

Where Do We Go From Here? (Ubiquity Interview with Bob Metcalfe)

Bob Metcalfe talks about life, luck and choices.

UBIQUITY: You present the hapless interviewer with a serious problem, because you've just published a witty, shrewd, erudite, hilarious, cantankerous book that covers every topic imaginable and leaves nothing left to talk about. So where do we go from there? We could do option A, which would be to end the interview here and refer the *Ubiquity* readers to your book, which would earn you a little money but wouldn't do much for *Ubiquity*, or ...

BOB METCALFE: You are too kind about the book. But we're into a second printing in the first month already, by the way. Well, option A is no good. What's option B?

UBIQUITY: Option B might reasonably be to concentrate here not on who you are and what you think but on how in the world you got that way. So let's begin with your parents. In the preface to your book you say, "Life is more than a little luck. And my biggest stroke of it was being born to Ruth and Bob Metcalfe."

METCALFE: Who just celebrated their 55th wedding anniversary.

UBIQUITY: Tell about them.

METCALFE: I hate to oversimplify, but they seemed to have two goals in life, both related to the American dream. One was to get their children through college and the other was to retire. My father was a union man, and retirement is always high on the list of union people. And he accomplished that goal, by retiring at the age of 50. My mother was a housewife and then became secretary at my high school after I graduated. I was the first person to go to college from our family. It was my high honor to have them at MIT when I got my Bachelor's degree and then have them at Harvard when I got my Ph.D. They believe in the American dream and they worked hard to achieve it.

UBIQUITY: Were they born in the U.S.?

METCALFE: Yes, both were born in Brooklyn in the '20s.

UBIQUITY: Did you grow up in Brooklyn? What kind of childhood did you have?

METCALFE: I was born in Brooklyn but we moved from there to Levittown to Bay Shore, Long Island. I grew up in Bay Shore, where I went to Bay Shore K-12. My father was home every day at 5:30 and we had dinner at that time. For the first half of my childhood, we lived in a development, 1048 South Thompson Drive, in one of a thousand identical ranch houses. Then my father got promoted. In about 6th grade we moved to Brightwaters, which is the incorporated village inside of Bay Shore where each house is different. That was a very big and important move for me.

UBIQUITY: How so?

METCALFE: In the first half of my childhood all my friends were sports nuts, so I played football and basketball. Then we moved to Bright Waters and suddenly all of my friends were into chess and science fiction and mathematics. And so I fell into academic competition instead of sports competition, which is how I eventually ended up at MIT, I guess.

UBIQUITY: Did you like your high school?

METCALFE: Yeah. I was really happy with school. My good friend, Ron Rosenbaum graduated as a

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valedictorian and I graduated as salutatorian, just a hair behind him.

UBIQUITY: And you resent it to this day.

METCALFE: To this very day. I'm just kidding.

UBIQUITY: You're sure of that?

METCALFE: I have my salutatorian statue on my desk here. And if I'd not taken typing I might have been valedictorian, but I got a B in it and it brought my average down. And Ron's mother was our English teacher, and so he had an unfair advantage. Heh heh.

UBIQUITY: Are you still a bad typist?

METCALFE: I'm an excellent typist. In those days, typing was transcription where you had to look over there and type over here. But these days, typing is out of your head, not off a piece of paper. I don't use touch-typing exactly, but I do know where the keyboard is. I'm old enough to remember when personal computers were not going to take off because no one, certainly no business executives, would ever use the keyboards -- those were for secretaries. And I suppose I'll probably live through the transition away from keyboards toward microphones. That'll take a long time, but it's possible.

UBIQUITY: Take us from high school to MIT. Why did you pick MIT?

METCALFE: There's a famous story in my family that I chose MIT in fourth grade because I was supposed to write a book report, but I hadn't read a book to do a report on. So, I went down to the basement, where my father's shop was, and found a book on a shelf, which turned out to be an electrical engineering textbook written by some MIT professors. I couldn't possibly understand the textbook, but I wrote one of those book reports about it that students do when they're desperate. You know the kind: "This book had its high points and its low points, but on average, it was an average book." And to make the book report really compelling, so the story goes, I ended it by saying, "And someday, I hope to go to MIT and get a degree in electrical engineering," which I then proceeded to do many whiles later.

