Part I: Dick Morley and the Barn Culture

A Man of Many Talents
Big Blue
A Perfect Solution
Geek Pride Day
Change Requires Persistence
Deconstructing Morley
Geek Pride
Texas and Technology

A Man of Many Talents

by Meg Mathur

When you speak to Dick," Karen Simpson, his secretary for the last year, cautions, "he's very down-to-earth. You won't have a formal conversation with him." Perhaps she has talked to a lot of people who expect a certain level of arrogance from Richard "Dick" Morley, the man who invented the programmable logic controller (PLC) in 1968, and over 20 other technologies, and says he is involved in "about 500 projects and 50 companies." Working with him, says Norma Baker, who was his secretary for almost 20 years, was "orderly chaos, or chaotic order." For him, she says, his work is a 24-hour-a-day job, but never to the detriment of his family.

Despite all his hard work and his numerous achievements, Morley has managed to keep his feet on the ground, his sense of humour intact and to have a lot of fun. And it really showed during the telephone conversation I had with him from his office, in a location he asked not to be disclosed. You'll find out why later in the article.

Manufacturing and Process Automation: Where did you grow up?

Dick Morley: I'm not done yet.

MPA: Did you grow up in the New England area?

DM: I was born in rural Massachusetts. I was raised on a farm until roughly the third grade. From the third grade to roughly the seventh grade, I lived in the bad areas of New York City. And then I went to New Jersey and stayed there through high school and went back to Cambridge, Massachusetts, for college years… So I'm an old Yankee. My family has been selling corn on the same corner for 80 years.

MPA: What were your interests growing up? What were some of your influences?

DM: What were some of my influences? Neat question. I liked Monopoly™. I liked space travel, science fiction and technology. I started off being a geek at a very early age.

MPA: Are you saying you've remained a geek?

DM: Well, my SAT scores were very high in math and science, and zero everywhere else. How's that?

MPA: You went to the Massachusetts Institute of Technology (MIT) for university.

DM: I went to MIT, no degree, four years, physics. Then I went to graduate school, mathematics, Northeastern (University, in Boston), no degree.

MPA: You didn't finish either?

DM: The formal answer is, no.

MPA: What kept you from finishing?

DM: In physics, I owe them German.

MPA: You didn't like taking German?

DM: Don't know. I'm kind of an opportunist. A free spirit, or something. I never really thought much about it. I wanted to get an education, not a piece of paper… I wanted to learn stuff as opposed to having accreditation that I learned.

MPA: You didn't finish graduate school, either?

DM: No. I hardly finish anything. See, you're so serious [laughs]. I'm a starter. Some people plant them; other people pluck them. I plant them. Somebody told me this once, and I don't know if it's true or not, but while I've had the equivalent of music training, i.e., MIT, I can also play by ear.

MPA: What was your first job out of university?

DM: Bombs, atomic bombs. Spy stuff.

MPA: You were building them?

DM: I was working on Defense Department initiatives. They put me in a corner and fed me paper, then I would put things on the paper and shove them out the door. And I was a happy clam because I enjoyed, and still do, work. I worked about half-time — 12 hours a day. So, one of my buddies, Jonas Landau, said, "Look, Dick, you're a geek. You ought to be able to do something else, like ski." So, I got interested in skiing… I worked for a laboratory (in) electronics at the time… and I quit to become a ski bum. That was in 1964. They hired me back for half-time at the same pay. It doesn't take rocket science to figure out what business I ought to be in. So, I've been unemployed since 1964. And that's not a negative term. I drift from pillar to post, from technology to technology.

MPA: You've started a few companies.

DM: Oh, I've been involved in 50 now? And I've started… I don't know how many. I have been the strong technical innovator on some, and some I might have just given money to. Now I'm a venture capitalist (he and his three venture capital partners collectively call themselves the Breakfast Club). I've been heavily involved in at least 10 companies.

MPA: I talked to Norma Baker last week. She said the two of you met when she started working at Functional Automation. Was that one of the companies you helped to start?

DM: About 80 percent of the companies I invest in are failures. Whether it's technology, self-starting or money. I only pay attention to companies that have a high rate of failure.

MPA: Why's that?

