a major in business with a special reference to the handicapped. I can think of a lot of topics for such a major--policy analysis, industrial organizations, employment practices, work place design, environmental analysis, and a lot of other courses. Wouldn't that help progress with respect to the handicapped?

What about other areas in liberal arts, things like psychology and sociology, human resources for the handicapped, and recreation. Couldn't there be well defined majors with subsets emphasizing the handicapped area. Maybe one of you would care to comment to what extent these things exist. Because, as more younger people enter these areas, some of the questions that we are addressing may interest them and offer handicapped and non-handicapped persons alike employment, growth and solutions.

DR. NUGENT: I think that there are perhaps two or three different answers to that question. First of all, many of these things do exist. We do have these sorts of people in various of our preestablished professions; for example, recreation has recreational therapists. We do have rehab counseling, which is an offspring of psychology. We do have rehabilitation administration, which is an offspring of hospital administration.

So some of those things do exist. I think the real ultimate success will be when all of the disciplines, particularly at the college and professional training level, become fully and appropriately aware that this segment of our population warrants inclusion in psychology, in sociology, in liberal arts, and in

what's going to be and they are scared to death. Now the kids aren't as scared as the teachers are. Things like this exist right on down the line. I think that there has to be more integration of knowledge about handicapped persons into the regular courses, more than just specialization--which, however, is also needed.

NUGENT: There is nothing different about business if you have a handicap or if you do not have a handicap. There may be a little difference in the way the individual with a given disability exercises his approach to the problem. He may wheel instead of walk or use some type of device where somebody else may not. But we've graduated people in business administration that have no arms at all, and they are excellent in the field. They do accounting and can be read in those small columns much better than my writing can be read. So we can't supercede the challenge to the individual to develop his capabilities and to utilize those things that will supplement him. We shouldn't change the professions for disability.

VANDERHEIDEN: Principles don't change, it's just strategies. I think there ought to be something in one's background concerning the development of strategies. I think this is part of rehabilitation of personnel. How do you develop strategies to allow handicapped persons to do, not to do specifically this or that, but to do the other thing? Just do When the individuals then go out and they hit the world, they are able to figure out ways to do things.

I think this is the crucial part. We try to avoid giving our people the ability to do anything. We have to teach them how to

and in the whole medical professions. It seems to me that it's a critical problem that still needs to have inroads made in it, if there is going to be long-term care, supports for independent living and all of that. Do you have any ideas on how that could be attained?

NICKEL: Yes, I think the Federal Government has done enormous harm in this. They have meddled inadvertently although with good intentions, I'll agree. I totally accept that, but truly the results have been totally different that what were hoped for.

VANDERHEIDEN: I think that the key to a lot of these problems goes back to something that you mentioned earlier. We talked about how the use of a communication board was barred in a lot of schools; speech pathologists said they were not supposed to use communication boards, etc. All of that has broken down. All of these things were suddenly accepted when the Government said, I'm sorry, you have to teach these kids, you have to provide them with adequate educations. At that point, the schools were no longer able to say, well, I'm sorry I can't teach them; I don't have the tools, and I don't believe in those tools because they are not the way that I think we ought to go.

What happens when you are forced to actually achieve? Then, I think you begin to look for alternate strategies. That's when people start looking away from the way they have been doing things and looking for new ways. Because they have to serve and the way they are serving now just won't work.

NICKEL: It is happening all over the place. You wouldn't do it precisely that way in acute. You see, there is some difference. But I would like to point out another thing. I don't think we want to leave this on a negative note. If I see a patient, and I'm an acute doctor in background, I mean acute injury and acute illness, I recognize the natural and logical and absolute, inevitable choices to the acute. Rather than treat a blindness, I try to prevent it. It is so much better, that's obvious. But acute problems are generally well cared for. That took years to evolve. I mentioned tuberculosis and some of these others. These are now generally well handled; now it's time to chip away at these other problems. We are doing this and they have improved markedly.

