A Clayton's Regime Change

Clayton's is "the drink" you have when you are not having "a drink." It is a nonalcoholic drink base or cordial. The expression comes from a television marketing campaign in Australia and New Zealand from the 1970s and featured rugged actor Jack Thompson. Since the IEEE Control Systems Society (CSS) is deliberately and decidedly international, I have chosen to embark on my first *IEEE Control Systems Magazine* "President's Message" with this piece of antipodean vernacular, which has come to capture the idea of being either a poor substitute or effectively the same thing. I am hoping for the latter interpretation, by which I seek to continue the sequence of capable and imaginative CSS presidents whom I follow and whose careful and thoughtful guidance has brought us this far. I learned a lot from my predecessors as I operated in a number of capacities for CSS over the years. Perhaps I should have been a touch nerdier or apropos and said that I expect a *bumpless transfer*.

It is, indeed, an honor to take the reins—but not the reigns—of the CSS for 2019 and manage our evolution in a rapidly changing external environment, both within our superset IEEE and the broader world. I have several unfair but innate advantages: I am somewhat wiser (read *older*) than the norm for recent CSS presidents. I spent the first 20 years of my post-Ph.D. professional life in Australia before moving to California in 1999, and I have spent a considerable amount of time working very closely and in sev-

eral countries with highly divergent organizations, such as academia, many industry sectors, government, and defense laboratories. This experience allows me to appreciate how organizations deliver on their objectives within their structural constraints. I hope to bring a big-picture view to the job and benefit from the expansive reach of the management team.

Bumpless transfer does not entail the absence of change, especially as our context and operating milieu alter around us. The CSS is in great shape—no need to "make CSS great again." Finances are very healthy because of the success of our technical powerhouse publications and conferences. Demand for control professionals is very strong across a great many industries and sectors. Modeling, estimation, and control underpin the technological response to many central human and environmental challenges, notably in climate, energy, biotechnology, medicine, and transportation and their knock-on effects to other activities, especially in automation in general. However, there are definite areas in which we, the CSS, can improve, lift our game, and lead better.

There was a time in the mid-1980s when the CSS felt rather unloved and forlorn. There was a perception that other fields, such as operations research and robotics, were stealing our thunder and perhaps siphoning off funding resources because they were able to publicize and promote their subjects better and capture the broader public imagination. Indeed, many powwows were convened to discuss the issues and propose remedies. There was a belief that the

rigorous downbeat reviews given to grant proposals within the control area were perceived as symptomatic of a field in decline. Look at us now!

The response from those early days was to promote the area more forcefully and capture the public's imagination. A key indicator of our problems was seen in the absence of articles about control in, say, *IEEE Spectrum*. A working group was formed without remarkable success. More recently, in 2014, "The Impact of Control Technology, Second Edition" (see ieeecss.org/general/IoCT2-report) was curated by Tariq Samad and Anuradha Annaswamy as a sequence of two-page flyers: "Success Stories for Control" and "Challenges for Control Research." The breadth of activity and impact is impressive. What a difference 30 years makes!

Still, we struggle with the 30-s elevator pitch or even the innocent question from one's children about what do you do at work. Control is hard to describe and possesses a barrier to entry, which, at best, yields some celebrity status to the control engineer on site. In 2014, I delivered an after-dinner presentation at the General Electric Controls Symposium and began with a deliberately provocative question: "Why is it that when a control engineer works on an industrial project, at the end of the effort, the control engineer has become at least a semi-expert on the process but the process engineer has learned so little control?"

The audience sternly responded, "Yes, why is that?" instead of objecting to the proposition, as I had planned. It is apparent that we struggle to get the message across. Perhaps we are like topologists or

algebraic geometers: too esoteric and divorced from popular experience.

Interactions with students amplify the dichotomy. There are those who get it and those who cannot get far enough away. For the CSS, this is an ongoing challenge, as the membership is inching slowly downward and aging demographically. The attraction to student members appears to be diminishing. The decline in numbers is not alarming (yet!), and it is not clear if it represents more than a maturing of the field and modification in student expectations. But it does not dovetail well with the demand for control skills, which shows no sign of slowing. As CSS president, I will seek further clarification of what measures we might adopt to increase our numbers. Jeff Peters from United Technologies Research Center is leading the CSS effort with IEEE Young Professionals, and this is a genuine effort to accommodate their requirements.

It is clear that trends have seen a technological center of thrust move from automatic control to autonomy while maintaining the reliance on modeling, estimation, and feedback. I am an avid reader of David Mindell's books, and in the December 2016 issue of *IEEE Control Systems Magazine*, a review of his 2015 book, *Our Robots, Ourselves*: *Robotics and the Myths of Autonomy*, was published. He is a historian of technology and a technologist himself. The long view indicates that the time of the CSS remains ripe. However, we need to appreciate our role and interact with our cognate societies symbiotically and in an advantageous manner. We also need to respond to any change in the field, such as alterations in the community function of professional societies in general and variations in the nature of work and employment.

The CSS is indeed functioning well and, within the IEEE, is seen as an innovator and implementer of best practices. Furthermore, we are early identifiers and eager adopters of bright ideas. The threats are largely external and environmental. This is nowhere more evident than in the realm of publishing, where print journals are disappearing and the economics of publishing are shifting rapidly, especially in two main areas: the disappearance of personal subscriptions and the growth of open-access venues with the increasing insistence of some granting agencies (notably in the United States and Europe) on exclusive publication in such journals. Luckily, the IEEE is responding, and the CSS will take a strong interest and action in development.

The reformation of academic publishing has been in play for many years with, in the early 1990s, the American Association of Universities (AAU) identifying the five main stages of journal operation: generation of research content, certification of content via peer review, editing and production of the finished product, distribution, and archiving. AAU's argument was that the government/university sector was responsible for three of the five aspects, largely on a volunteer basis. That ground is now shifting further with the transformation of libraries. Even more so, the growth in volume of published academic material is astounding and, in my view, problematic, since it becomes difficult to maintain currency.

My aim in writing this message has been to provide a snapshot of how I, as incoming CSS president, view the landscape in an informal SWOT analysis. As I stated in my introduction of Clayton's (or, maybe, my Clayton's introduction), the CSS has benefited from a perspicacious and diligent leadership for many years. It is held in high regard within the IEEE and appears aware of and adaptive to the trials ahead. I am fortunate to be accompanied by a talented and enthusiastic Executive Committee. Tally ho, and let's have a Clayton's and dry!

Bob Bitmead