DM: So I get a high rate of return. If I wanted no risk at all, I'd buy government bonds, right? And I'd get a job at IBM. I don't want that. I want to have fun, have a hell of a good time and make enough money to pay for the skiing or, in the summertime, to pay for my Harley.

MPA: Now with Modicon (of which he is a founder)…

DM: Modicon was my 84th project. The product was called 084 because that happened to be my project number. Modicon is now doing about $600 million a year.

MPA: Do you still invest in Modicon?

DM: We still do… If you're going to print this, don't put my phone number because every time I say that I'm a venture capitalist, I get 200 phone calls a week. You can say New England area, but don't print my town and my phone number. So, we (the Breakfast Club) see about 100 business plans per year. We were written up in *Inc.* mag-

azine (Sept. 1989). So, we do a lot of investing, a lot of looking and seldom win, and when we win, we win big. Typical venture capitalist. We're called "angels," by the way, because we're the first line of investment.

MPA: Going back to Modicon. I wanted to talk to you because you invented the PLC.

DM: That's right, but…

MPA: You seem very humble about it in reading some of the stuff Karen (his current assistant) sent me.

DM: I'll buy the fact that I'm the father of the PLC. Okay? And I have a couple of the basic patents. But like anything else, you stand on the shoulder of giants. There were people before me, and there are people after me. If I was all alone in the jungle, there would not be a PLC.

MPA: What's the difference between being the father and being the inventor?

DM: Americans, and North Americans in particular, have a passion that says only one man does it. They like this underdog, single person thing. When, in fact, there were software people; there was Norma, there were my kids and there was George Schwenk (his partner at Bedford Associates, where the PLC was first developed) — a whole bunch of people. Yes, I was the father, but the inventor means the sole inventor, and there was no other contributor. I just take issue with that.

MPA: When you developed the PLC, you originally intended to sell it to the machine tool industry.

DM: That's correct. They didn't want it. So, then I've got a solution looking for a problem. [Whistles.] Tough job. We had all this money, and it turns out that in the meanwhile, other people, including General Motors, were all interested in solving their problem, as was Digital Equipment. We had a solution that made a lot of sense to people, so they bought it.

MPA: How long did you develop the PLC? Is it something you continue to develop?

DM: Oh, I don't know. I estimate that I've got about 500 projects and about 50 companies that I'm involved with. They include supercomputers, software companies, communications, television, atom smashers. I'm a physicist, so that means I know everything about nothing. I dive into areas. It could be mechanical engineering, it could be process. In the last year, we've done a lot of investment in social dynamics. You know, pillar to post.

MPA: I want to get your opinion on PLCs and some other things going on in the industry.

DM: Sure. Hit me.

MPA: What is your opinion of open architecture?

DM: To some extent, I don't understand it. I'm rather heavily biased on that point. When people say "open," they mean "closed," and only use Windows. Windows is not open. Windows is Gates; he owns it. The richest man in the world and he says, "Whatever I sell, you must use, and we'll call that open." And I take issue with that. I don't think that's "open." Open means that anyone can open up a system. The specifications that come now, the card people and the computer people, in general, the sec-

ondary tier people, don't make money when it's open and when it's standard. For example, (let's take) an "open" automobile. If I could switch General Motors and Ford carburators, and the interface was identical, and I could switch the radios, I could switch everything, motors and all, the automobile people would think that's insane. They'd lose what they sell, which is brand recognition, support, marketing, sales and distribution.

MPA: This relates a little bit to what people call the soft PLCs.