I remember a time when it was almost impossible to get a prosthesis for any human being unless he were a veteran. Now everybody gets a prosthesis. For example, take wheelchairs. When I went to Rancho, we had not a single metal wheelchair. Not a single one. Well that has changed radically. Things do change and they are changing. These are devices that we've seen and some of them are becoming accessible. A few years ago, accessibility was a dream that seemed hopeless, wasn't it Tim? Now it is almost everywhere you see; the curbs are ramped here, you people are in this room with a wheelchair, and so on. So things do happen and they are happening. I don't want to leave it in the negative. But like in anything, you have to keep

have any Federal program grants right now anywhere in that area. But it is something that we're doing and I think it is the only kind of thing that can be done on a local basis.

Rancho has areas of expertise; right on down the line you'll find people who are really on top of individual areas. In addition to that, you need some central place so that people can go there first and get the general information. Then they can go to other places, we'll call them special topic expertise areas, to get further information on specific areas. If you're interested in any of the areas I've been talking about here, just write to our center and we will send you all sorts of things about them.

PAN: How will disabled people know about your center?

VANDERHEIDEN: Well, when the national, the NEMIS system, for example, refers things--that's the special education national information center. Also, when you go to your Government agencies, they generally know where the major centers are and can direct you to them. There is, of course, a great need in this area. There was just a conference on this; you can talk to Joe Traub afterwards about that conference. A lot of work is being looked at very carefully in that area aimed at providing some kind of a system. There have been a lot of information systems set up; they come and go. I think they are really trying to look at something that is based, not just on some one place, trying to know about everything, because that doesn't work, better to set up some kind of a home base and a network of places where the expertise lies. I think this is where the key is going to lie.

about 120 data banks. However, preliminary search of those data banks, with the exception of the SSIE which lists research, and maybe one or two others, did not yield too much relevant information. Maybe two or three out of over the 100 data bases have any information that I would consider useful answering the previous question. Probably one of the most useful things I found is the communications newsletter that Gregg Vanderheiden's group puts out. I'm so impressed with their basic but effective method of delivering information. They now have five issues of this communication. It only costs $12 a year. I'm selling this, but it's so beautifully done and so simple. Could you explain it a bit more, Gregg?

VANDERHEIDEN: The primary effort for this comes out of Michigan State University. We have been collaborating with them on it, but the credit goes to the staff of the Artificial Language Laboratory of Michigan State. They are doing all of the work. The newsletter is called Communication Outlook and it is a newsletter on the area of nonvocal communications, aids, techniques, controls, and things like this. The newsletter is one of the few newsletters that comes out that talks nothing about the program at Michigan State; it just talks about what is going on in the field. The objective we had in setting the newsletter up was to just have some way of getting information out in a matter of months instead of a matter of years, which is usually what happens in the area. Anytime a new aid comes out, a picture of it is in there. The area of nonvocal communication cuts across about six fields, so we have something called cross reference where all of the publications that appear in the Journal for Occupational Therapy,

private-public incentive relationship. I'm going to let the audience choose the other issues. I don't want to take the prerogative of choosing the other issues for discussion. We should discuss at least three, maybe four issues on November 16--just ten days from today. I hope to see most of you there.

AGENDA AND ISSUES FOR POTENTIAL DISCUSSION

AGENDA

The third panel/workshop was devoted solely to the analysis and exploration of issues concerning handicapped individuals by a diverse panel of experts in the subject area and by the audience. The panelists and their affiliations are shown below.

• Introduction of panelists and session moderator	Marvin Kornbluh, Specialist in Information Sciences and Futures Research, Congressional Research Service, Library of Congress, Washington, D.C.

Panelists	Affiliation
Dr. James Reswick:	Project Director, Rehabilitation Engineering Center, Los Amigos Hospital, Downey, California
Dr. William A. Spencer:	Acting Director, National Institute for Handicapped Research, Office of Human Development and Services, Department of Health, Education and Welfare, Washington, D.C.
	also
	Director, Medical Rehabilitaton Research and Training Center, Baylor College of Medicine, Houston, Texas
Mr. Joseph B. Heil, Jr.:	Assistant Manager, Services for Disabled People, American Telephone and Telegraph Company, Morristown, New Jersey
Mr. John Williams:	Deputy Director, American Coalition of Citizens with Disabilities, Inc., Washington, D.C.
Dr. Donald E. Galvin:	Director of the Universities Centers for International Rehabilitation, Michigan State University, East Lansing, Michigan
Ms. Rosalyn Rosen:	Director, Kellogg Foundation, Special Schools for the Future Project, Gallaudet College, Washington, D.C.

