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January 2006

## Discussion following the Remarks of H. Douglas Barber and Craig Maxwell

Discussion

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### Recommended Citation

Discussion, *Discussion following the Remarks of H. Douglas Barber and Craig Maxwell*, 32 Can.-U.S. L.J. 212 (2006)

Available at: <https://scholarlycommons.law.case.edu/cuslj/vol32/iss1/36>

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before.<sup>59</sup> We think it is on par with the development pace. Fuel cells are not that far away, they are getting very, very close to commercialization; and there is the bike at the bottom, which is the commercial production vehicle.<sup>60</sup> And then something really curious starts to happen, which is the technology starts jumping, and all of a sudden these fuel cells they developed for something as crazy as a scooter start showing up in things like wheelchairs where we could take the range of a wheelchair and increase it by five times with no increase in weight.<sup>61</sup> And if you don't think that has a lot of value to somebody who is handicapped, well, it does. So stay close to the value. This is your take away I hope. If you are so empowered to develop a common language of innovation, standardize the process, license the team members to innovate, engage the engineers in the business rather than working on the business, the process will draw a change in the organization. You have to walk the talk. You have to lead, not manage at the top and build better mouse traps really, and now when we ask who can sing, we get a different response a year into this than we did previously.

Thank you.

#### DISCUSSION FOLLOWING THE REMARKS OF H. DOUGLAS BARBER AND CRAIG MAXWELL

MS. TODGHAM: Questions. Henry.

DR. KING: I had a question. Is this on?

MS. TODGHAM: Yes, it is.

DR. KING: Okay. I am concerned with rewarding innovators or developing a psychology of innovation. My recollection is that 3M has something of that order. I am thinking of financial rewards, cultural development. Can you train innovators? Can you train people to be innovators? I want to get right at the heart of the problem, and I wanted to get your thinking on it, both of you.

MR. MAXWELL: Can you train people to be innovators? There is no question that some people are just more innovative than others, but I am sure that everyone in this room has had a great idea at one point in your life; I will bet on it, but maybe you didn't feel empowered to bring it up.

The process that I talked about, everyone in the organization has access to it and can input an idea; it doesn't matter where it comes from in the organization. As far as rewards, you know, this is a slippery slope because people say we should pay for patents. I say we don't sell patents. We are not in the

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<sup>59</sup> *Id.*

<sup>60</sup> *Id.*

<sup>61</sup> *Cf.* Atsushi Takano & Nikkei Monozukuri, *Suzuki Unveils Prototype Fuel Cell Electric Wheelchair*, TECH ON, Sep 27, 2006, [http://techon.nikkeibp.co.jp/english/NEWS\\_EN/20060927/121588/](http://techon.nikkeibp.co.jp/english/NEWS_EN/20060927/121588/) (last visited October 24, 2006).

business of manufacturing patents, and I could keep those gentlemen up on the top there in our Patent Office very busy if I started offering \$2,000 for a patent. Of course, you can get a patent on just about anything. That doesn't mean it has value. The mouse trap example is a perfect showcase for that. So how do we reward them? We recognize them. We have a Patent Hall of Fame. We are putting an addition on to our building here in Cleveland, that after you get a certain number of patents – five will be the number – you will be admitted into the Innovators Hall of Fame in Parker, and you will be there, your picture, and all of your patents displayed for everybody, forever.

I think innovation sounds a little cliché. It is its own reward. I would say I am living proof of that. I kept my head down, kept innovating, kept having fun, and people recognized it because it created a tremendous amount of value for the corporation. So they would have been fools to ignore it, and I have gone out of my way to recognize people who are innovative because they create value at such a high level in the organization. But I have always been reluctant to offer money. These people are paid pretty well to begin with. It is almost like paying the purchasing department for cost reductions. It rubs me the wrong way. I mean, that's your job, and if you are an engineer or scientist and you are paid to innovate, I think the recognition of your peers and then later in your promotion, your salary is potentially a much stronger incentive than some individual gift or reward. We do offer patent plaques and things of that nature when they are issued.