DM: The problem is that a lot of people don't understand real time. Real time has three aspects: fast enough, robust enough and predictable. Real-time systems are used to run airplanes and to run the engine in your car, but when you hop into your car, you don't open your laptop and turn on a disk. You would think I was *insane* for that. Because you know the thing is going to crash, and that the disk can't keep up with the motor speed. Would you fly an airplane if you looked in the cockpit and there was a laptop on the guy's knees? The answer is no [laughing]. Okay? Now, why do I want to commit to a $20 million or $100 million factory? The reason we want to commit to that, and I can appreciate this view, by the way, is because (an engineer might say) "I do all my CAD/CAM designs on a personal computer. I'm familiar with my desktop." I'd understand it if I were the engineer. Well, as it turns out, the embedded real-time systems have technical issues that have yet to be overcome. There is an operating system that *may* possibly make it on personal computers, that's called NT. That may make it, but a real-time system can have no aspect of its response time tailored to disk response time. You know how your computer slows down when you're printing and typing? You can't have that when you're running a machine tool. So you must have a formula which is 100-percent predictable for a given action, repeatable over and over again, and it should not fail. When we did programmable controllers, there were lots of things we did. One, there shall be no rotating elements: fans, disks or anything. Two, all operations should be out of either RAM or magnetic memory. Three, there should be no such thing as an interrupt, all I/O service all the time. Then it should be built ruggedly so you can stand on it, step on it. None of those are met by a laptop. That doesn't mean you can't operate a laptop in a control environment or, more especially, run a Wonderware package that controls real-time performance. It's okay, I mean, I just came from a meeting where we said, "Gee, software is the issue. We've got to make sure we understand all that stuff," and we agreed. I'm not disagreeing, mind you, that the personal computer, of which I have 10 here in the house, are not valid gadgets to use. That's not the issue. But when I run my hot tub, I use an Andover Controls unit, which is a building controls unit, and another company we started.

MPA: You aren't using software and a laptop to run your hot tub?

DM: No. No. Because if I go away for a week and lightning strikes, and I get a power outage, when the power comes back up I want the computer to start by itself. I want it to be like my lightbulbs. I want appliances, not toys. [The PLC] has many defects, as well, because it's that kind of appliance, and because it hasn't changed much in almost 30 years. Its database and reporting functions are next to nil. Its perceived cost versus perceived function is low. In other words, (people) say, "Why should I pay $1,000 for a programmable controller, when for $2,000 I get a real computer?" Its

communication capabilities are low. It primarily uses an object-oriented language called ladder logic, which only has the ability to interconnect modes of logic rather than data objects, or that sort of thing. Its diagnostic capabilities are next to nil. So it has, like anything else, a lot of bad stuff and a lot of good stuff.

MPA: What is dramatically different about your first PLC compared to what's out on the market today?

DM: Size and speed of performance, number of I/O points, how big a problem it can handle and physical size. When we first started out, it was on a six-foot rack, now it's in a coffee can.

MPA: Micro-PLCs.

DM: Yeah, people are selling them through catalogues.

MPA: Is there anything else that is the same?

DM: Yeah, the language and the whole thing is the same. The approach is the same, which is kind of a pity. In about 1980, I said, "Gee, there's got to be something going on out there, so let's put computer language in (the PLC). We did a survey, and all the people on the floor said, "Don't change anything," so we didn't. The engineers said, "Let's make it like a PDP11 or a Unix system," but the people on the factory floor said, "No, (we) want to be able to fix this when you're asleep." It's like a word processor. The word processor is not for the computer scientist, because he can't program it. It's an appliance. So if anything has changed, it's an appliance capability, what it needs is database capability, interconnectivity to other classes of computers and languages, and communications capabilities.

MPA: I know this isn't your only invention.

DM: Yeah, it's like 25 patents or something.

MPA: So, some of these other things, the handheld terminal…

DM: Yeah, the handheld terminal. I worked for a brief amount of time on the automatic braking system for Ford, you know, the system on your car. Floppy disks, and what else? I can't remember.

MPA: What was that, the 5.25-inch disks?

DM: No. The basic principle. The fact that it was air bearing heads, rotating media. My first computer was built with tubes, those little glass things that heat up. I did it for the dress department in B. Altman & Co. in New York City.

MPA: Do you mind if I ask you how old you are?

DM: No, I'm 63.

MPA: I would imagine you have no plans for retiring.

DM: Well, I keep retiring, but people keep calling me up. I really did try to retire in about 1972. And like my wife says, I retired for a couple of months, and then I tried and tried again. But the problem is, I play the piano. Now, if you play the piano, you might as well keep playing the piano… (If) you ask me when I'm going to retire from playing the piano, I'd say that's kind of a meaningless question.

MPA: That's because what you do is also your hobby.

DM: Yes, like, when are you going to retire from motorcycling and skiing? What?! That's a meaningless question, again.

MPA: How has your work changed over the years? You do a lot of things, but are you traveling more recently?