The interpreters for the deaf were Mr. Roy Craig and Ms. Janet Mishimura.

2. Technology Transfer

Like all forms of knowledge, technical knowledge gained from one field can be applied to uses different, and even remote, from the original application. Sometimes, a technology can be transferred directly with little modification to a new field; sometimes modification and/or adaptations are required. Sometimes we employ obsolete and more costly technology to applications because we are not aware of technological advancements. HOW CAN WE ACCELERATE, DIVERSIFY, AND MAKE MORE COST-EFFECTIVE THE TRANSFER OF TECHNOLOGY FROM SPACE AND MILITARY AND OTHER DEVELOPMENTS AND AREAS TO PRODUCTS AND SERVICES FOR THE HANDICAPPED?

3. Evaluation

Devices and systems for the handicapped are susceptible to failure with continuous use, especially at extreme temperatures and under adverse weather conditions. Prototypes--especially those poorly financed--require clinical, laboratory, and field testing under controlled conditions and with independence and objectivity. In this way, we may be able to ensure valid and reliable use over an extended period of time. HOW CAN TECHNOLOGY TO AID HANDICAPPED INDIVIDUALS BE BEST EVALUATED SO THAT INFORMED CHOICES OF THE MOST APPROPRIATE DEVICES AND SYSTEMS CAN BE MADE?

6. Measurement

The collection of accurate statistics on the numbers, and types, and locations of handicapped persons can be a tedious and expensive endeavor. At present, those who require information concerning the handicapped population obtain information through a "hodgepodge" of sources--most of which appear to be incomplete. Further, incorporating the information on the handicapped into meaningful measurements of their individual needs and encompassing economic and social costs to the Nation as well--such as lost earning capacities and increases or decreases in welfare payments--is not being performed in a comprehensive manner. WHAT ARE THE MOST EFFECTIVE MECHANISMS FOR COLLECTING NEEDED INFORMATION ON HANDICAPPED PERSONS AND INCORPORATING THIS INFORMATION INTO MEANINGFUL MEASUREMENTS OF THEIR INDIVIDUAL AND NATIONAL NEEDS?

7. Coordination and Cooperation

The handicap community consist of many and diverse groupings of handicapped individuals and their families, service providers, researchers, manufacturers and distributors of products, legislators, advocates, government administrators, and others. Each group has different perspectives. Thus, different jurisdictional, funding, accessiblity, educational, and informational priorities may arise and the community may fail to fully cooperate and coordinate with each other to attain similar goals. WHAT ARE SOME EFFECTIVE MECHANISMS TO FACILITATE COLLABORATION AND COORDINATION AMONG THE DIVERSE GROUPS COMPRISING THE HANDICAP COMMUNITY?

of handicapped individuals. HOW CAN WE ENHANCE PUBLIC AWARENESS CONCERNING THE DAY-TO-DAY ACCOMPLISHMENTS AND DAY-TO-DAY PROBLEMS FACED BY HANDICAPPED PERSONS AND SUBSEQUENTLY SHOW THE NEED AND THE ROLE THAT TECHNOLOGY CAN PLAY IN THEIR LIVES?

On my far right we have Mr. John Williams, and this is his name tag. John is Deputy Director of the American Coalition of Citizens with Disabilities here in Washington, D.C. Immediately to the right of me we have Ms. Rosalyn Rosen: Ros is Director of the Kellogg Foundation, Special Schools for the Future Project at Gallaudet.

Now, time does not permit me at this moment go into details on their backgrounds; but should anyone here wish to converse with me or any of our panelists during the break or afterwards at the end of the session, feel free to do so. We have a number of interpreters--we have two official interpreters and a number of other people who can sign also; so--if you want to speak to Ros during the break, feel free to do so with reference to what the Special Schools for the Future Project is all about or anything else. She is with Gallaudet as I said. Should any of you have a need to contact her or any other panelist in the future, feel free to give me a call here at the Congressional Research Service in the Library of Congress.

