pioneered this field,[12] understanding has advanced on relating rheology to consumers' mouth- and skin-feel; but this was not the original motivation. In a 1977 interview with Philip Sherman,[13] later his obituarist in *Rheologica Acta*,[14] Scott Blair recalled that "when I was working at Rothamsted Experimental Station on flour doughs I found out a lot about the dough, but I couldn't find out a lot about the baker." He became frustrated at not being able to relate his rheological measurements to the master baker's knowhow of kneading, etc. - what the philosopher of science Michael Polanyi called "tacit knowledge".[15]

Luckily, the frustrated Scott Blair was able to strike up a brief collaboration with a refugee from Nazism, the psychologist David Katz, in which "he [Katz] studied the baker and I studied the dough". So, the earliest focus was on the artisan and not the consumer. Later, Scott Blair dedicated *A Survey of General and Applied Rheology* to "Bill – Bill, in every land, wherever he may be. When they want to know what to do next, they send for Bill. Bill squeezes the stuff in his fingers, sniffs it, holds it to his ear, and squeezes it again. Then he looks wise and says, 'O.K.' or 'Leave it for another ten minutes.'"[16] For me, such "squeezers between fingers" are rheologists par excellence,[17] only that they use "embodied instruments" honed by billions of years of evolution.

Articulating the rich store of tacit sensory knowledge embodied by Bills (and, today, we should include Jills) everywhere and relating it to scientific rheology should be a fascinating, and likely lucrative,[18] exercise. Recent work on 'protorheology' is an excellent beginning;[19] but, taking my cue from Scott Blair, I suspect that really big advances will require us to team up with researchers from other disciplines, such as experts in sensory evaluation,[20] neuroscientists (for whom the 'wearable brain scanner' is a pertinent recent advance[21]), and even philosophers.[22]

[12]G. W. Scott Blair, J. Texture Studies 5 (1974) 3-12.

[13]Transcript, AIP Oral History archive, https://repository.aip.org/scott-blair-george-william-1977-july-9.

[14]P. Sherman, Rheol. Acta. 27 (1988) 1-2.

[15]Michael Polanyi, The Tacit Dimension, Chicago (2009); originally 1966.

[16]G, W. Scott-Blair, A Survey of General and Applied Rheology, London (1944), p. v.

[17]As were early-modern apothecaries, see J. Burke and W. Poon, Ambix 48 (2024) 1-26.

[18]Ikujiro Nonaka, Harvard Business Review, July-August 2007, 162-171 (Originally HBR November-December 1991).

[19]M. T. Hossain and R. H. Ewoldt, J. Rheol. 68 (2024) 113-144.

[20]D. D. Torrico, A. Mehta and A. B. Borssato, Curr. Opin. Food Sci. 49 (2023) 100978.

[21]E. Botto et al., Nature 555 (2018) 657-661.

[22]P. Nightingale, "Tacit Knowledge and Engineering Design", in A. Meijers, Philosophy of Technology and Engineering Sciences, North Holland (2009), pp. 351-374.