UBIQUITY: Clearly, you were ready to be a great engineer and a great entrepreneur, and it was all revealed right then.

METCALFE: Yeah, sucking up to the fourth grade teacher that way. In fact, when I was at MIT at the first degree I was to receive, although I got them simultaneously, was a degree in management. And my father said, "We didn't send you to MIT to get a degree in management!" So, I stayed a fifth year and got a degree in electrical engineering, just to make the book report come true, I suppose, and to make my father happy.

UBIQUITY: Why do you think your father felt that way?

METCALFE: He himself was an engineer, and so I suppose he was hoping that I'd become an engineer as well. And MIT is known for being an engineering school, so I guess he expected that if I went to MIT I would be an engineer, too, which I turned out to be, sort of.

UBIQUITY: Is it fair to assume that you were thrilled with MIT?

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METCALFE: Start to finish. You couldn't find a more enthusiastic student. It was perfect for me. Not perfect for everyone, but, for me, it was.

UBIQUITY: Why do you say it's not perfect for everyone?

METCALFE: It's a very intense place with a lot of competition and a stress on excellence and focus on engineering and technical things. I came from New York, which gave me a huge advantage because we were already competitive and had good schools compared to many of my fellow students -- except those from the Bronx High School of Science, I might add, who were much better prepared than we were. I like building things and I like math, so it was perfect.

UBIQUITY: And when you went to get your master's degree at Harvard you chose Applied Mathematics. Why that choice?

METCALFE: In those days, at MIT computers were considered to be electrical engineering, but at Harvard they were applied mathematics. It was around the time that MIT's engineering department became the electrical engineering and computer science department, and around the time that computer science departments were being formed. And so the computer science department at Harvard wasn't called that. We were in the graduate school of arts and sciences division of engineering and applied physics department of applied mathematics. I took the courses that were related to computers and computer math.

UBIQUITY: And then you moved yourself off to PARC, the Palo Alto Research Center

METCALFE: Right. There's a funny story there. What I wanted more than anything in the world at that time was to be a professor at MIT. MIT offered me several jobs but not that one. So I was forced to take much more money to move to California to not have to teach or raise money, but just to sit at the Xerox research center and do whatever the hell I wanted to. It was a tough decision. Had MIT said come and be an assistant professor I would have given it all up. Thank God it didn't.

UBIQUITY: Tell us about what PARC was like then.

METCALFE: I can't tell you what it's like now because I haven't been there in a really long time.

METCALFE: It was heaven on earth. The center was well financed by Xerox -- so much so in fact that the research scientists all traveled first class on the airlines, for example. Shortly after arriving there I convinced my boss that I should go to Hawaii for a month to study the Aloha computer network. So I flew first class to Hawaii and stayed there for a month at Xerox's expense while I was a visiting scholar at the University of Hawaii. And then of course what happened there is that Ethernet got invented.

UBIQUITY: By you.

METCALFE: Yes. I mean that's what happened while I was there between June of '72 and May of '73 when Ethernet was invented. Part of it was that month in Hawaii. Everyone who I could think of who was really good at computer science worked at PARC. Alan Kay and Butler Lampson and Danny Bobrow and many, many others. We were really full of ourselves, how great we were and it was really fun to be there. To this day I am grateful to Jerry Elkind, who was the guy who recruited me, who got me to come from MIT into the PARC.

UBIQUITY: Why did he recruit you?

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METCALFE: They needed a working guy. I had done my Ph.D. work on the Arpanet, so they brought me in as a "networking guy."

UBIQUITY: Are you still in touch with any of those guys like Alan Kay?

METCALFE: Yeah, I see Alan a few times a year. I see Butler maybe once a year. He's now in Cambridge working for Microsoft.