DR. KING: Mr. Barber, do you have anything?

DR. BARBER: Yeah. The only comment I would make, maybe two comments, is first of all, I grew up in a pioneer farm in Saskatchewan about 200 miles north of North Dakota where the nearest neighbors were typically about two miles from each other. And the thing I remember as a child, because I grew up after the drought and the depression where people didn't have any money, was that I became convinced that every person can innovate. When you've got your back to the wall, you find a way, and the innovation is there. I just don't have any doubts about that, and Gennum has always worked on the basis that every person in the company can innovate. In terms of motivation, I have never been a strong believer that money is a real incentive. Money is always a pain in the butt in some ways.

But the psychologists tell us that the reasons people work, if they are not suffering from exposure, don't have a shelter or starving to death or things like that, where their basic needs are all relatively satisfied, the reason they work reflect what you were saying, the first thing is I want to feel good about myself. Now, it is really hard to go to your boss and say, you know, I am not feeling very good about myself. You don't have those discussions, but that's where the reality lies. The second thing is that people want to feel that they are appreciated and valued by their peers and the people around them. The third thing is that they want to feel they are advancing, that they are growing

and moving. Those are the real rewards. For innovators, I think they are the real rewards. If you do something that move things and people recognize that, it is really hard to match how you feel about that.

MS. TODGHAM: And I am going to ask a question, and then we will have a question from the front row. Craig spoke about Winovation, which is an internal strategy within your company, and Douglas talked about the need for broadly learned people. You have a room full of service providers here today, whether it be lawyers or Government personnel, even within the universities, and I'd like both of you to give me three things that your service providers can do as partners to help you innovate and help companies meet their innovation goals. And to make it a little bit harder to answer the question, I am going to take away striving for excellence because that should be a given, and I am going to take away free legal advice.

DR. BARBER: I don't know if I can come up with three, but I can certainly come up with one, and that's true whether you are dealing with your customer or whether you are dealing with other employees in the same organization or whatever it is, if you have any interaction at all, make it easy. Make it easy.

And I can tell you that the reason that Intel won in the battle of the microprocessors against Motorola was exactly that. They decided the one thing you had to do was make the use of microprocessors easy, and if you made it easy, you would win, even if you had the worst microprocessor, which was their case. So this whole business about the customer in a sense or your partner or whoever you are working with to facilitate them, make it easy for them to do what they are doing. Innovate on that front. That will help.

MR. MAXWELL: I am not sure I can come up with three either, but Tom Kelly from IDEO told a great story. He spoke to our team last April. One of the things IDEO has done – and I think it is overlooked in the whole field of innovation – is discovering these unmet needs. And so what they pioneered is what they call technical anthropology, where they actually hire social scientists to go out with the engineers to study people, using products like an anthropologist would study a tribe, and that's where the moments come because he said it is dangerous to use tools like voice of the customer. He said, if I asked you a few years ago what you want in your VCR that it doesn't do today, you would have said – you want to please the interview person – so you say super fast rewind. That's what I want so I can rewind the tape and bring it back to Blockbuster, and I don't get charged that \$2. So he said you bring that back to your engineers and you say super fast rewind, that's what the customer wants. And he said can your engineers do super fast rewind? You bet. They can make the fastest rewinding recorder in the world. So you show up at the consumer electronics world trade fare with the fastest in the world, super fast rewind recorder, and you get blown away by DVDs because it is the stuff – he said because the customer is never going to tell you about the

break through. You have got to connect these dots. He says the customer is not going to say to you, well, what I really want to do is throw away my VCR collection and get these shiny little disks. They are not going to do that. You have to do it for them.

