



## An Interview With Dr. Herbert R. J. Grosch

*Q. Dr. Grosch, how can the drafting of computer standards be effective when the field changes so quickly?*

A. One immediate answer to this problem might be to not standardize at all, but you have to look at the costs. In one year, we spend \$10-15 billion on computers in this country alone, and some people have predicted that in the distant future, thirty or forty percent of the gross national product will go into information exchanges of one sort or another—computers, telephone systems, and so on. If you look ahead to a gross national product of a trillion dollars, you're talking in terms of \$300-400 billion a year for computer-associated activities. If this is true, in any time section you take, no matter if it is only six months, we can make tremendous gains in efficiency and savings through standards, even if we have to throw them away at the end and do it all over again for the next six months. But we can't do this through existing standards methods or existing user organizations. We aren't geared to make decisions, promulgate them, propagandize for them, and abandon them that quickly.

*Q. Do you see the possibility of these user groups disappearing then?*

A. I hope so. In my view, a user group is essentially valueless after full operation of a new system has been achieved.

*Q. Isn't there some value in exchanging programs within a user group?*

A. The idea of an exchange is that I hand my program to a center, and that center distributes it to everybody, and everybody uses it. But they don't. I hand my program to the center, and the center distributes it, and that's the end of the process. Nobody uses these programs. They're more likely to benefit from the flowchart or the documentation than from the program. At the very earliest stages, when you are comparing notes on why you can't get a certain level of an operating system to work, a user

group is very valuable. The original purpose of a user group was to help members in such emergency situations, and even more primitive than that, to put pressure on the manufacturer, which is still an undercover motivation.

*Q. Does this pressure work?*

A. Not any more. The manufacturers have learned how to get around it. They do all of this free distribution, and they entertain, and everybody's happy. So now, what a user group provides is catharsis. You get up during a meeting and yell at the manufacturer, "Why don't these systems work?" and the manufacturer says, "Oh, we're trying real hard." And then everybody goes home. Well, the manufacturer is trying real hard, but he was trying hard whether that meeting was held or not.

*Q. In the government, assuming you arrive at some standard data elements and codes, won't you be able to exchange programs more readily?*

A. You have to start at a different point, though. You have to exchange complete application packages.

*Q. Such as the payroll package the Budget Bureau is looking at?*

A. Yes. A standard payroll, or a standard personnel record, or a standard government invoice. I admit this is a lot harder to do than just exchange a piece of it, namely, the data processing package in the middle. But that's where you find rewarding "commonality." But is that really standardization? I'm not sure that it isn't just the imposition of a single system. One way to get a standard, of course, is to have only one alternative. When practically everyone had a 1401, there was a sort of imposed standardization that IBM gave you free: "Buy a 1401 and the guy next door will help you."

*Q. So any enforced standardization from IBM's dominant position is not all bad for the government?*

A. It certainly has its advantages. The Air Force had this in mind in its recent spectacular adventure. It wanted to have

all 150 machines from the same manufacturer. Whether it turns out that they come from IBM, Honeywell, or someone else, that's a very useful form of standardization and compatibility.

*Q. And yet IBM is losing some of its dominance, or at least its percentage of the number of government computers is dropping.*

A. Yes it is. Whether it would be to the government's advantage to have three or four computer suppliers, each of which had ten, fifteen, or twenty percent of the business, instead of our present situation, is a different matter. It depends more on social judgements. The original economic philosophy behind anti-trust laws says you shouldn't have a giant build-up like IBM. But my guess is that we wouldn't be where we are in the computer field if there had been three or four outfits struggling for equal chunks of the business.

*Q. Still on the subject of manufacturers, what do they gain from cooperating in a standards program?*

A. The little manufacturer hopes to get a chunk of the big guy's business, and the big guy defends himself against antitrust action, or against regulation by someone like the FCC. I believe IBM would rather cooperate in standards and maybe lose a few sales than be subject to regulation in the way the telephone company is.

*Q. What do you think of the FCC study of computers and communications?*

A. It's not clear to me where this enthusiasm for regulating the analysis of data comes from. I'm not surprised at rate-setting for data communication; that is, how much to charge for Telpak or the terminals on a line. I'm talking about the idea that computer service may be a subject for regulation. I'm certainly in favor of having early concern with the social and regulatory aspects of the problem before we get our positions frozen, but there is a growing feeling, I think, that regulation is necessary in the computer service area, and I honestly don't understand why.

Dr. Grosch is the Director of the National Bureau of Standards Center for Computer Sciences and Technology.