UBIQUITY: How many people were at PARC in those days?

METCALFE: We were in the computer science laboratory, and I'd say there were maybe 30 of us. Then there was a system science laboratory, which had another 30, roughly. And then we were part of the Palo Alto Research Center, which was probably much bigger than that. Of course it grew over the years.

UBIQUITY: Now Xerox and PARC are always held up as classic examples of a mismatch between research and marketing and manufacturing. Is that not right?

METCALFE: Yes, the book was called *Fumbling the Future*. Well, the problem was that Xerox was a monopoly, and had been one for a long time, and had patents on the copier, and so enjoyed a virtual monopoly from the '50s and in the '60s and then into the '70s when I was there. The company simply did not know how to compete in a competitive market. Computers were competitive then and we just didn't have the killer instincts. We didn't know about *adequacy*, for example. That the market needs an adequate product not a gold-plated product. We tended to work on things that were really "cool" and extra gold-plated. So when the Xerox Star came out it was way too expensive, about \$16,000. The Macintosh was adequate, and it cost just a few thousand dollars.

UBIQUITY: Help us remember the differences between them.

METCALFE: Well, for example, the Xerox Star had a real Ethernet in it that ran at 10 million bits per second, whereas the Macintosh had AppleTalk in it, which was a cheap version of Ethernet. But because it was so cheap AppleTalk could be built into every machine, and still is today.

UBIQUITY: The news these days is that some people are developing a 10 gigabit Ethernet. Any comment?

METCALFE: Just that technology marches on. In the '80s this used to happen to disks -- You know we had the diskette and then the double density diskette, and so on. I remember the IBM XT came out in 1981 with a 10 megabyte hard disk, which was considered huge at the time. Of course now my laptop has an 8 gigabyte disk. Well, the networks are now doing the same thing. So you have the Ethernet going 10, 100, one gig, 10 gig and so on. The amount of bandwidth available to us is skyrocketing.

UBIQUITY: Are you close to the development that those folks are doing?

METCALFE: No, at all. I write my columns. I give my speeches. I organize my conferences.

UBIQUITY: How did you go from Xerox to creating 3Com?

METCALFE: After being at PARC eight years, I became a consultant to MIT. I kept my Palo Alto

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apartment but I opened another apartment in Boston and became a consultant to Professor Michael Dertouzos, Director of the Laboratory for Computer Science, formerly Project Mac. I had worked there while I was a student at Harvard, now I joined the group as a consultant on local area networking. Five months later in June of '79 I founded 3Com. It was during that interval that I arranged through luck and cleverness to get DEC, Intel and Xerox together to support an Ethernet standard. Then 3Com was founded to exploit that standard.

UBIQUITY: How many people besides you and us know what the three "Coms" are?

METCALFE: People ask about it all the time. And I'm careful to say it's *computer, communication* (singular!), and *compatibility* (spelled correctly!) Because everyone who writes it down usually likes to make communication plural and then they like to misspell compatibility. It's com, com, com -- 3Com.

UBIQUITY: Was it always 3Com? "Com, Com, Com" was not your first choice?

METCALFE: Well, I named it in a day. I have two jokes about the naming of 3Com. One of them is I spent a day and I should have spent two, because starting a company name with a number is really a dumb idea. You spend your whole life spelling for people.

UBIQUITY: But it gets attention doesn't it?

METCALFE: I suppose, but many times I've been called the founder of 3M, which I wouldn't mind being except he's dead. The other joke is that if had I to do it all over again I would have called it Candlestick Networking.

UBIQUITY: You'll have to explain that.

METCALFE: Well, when you go to San Francisco you'll see that they renamed a ballpark. It cost 3Com \$4 million to do that. I could have saved them \$4 million if I'd called it Candlestick Networking.

UBIQUITY: Oh, of course. We're apparently following the wrong ball clubs. But now we see the light, or the candle. But tell us: what's it like to create such a huge and successful company? After the day you spent naming it.