So this whole idea of bringing in another group of people that helps the engineers innovate and the scientists innovate, to make sense of what's important to the customer is a very interesting area for us personally and I think one that is overlooked in academia because I have been to several universities. There are a few that just kind of caught on to it that are offering degree programs in this field of, for lack of a better term, this technical anthropology, studying needs, human needs, human factors I think they call it.

MS. TODGHAM: Front row.

DR. NAIMARK: I have enjoyed the presentations, especially the coherence between the two, but Douglas Barber said something I found a little startling. He said that research was dangerous or that it was destructive learning, words like that. Since research is simply a systematic way of learning, I am trying to understand what you meant by that.

DR. BARBER: Generally speaking, everything that has great value – and that's true about technology, too – can be used constructively or destructively, and the whole thing is that research is very valuable. It is a method of learning and of discovering and uncovering new knowledge. But if you focus really narrowly on research, the impact that it has is an impact it has had, which narrows the learning environment. I mean, I sit in an engineering department at the moment where every engineer is striving to get his research learning into the curriculum, and he is squeezing out everything else so your chances about learning about humans or politics or about music or things like that are just eliminated. So liberal learning, even in the faculties that consider themselves to be liberal, has really been damaged by the narrow focus that the faculties have to get in order to succeed in the research environment. It is not that research is bad. It is the way we are doing it that has an outcome that is unexpectedly not good.

DR. NAIMARK: Well, if you had posited the position as the balance between technical learning and liberal learning, no problem. It was just saying research.

DR. BARBER: I am saying liberal learning is doing the same thing. They are not as liberal as that word would imply.

DR. NAIMARK: You mean faculties who should be liberal?

DR. BARBER: That's right.

DR. NAIMARK: I agree with that. Thank you.

MS. TODGHAM: The back corner.

MR. BUCA: I guess the first comment is on money, and money is an important issue for innovation obviously. Parker-Hannifin has a profit sharing program that every innovator shares in the results of their work that can't be

overlooked and should not be forgotten. That's an important part of our compensation plan. Experience tells me also that money can be a destroyer of innovation, so if you have an innovative program and you are not balancing your compensation, you can destroy, so keep that in mind.

The question is for Dr. Barber. You said that Gennum has – if you had one failure in 20 projects, that you would be disappointed or shocked. That's a very, very low number and an extremely high batting average. Our Canadian Dr. Cooper, who developed the stage gate system, says that the best companies fail more than half the time. What's the right number for failed projects?

DR. BARBER: Bob Cooper helped us to develop our stage gating program, and in our program, as you were saying earlier, we have the same kind of thing. There has to be a customer right at the beginning, at least one customer, and the customer has to be involved all the way through so that you can't get to stage 4 if something has gone wrong in stage 3. So there is feedback in the system all the time, and we consider when we are looking at the competition that we face, that the batting average amongst the excellent companies is actually very high. They are very connected, as well, to the customer needs, and the feedback loops are very tight, and you get those kinds of success rates.

We hardly have a sales force because we have engineers – and it has been a tough job, and you were saying that, too – it is a tough job to get engineers who have been bright engineers, who could be designing the products but who are actually quite gregarious and humanly oriented people. And they find it really good when they finally allow themselves to go out there and interface with the technical and other people, within the customer, to try and get that feedback working. They actually become very good at it, but they kind of feel from their learning environment that somehow or another they are abandoning something by doing that, but they are extremely valuable in getting this feedback, which really increases the batting average. By the time we get to the end of it, we already have customers that are waiting for us to deliver the first product. They are ready to place the purchase orders right there, so it shortens the time to revenue, and it increases the certainty that you are close to the bull's eye.

I might mention since you mentioned it, we also have profit sharing for all of our employees, and we have an incentive compensation plan that is based on our growth and our return on assets that pays every employee in the company. So there is a reason for every person to be hitched to excellence and to the innovation agenda.

