



LYLE'S LAWS

The Limits of Logic

My first engineering job was a summer internship at Collins Radio Company in Cedar Rapids, IA. It was a great experience, and I have long said that I learned more engineering in those three months than in any other 12-month period of my career. I worked for and with engineers and technicians who had been with the company for years and were very solid, both in their engineering fundamentals and in their dedication to their company and to their craft.

My assignment for the summer was to design and deliver a production test unit for a major component of a flight-control system. In that short period of time, I had to learn the operation of the system, understand the parameters that had to be tested, work with other engineers to develop the test procedures and tolerances, and, finally, design the test circuits. But it didn't end there; then I had to design the panel itself, choose the components, and get the whole thing fabricated and tested before I walked out the door. Can you see why I learned so much engineering?

What did I learn? I could write a thousand words to answer that, but I want to concentrate on a revelation that came very near the end of my tenure when I proudly showed the finished product to my supervisor. It was a rack mounted panel full of meters, lights, switches, and knobs, and it worked perfectly when I demonstrated it. When I was all finished with the demonstration, my supervisor complimented me and then asked, "Why did you choose those knobs?" Well, I guess I hadn't given much thought to the knobs, but they looked sturdy, they were easy to grasp, and they weren't very expensive. What's not to like? The boss then said, "Those are the ugliest knobs I've ever seen."

Wait a minute, I said (to myself). Sturdy. Easy to grasp. Cheap. What does *ugly* have to do with it? Well, as I thought about it, I had to admit that the knobs were not the most attractive. But still, simple logic would dictate I should use those knobs. And then it occurred to me—well, not then, but over the years—that engineering is not just pure logic. Good engineering does certainly employ logic, but it also must, at times, involve feelings or emotions, intuition, a sense of beauty, esthetics—a whole host of non-logic

cal parameters. Thence, Lyle's Law of the Limits of Logic: *Think, but also feel.*

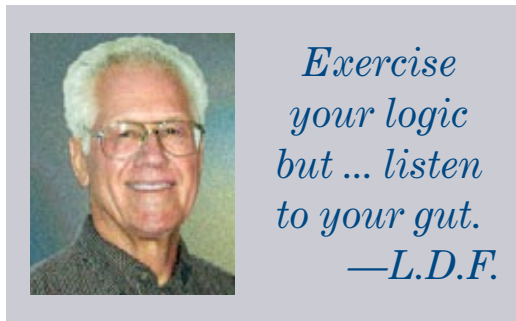
Countless words have been written—and probably even more have been spoken—about the tension between logic and feelings in the leading of our lives. It would seem that we listen to both: some of us more to one, some more to the other. Logic rules in one case, feelings in another. I trust that very few people consider themselves 100 percent logical. After all, we still beget children even though we know—if we think about it—that they will seriously restrict our activities for about two decades and also cost us a bunch of money. But, while we may lose money on the logic side, we are richly rewarded on the emotional.

It is less apparent, I think, that such logical ambivalence should extend to the practice of engineering as asserted by the Law of the Limits of Logic. But consider the *non-logical* phenomenon we call intuition. I suspect that we have all had the experience of solving a problem or working out a design or somehow reaching a conclusion and then stepping back and saying, "That

just doesn't look right." No reason. Or at least no reason that we can put our finger on. But further reflection will often show that there really is something wrong or at least that something could be better.

What is this thing called intuition, and how does it work? I don't know. Certainly it involves—or at least is informed by—experience, but it seems to go beyond that. Whatever it is and however it works, we are well advised to heed it. Many an error has been uncovered, and many an improvement has been engendered by intuition.

Another non-logical phenomenon is emotion, broadly defined as a mental state arrived at through feelings rather than reasoning or cognition. I ran across an interesting quote from Isaac Bashevis Singer, the 20th century Polish-American author who won the Nobel prize in literature in 1978. Singer wrote, "The very essence of literature is the war between emotion and intellect," That may be true in literature, but I suspect that in engineering, the war is over—and intellect won. The vanquished, however, should not be purged or exiled. We need to integrate emotion into our post-war culture and listen to it from time to time.