METCALFE: It took a long time and it was really hard. And at no time did I see the whole thing happen. The big "aha" for me came one day when I went to the company picnic. There were thousands of us and many of us were married and many of us had children. And I suddenly felt responsible for all of those college educations ahead and it overwhelmed me. My God, look at all these kids who this company is going to send to college some day.

UBIQUITY: Well, you should be very proud.

METCALFE: I am now, but at the time it was nerve-racking, because you can make mistakes. Companies go under. It was scary.

UBIQUITY: Why did you finally resign?

METCALFE: The company had outgrown me. I should have left sooner. It was too big for me. My talents come to the fore when chaos reigns. For some reason, when there's nothing there or when chaos reigns I know what to do. But when it's "full speed ahead" and the company is huge and there are lots of people involved and complicated arrangements and a lot of pressure to suffer fools gladly

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and things like that -- well I'm not really good at those kinds of things. **UBIQUITY:** It's clear in your columns that you're not very good at suffering fools gladly.

METCALFE: That's why I'll never run for office, for example.

UBIQUITY: But you do seem to be pretty interested in politics?

METCALFE: Yeah that's right. Actually, I'm more disgusted by politics than "interested." I was disheartened by a speech I heard last year by Reed Hundt, who was the outgoing Chairman of the FCC. I hope he was wrong, but he said something to the effect that "economics trumps technology and politics trumps economics. Therefore we should all be interested in politics." He's a political guy.

UBIQUITY: Do you think he is wrong? Or are you just afraid he's right?

METCALFE: I'm afraid he's right, and I don't want it to be that way. I'm now reading a book on the last 500 years, by the historian Jacques Barzun. I'm reading it looking for technology. It's very fun to read, but it's like the author's missing what *caused* everything. He's looking at the symptoms and not the disease. For example, I just read last night about Luther's posting of his 95 Theses at Wittenberg, which happened forty years after the invention of the printing press. That was auspicious timing, because the press had been perfected by then, and that made all the difference. Apparently posting things on church doors was pretty common and not really that dramatic; what was much more important was that Luther happened to publish his Theses with the printing press. So there's a perfect example of technology. And Barzun did mention it, but he doesn't dwell enough on technology, in my opinion.

UBIQUITY: At the very end of the book he mentions the World Wide Web in a way that will surprise you: he gives it the shortest shrift one could imagine.

METCALFE: Well, I'm also expecting in the end that he's going to close with this inexorable movement towards a Marxist utopia. I hope not.

UBIQUITY: How would you sum up your politics?

METCALFE: Libertarian. I'm really angry about Clinton. I would be called a Clinton-hater for 30 reasons. And Gore, whom I generally admire, I can't possibly vote for because he stood on the lawn of the White House and called Clinton the best President we've ever had. And that's the end of Gore.

UBIQUITY: How would you characterize the interplay of politics with the new economy? Are people prominent in technology mostly Gore-ites?

METCALFE: No. They're all over, and I'm all over. There are a lot of things I haven't thought through, so I rattle around. I recently wrote a piece for the *American Spectator* magazine. I love the magazine, but it's a questionable magazine in some ways, because it's way, way over on the right. I managed to get a piece in there and you'll be surprised to learn what I wrote about. I wrote an article in favor of Internet taxation. And George Gilder argued the opposite. I was just pleased because that magazine is the last place where you would argue in favor of Internet taxation.

UBIQUITY: What is the short version of your argument?

METCALFE: That consumption taxes, like Internet taxation, are sales taxes. And that consumption taxes are preferable to income and wealth taxes. And since all consumption is going to be on the Web

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soon, we better learn to tax it. Otherwise all taxes will be income and wealth taxes.

UBIQUITY: Does your disdain for politics leave you pessimistic about the future?

METCALFE: No, I'm optimistic to the core. I'm an anti-Luddite and anti-Marxist, which makes me pro-technology and pro-capitalist. If you look in my book you'll see mention of what I consider to be the silver bullet, the thing that solves all problems, and I call it freedom of choice among competing alternatives or FOCACA. I claim that in culture, economics, politics and technology, freedom of choice among competing alternatives is the situation you *always* want to be in because things work best that way.