DM: I am traveling more. But what I'm finding now is that since I'm old, as my neurons are eroding away, that people want me for my wisdom, which is a collection of experiences, rather than my ability to innovate. So, as result of that, I travel more and give lectures and write more.

MPA: You were just in Detroit (speaking on a panel at the IPC show in April).

DM: Yeah. And over the next 12 months, I've got Amsterdam, Sante Fe, China, Australia and possibly Korea.

MPA: Wow. Are you going to be speaking at trade shows?

DM: I do trade shows, but I mostly do gigs. An agent will call me and say, "I want to arrange a tour for you. I'll pay you this much and we'll advertise it in the newspaper." Believe it or not, I'm like Willie Nelson with the guitar, but in this case, I'm not Willie Nelson and I don't have a guitar.

MPA: Tell me about your office. Is it really a barn?

DM: [Laughing.] Yeah.

MPA: With haystacks and that kind of thing?

DM: You know what you might do? My daughter is right here, you could talk to her. She can describe the barn very well. Do you want to do that while I get a cup of coffee?

MPA: Okay.

DM: Hey, daughter! Here she comes. [Shouting somewhat out of range of the speakerphone.] Meg wants to know if we're really in a barn.

Daughter: [Off in the distance.] Oh yeah, we're really in a barn. Mooo! (Now on the speakerphone.) Hello, this is Pat Letourneau.

MPA: Now I understand he has about two dozen foster children.

PL: Yeah, we have an incredibly extended family.

MPA: Are you one of the foster children?

PL: No, I'm one of the biological offspring.

MPA: What's the age range of all these children?

PL: I think the youngest now is about 20ish. It's kind of hard to keep track. Most people are out and about with their own businesses, or working or doing whatever it is they want to do.

MPA: Do you work there [in the barn]?

PL: Yes, I'm the coordinator. I act like an I/O board for dad.

MPA: Do you also have an engineering background?

PL: I learned most of this stuff by osmosis. My background is in biological sciences. Dad and I have a joke that I'm into carbon life and he's into silicon life.

MPA: How long have you been working with him?

PL: All my life. [Laughs.] When you have a father like him, you can't get away from it. When you sit there at the dinner table and talk about chaos theory, it's just something you grow up with… so, it's been forever. On this go-around, in the barn here, since last year. It *is* a barn. It's a big, red building that my husband built.

[Dick returns with his coffee.]

MPA: Does your wife still work with you?

DM: Sometimes. Formally, at the moment, no. Whenever we have a crisis, she does. She's worked formally [for me] for quite a while, informally for a while and not at all. And sometimes I work with her.

MPA: How long have you been married?

DM: Oh, God! Forty years.

MPA: Does she have any interest in science and technology, or is she like your daughter, learning through osmosis?

DM: She spends two or three hours a day in front of *her* computer. We actually send messages to each other over the Internet even though we're across the room, which is kind of dumb when you think about it.

MPA: But it's so much fun.

DM: Well, the Internet is interesting because of the informality. I use it professionally, primarily for the database. I'll look people up or technologies up. And I'll subscribe to some of the professional databases. My phone bill and database bill for a single person is about two grand a month. I look at Dow Jones and technology databases and forums that are heavy in the professional and computer and control and manufacturing science sense. I look at one journalism one, but that's just out of curiosity.

MPA: Do you have any opinion of the Canadian manufacturing industry?

DM: Nnnno. I really don't. All my in-laws are Canadians. They all came down from Newfoundland and Nova Scotia down to Maine. A classic migration pattern.

MPA: Your wife is Canadian?

DM: No, my mother-in-law is.

MPA: So, you don't have professional ties to Canada?

DM: No, none other than Modicon offices or Andover offices, or something, or a show.

MPA: Is there anything about yourself that you'd like to add that I didn't ask?

DM: Let me think. Let me think. What would I like to add about myself?

PL: That you're an egocentric eccentric. [Laughing.]

DM: [Chuckling.] Yeah, and arrogant. Now, let's think, what have we got? We talked about writing. I exercise two or three times a week and run in the woods. I enjoy dogs and animals. Skiing, [my] Harley.

PL: He's a pretty good dad.

Published Sept/Oct '96