My old boss didn't go through any reasoning process to arrive at the conclusion that those knobs were ugly. Looking at the knobs elicited in him a feeling or a reaction that was unpleasant, and he knew he would feel better if he were looking at a different knob. Logically, the choice of knobs really didn't make any difference. Esthetically, emotionally, it did. It does. In our professional activities and in living our lives, it is our emotions that lead us to consider such things as beauty, ethics, justice, and love. To ignore those considerations will diminish our profession and our lives.

Another quote I like is from Rabin-dranath Tagore, an Indian poet and another Nobel prize winner: "A mind all logic is like a knife all blade. It makes the hand bleed that uses it. ..." Ouch.

While the Law of the Limits of Logic advises paying attention to non-logical phenomena, it does not condone the use or even existence of what might be called the *anti-logical*. By anti-logical, I mean the know-nothing rejection of science and scientific knowledge that seems to be rampant in our society today. We can't eschew experimental science simply because we don't feel good about the results produced by that science.

All the while I have been writing this article, I have been trying to figure out how to get through it without reference to our viscera. Perhaps my readers will be more creative, but I haven't been successful. After all, when you are being affected by your intuition or your emotions, where do you feel it? I'm afraid I have to end by suggesting that you exercise your logic but that you should also listen to your gut. Sorry.

—Lyle D. Feisel, Ph.D., P.E.
Iowa Alpha '61

EXECUTIVE COUNCIL MEETING

The Executive Council met in Indianapolis, IN, on October 27 and 30, 2011.

The Council enthusiastically voted two TBPI Superior Service Awards to retiring advisors of the collegiate chapters. The Council voted a TBPI Resolution of Appreciation to Dr. Amy Kaleita-Forbes, *PA B '97*, Alum-Net Coordinator during 2003-11.

R.L. Werneth, D.A. Stirn, and M.T. Pittard were appointed to the Alumnus Recognition Selection Committee. The Council appointed Wesley A. Repke, *MI A '09*, as District 7 Director to a term ending June 30, 2014.

Councillor Norman Pih reported on the meeting of the Engineering Futures Planning Committee in Knoxville, TN, on September 21. The Council agreed to hold a meeting for all EF Facilitators in Orlando, FL, on June 9, 2012.

The Council approved MindSET Project Grants to the Florida Alpha Chapter for \$500, New York Gamma Chapter for \$100, and Tennessee Alpha Chapter for \$200.

Executive Director J.D. Froula reviewed the final program and logistical details of the 2011 Convention being held in Indianapolis, IN, on October 27-29.

The Council approved the inspection reports of the visits to the petitioning groups at Penn State Erie and the College of New Jersey; both petitions for new collegiate chapters will be presented to the 2012 Convention.

The Council approved Resolutions to modify authorized signatories for TBPI bank accounts; to permit Executive Director C.D. Gomulinski to access the TBPI safe-deposit box and to authorize trust transfers for cash-flow purposes, bequests, and capital gift annuities; and to provide contingent access to the safe-deposit box.

Mr. Froula reported on the status of the 2011 Alumnus Giving Program, the AGP Multi-State Registration Project, ED/STE Schedule of Responsibilities, and updates to the TBPI Trust Investment Reference Document. The Council reviewed the quarterly trust report.

The auditor's report was accepted and the management letter was reviewed with respect to segregation of duties and the size of the Headquarters staff. The Council agreed to seek two bids for audits for 2012-14 and to conduct a risk assessment to be completed by December 2012.

The Council accepted changes to the TBPI health plan for 2011-12 and requested that Executive Director C.D. Gomulinski provide a long-term strategic goal for the plan.

The Council requested that Mr. Gomulinski provide information on the retirement plan, trust fund earnings, trust administration costs, and recommendations regarding possible changes to the Constitution and Bylaws. The Council heard and reviewed a benefit proposal regarding accident and universal life insurance for members.

\$\$ Benefit for Members

Members may be eligible for an additional discount off their automobile insurance.



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