UBIQUITY : Do you enjoy writing your column as much as you appear too? Or is it a burden?

METCALFE: Neither of those. I have enjoyed it but I'm now getting tired of it. I've done one 51 times a year for going on eight years. So I'm now looking for a way out.

UBIQUITY: But surely not to retirement?

METCALFE: Oh, no. I'm not there yet. I've just begun hinting to my employer that I'm getting tired of writing the column. We've added a Web cast recently so now every Wednesday I do a live Webcast based on my column. **UBIQUITY:** What about your conferences? How much activity is that?

METCALFE: I do three. Two of them are elite executive conferences by invitation only: one for the computer industry called Agenda, www.agendanet.com; one called Vortex, on the convergence of the Internet, telephone, television, and networking industries; see www.vortex.net. And then, pro bono, I do a conference up here with my neighbors in Maine every October called Pop!Tech (for popular technology), www.poptech.org.

UBIQUITY: Pop!Tech is an interesting phrase and an interesting concept. As the technological world rushes ahead at ever-increasing speed, most of us are bewildered about what it all means. How do people cope with things that they don't understand?

METCALFE: Well, *InfoWorld* has a million readers, and it's a trade book for information technology professionals. *PC World*, one of our other publications has quite a bit more readers. So I think technology is not as bewildering as you think to a lot of people, because they read *PC World*. I don't think the world is as bewildering as it's claimed to be. I get a sense of all that being exaggerated for effect. I heard a great talk by the chief editor of Conde Nast. He went through a series of labels like "Generation X" and other constructs of the media, and the thesis of this talk was that there actually *isn't* a Generation X, it is just something created in our magazines. Then years later when we looked around we saw that it had only been in our magazines, it hadn't been in the world. A lot of this ever-accelerating technology advance and people's "bewilderment" with it is, I think, also largely a figment of the media's imagination. It exists more in magazines than it does in the world.

UBIQUITY: What about the construct of the so-called "digital divide"? Do you worry about it?

METCALFE: Not at all. I find that particular phrase is a code word. Look, there's the food divide and the education divide and so on, and all these divides have been around thousands of years. Now suddenly it's the digital divide. That's just a code word for we've to get the government organized to do something about this. So whenever there's talk about a digital divide, it's immediately followed up by some proposal organizing a huge and expensive government bureaucracy. I freeze up when I hear that phrase. The "racial ravine" and the "digital divide" are code words. It's like when Al Gore called the

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Internet "the information superhighway." That analogy would lead to the government ramping up to build highways everywhere. It was a pro-government formulation of the Internet, making it the job of the government to build it.

UBIQUITY: Just to be clear: you're not saying the "digital divide" does not exist.

METCALFE: There is actually a digital divide but it's not a new thing. It's highly correlated with income and education and country and things that have been around a really long time. It's nothing new. One of my favorite stories is about the Camden Library here on Camden, Maine, which is a gorgeous library, by the way. I supported the effort to put Internet terminals for the community in there so that the digital divide could be bridged and those people who could not afford to have computers in their homes could come to the library and use them for free to access the Internet.

UBIQUITY: Is this a success story?

METCALFE: No. None of the people you'd think of when you said "digital divide" would set foot in that library. They don't like books. Going to a library is not their thing. And then there are those like me for whom Internet terminals are handy when I go to the library. But there aren't flocks of people on the other side of the digital divide there, I assure you. So we built it and no one regrets it. But too bad that the people who you would hope would benefit from it wouldn't use them on a bet. You'd have to drag them kicking and screaming. If you give them a choice --Would you rather have Internet access or a carton of cigarettes or a six pack of beer or a television? -- they would not choose the Internet.

UBIQUITY: Could you be persuaded to run for Governor of Maine?

METCALFE: I definitely wouldn't win because I don't find it part of my makeup to compromise. I guess that's a character flaw, but there's something to be said for it.