MR. CARMODY: My question again is for Dr. Barber, but perhaps, Craig, if you had comments as well, I would be very interested to hear your view. Dr. Barber, you said in your presentation that prosperity tends to undermine innovation, and I think that's a very interesting comment on the sort

of tradeoffs that mature industrialized companies like Canada and the United States face.

I am wondering if you have come to any sort of broad conclusions about how it is we stay hungry. How is it we continue to innovate in the midst of great prosperity? We see other countries like Japan that face certain inbuilt constraints. Japan is resource poor in some respects, but it is also work force rich and has a very highly-skilled labor force, and a skilled labor force and industrial complement that certainly shine beyond our own country, Canada. How is it we can continue to emulate some of those values, and how can we continue to function, to survive but also to succeed?

DR. BARBER: That's an incredibly good question, and I wish that I had a clear vision of the answer to that one, because I think that for Canada, where we have been quite prosperous, we are not as prosperous as we used to be. We are really struggling with meeting our own expectations for the health system and the education system and the social services system in the country that we really can't afford any more, not at the same levels as we have expectation of, and so we are struggling in a way. But that is still not really fueling the innovation agenda, and it is because I think that amongst the leaders in the country, they are not very hungry at all, and maybe their desires are way too local and focus too close and I don't know how we shake out of that.

Let me give you an example. You heard in this conference that Canada and a particular part of Canada called Alberta is the second largest supplier of oil and petroleum to the United States, and I can tell you that province prospers, and they have been incredibly innovative in how to get oil out of sand, which is where their oil is, and there has been huge amounts of money made there. And there is a concern in that province by quite a number of people that they need to diversify, and they need to get into the knowledge-based economy, and they have money coming out of their ears. The money flows down the streets of Edmonton these days, and I am sure that happened in Texas here at various times, too. But it is very difficult to understand because in some ways, Alberta has the most nonsensical failures in knowledge-based industries of anywhere, while in other respects, they don't because the people who have the money know the energy business. What they know is the oil and petroleum and gas, and they are not really comfortable about investing in other kinds of advances. They are pretty comfortable where they are.

I don't know how you change those things when people are relatively comfortable. You know, as I say, I grew up in a pioneer environment just after the depression, and people didn't have any money. The drive to innovate and to make things better, every person was doing it. Every person was doing it. When I go to Alberta these days – and I am there very often – the comfort level is extremely high. People don't need it any better. They don't have any

driving force, and if you have an idea about that, I really don't know what to do.

MR. MAXWELL: I will comment and tell you what I think is going on. As these companies become more and more successful, they turn to management and away from leadership, and growth and innovation requires visionary leadership. You find these small companies, startup companies like RIM not so long ago, who have visionary leaders with lofty goals they wanted to achieve, and they lead the corporation to that level.

And then you see oftentimes they leave. There was something in the financial times this morning about whether the company Richard Branson is with can survive; I would argue probably not, at least not at the same level that they have been. But you look at people like Stephen Jobs, you know he started Apple and left Apple. Apple almost became nothing, and now they are back again. He demands what I have heard as a term used "a frightened sense of urgency." He beats the drum everyday, and I have read books about him. He is impossible to work for and demands excellence, but he sets the bar very high everyday and managers tend to manage what's already there. They don't set this visionary lofty agenda about where we are going and paint this picture for everybody that people can rally behind. Sure people get comfortable, but who doesn't want to be part of a winning team? Who doesn't want to go after some lofty goal that's going to change the world? Everybody in this room wants to do that, but that requires visionary leadership, and I don't think there has been a whole lot of that around lately. Again, go back to what happened in this country in the '60s. When is the last time a president said, "We are going to put a man on the moon by the end of the decade," and everybody went wow. I mean, why not? Let's go do it.

DR. BARBER: I think that's right.

MS. TODGHAM: I think we will put an end to the session, and I would like to thank our speakers, Dr. Barber of McMaster University, and Craig Maxwell of Parker- Hannifin. It was very insightful; thank you very much.

(Session concluded.)