*Q. There is another study of computers in the offing, by the Copyright Commission recommended by Senator McClellan.*

*A. I'm all for that type of commission, where you attempt to get all the different viewpoints on a subject. One of the things I have been disturbed about for a good many years is the "committee of enthusiasts," all of whom are pre-convinced of the advisability of a certain thing, who get together and call themselves a committee or a commission. Well, you can predict right off the bat what they will recommend—go, man, go! This is what happened with the committee that studied computers in universities.*

*Q. Are you talking about the Pierce report by the President's Science Advisory Committee?*

*A. Exactly. Everybody concerned with that is in favor of computers in schools. You're not likely to have anything come out of such a group but a recommendation to do more of the same. Now I can think of a lot of things I would rather do with \$300 million a year than spread more computers around the universities. Congressman Brooks pointed out rather clearly at his recent hearings that Dr. Hornig [Chairman of the President's Science Advisory Committee] was proposing \$300 million a year for educational institutions and this Center couldn't get an extra \$1 million.*

*Q. During those same hearings you talked quite a bit about performance standards. Why are you so interested in them?*

*A. I think it's partly because of my personal interest in computer performance. To put it in concrete terms, it's a pretty common article of conversation nowadays that time sharing doesn't solve everything, just as none of the other panaceas have—COBOL, or disk memories, for example.*

*But how do you make this sort of assessment at a practical stage of the game? If you do it too soon, you suppress inventiveness and experimentation. That's wrong. In spite of the cruel things I've said about Project MAC, for example, we need such experimentation. On the other hand, at just about the time when everyone hears about a new development and wants to get into the act, we should try to measure whether it is worthwhile or not. If it turns out to be worthwhile, but practical results are way down the road, then R&D funding, priorities within development agencies and laboratories, and the support of new business should be cut back.*

*This is what has happened in machine*

*translation. It isn't that people have given up an interest in semantics and human language. They have seen that in order to keep on having interesting adventures in the field, they have got to cut back on promises of immediate results and use available funds to explore those things that are going to give long-range understanding. Time sharing never arrived at that point. Long before anybody said, "Let's cut back our activities and look also at developing better batch processing and remote access techniques," everybody was in the act. It's been fascinating to watch this thing proliferate without anyone really having yet come up with any performance measures.*

*Q. Do you think performance standards will have to come out on a comparative basis?*

*A. Yes. If you try to establish an absolute in something like time sharing, everybody's absolute system is going to lead in a different direction, and you won't get any real guidance out of it.*

*Q. You also said recently that you are ambitious to put measurements on standardization and compatibility. How do you arrive at these measurements?*

*A. The first stages of this have already been undertaken. People are using timing calculations and simulation to choose between various machine complements or between competitive machines. You can extend this concept to include things other than simple hardware and simple software packages and get to the point where you even have management alternatives. We would like to have at least a broad context of desirable measurements as early as possible, so that we can do our tasks with some quantitative feeling.*

*Q. Do you have a set schedule in mind?*

*A. No. This is a long term project. It will take several years to lay it out and make substantial accomplishments.*

*Q. How does the Center for Computer Services and Technology fit into overall computer standards work?*

*A. We have two roles. We cooperate in the establishment of voluntary standards, and we aid the Budget Bureau and the General Services Administration in establishing compulsory federal standards, which are normally derived from the voluntary standards. Any day now, President Johnson is going to promulgate the first federal computer standard, the USASCII interchange code.*

*Q. What is the next federal standard?*

*A. The physical exchange media that go with the code. We'll probably issue a*

*standard on paper tape in a couple of months, then on magnetic tape and punched cards. But it might be a couple of years before we get anywhere with disk packs.*

*Q. Will the government enforce any federal standards ahead of voluntary ones?*

*A. We might establish a compulsory standard out of sheer, specialized need. Then later, if it turned out that the USASI standard was going to be different, we might switch to it. It's far better, of course, if everybody can start earlier. Right now, for instance, we are active in optical character recognition standards, and within the Bureau we've had some preliminary meetings on automatic typesetting standards. If we can start soon enough, we can afford to make some preliminary investigations and recommendations and avoid this business of people establishing big investments that they have to defend. On the other hand, we might have an entirely different problem, such as the one that is coming up in magnetic tape. A new technological development can come along and knock out all of the work we've done so far. We've been struggling manfully with 800 bits-per-inch tape standards for some time, and all of a sudden it looks like we may go to two or even four times that density with new recording techniques and new tape material. Crunch!*

*Q. How about software standards?*

*A. COBOL is coming along nicely, as are two kinds of FORTRAN, Standard and Standard Basic, both of which have been provisionally issued by USASI. But I'd like to talk more generally about software, if you don't mind. There are some fundamental differences between computer hardware and software that people have not noticed because of the way the field has grown. For instance, has it occurred to you that there are really no manufacturing costs in software? They are all essentially development costs. I don't mean to imply that a reel of tape doesn't cost anything, but the price is very small compared with the cost of writing the program in the first place. I think this difference explains a great deal of the difficulty we have had in managing software work. We learned to manage the manufacturing costs of hardware very efficiently, and that helped us in managing hardware development costs. But there has been no way of creeping up on the development costs of software through manufacturing costs, because there aren't any to speak of. You have to start out to control the development costs, and we aren't very good at this.*