Immediately to my left I have Dr. Don Galvin. Don is Director of the Universities Centers for International Rehabilitation in Michigan State University. Immediately to Don's left we have Dr. Jim Reswick. Jim is Project Director, Rehabilitation Engineering Center, Los Amigos Hospital in Downey, California. On the far left we have Mr. Joe Heil. Joe is Assistant Manager, Services for Disabled People, American Telephone and Telegraph Company.

SPENCER: All right. If I can hold out on my Radio Shack amplifier, we're all right.

KORNBLUH: All right. Before we begin, I'd like to explain our procedure. We're going to discuss three or perhaps four issues; and there are nine issues listed on the back of the background materials. Issue No. 1 is on the program because a number of us feel it's very important, and I'll read it again before we go into the discussion of it. Then we will discuss two or three other issues. I'm going to ask you to vote upon which ones. So while I'm talking, if you would kindly put the numbers 1, 2, and 3, next to what you feel are the three most important issues. We'll take a vote in a few moments on which issues will be discussed.

The procedure for discussion will be, first, to have comments on the issue by any member of the panel who wishes to make a comment and countercomments. We'll try to limit the panel discussion, maybe, to 20-25 minutes. I'm sure you'll have many questions to ask of either the panel member or comments that you may wish to add relative to the issue--either to explain the issue more clearly, to amplify it, or to provide some nuances about the issue, or to offer limitations, or even some solutions and responses relevant to the issue.

Now, we don't necessarily expect final answers from such discussions. What we hope for, obviously, is clarification and further understanding of some of the major issues that exist

All right. The first thing I'd like to do is to select the issues for discussion. If I could ask Pam and Cheryl to also count with me to see that we get a reasonable count, and I'd also like to ask the panelists to include themselves in the voting on the issues. If you'd turn toward the issues, I'd like you to look at issues two to nine and put a 1, 2, and 3 next to three of them. There's only one person excluded from voting, and that's me, because I don't want to bias or prejudice anyone. After we're all counted, I want to make sure that Bill Spencer has his vote included. I'm just going to read the number of the issue and the major title. You will raise your hand if you marked a "one" next to that number. Otherwise, don't raise your hand. If you've marked nothing or "two" or "three," don't raise your hand.

No. 2 is Technology Transfer. Yes, Don?

DR. DONALD GALVIN: Can I ask a question?

KORNBLUH: Surely.

GALVIN: Can there be a brief discussion on each of the issues?

KORNBLUH: Well, what I've tried to do is give a brief discussion in short paragraph form on each of the issues to try to convey some of the intent of what I was driving at. I did try to create a key word or words, a short paragraph, and phrase the issue as a question in capital letters. I realize that there are multiple interpretations of a potential issue, Don; I understand that. But let me not cut you off, please. What were you going to add?

KORNBLUH: Let me correct myself. I wouldn't use the word, "noise" in the direction of the speaker, because noise has a very special meaning in engineering.

SPENCER: Maximum information.

KORNBLUH: Correct. Okay. Who would like Technology Transfer? Who voted No. 1 for Technology Transfer? Please raise your hands. Nine--is that the count you get? Okay. I delegate Dr. Galvin as scorekeeper. I think he's tallying. I appreciate it.

Who voted No. 1 for Evaluation? Ten.

Who voted No. 1 for Standardization?

SPENCER: Marvin, I did.

KORNBLUH: Okay. Thank you, Bill. Do we have any other No. 1s? Bill, you're a voice in the wilderness for No. 1. Maybe I could ask to address us later on why you voted this No. 1?

SPENCER: I appreciate that.

KORNBLUH: It's also in keeping with what Don Vargo said, also. I guess we don't fully appreciate, all the manifestations and nuances of some of the issues; but we'll try our best.

Okay. Who voted No. 1 for Delivery System? Seven, is that correct? Do we all agree with "seven"? Could you raise your hands again, please? Eight. Is that what you got? Eight.

Measurement. Two for Measurement--three. It's interesting just to see the vote.

Coordination and Cooperation. I count "two." Is that correct?

SPENCER: I'll add "three."

just the issues that received ten, nine, and eight votes. We'll do that very quickly.

Okay. Who put Evaluation as No. 2? Raise your hand, please. One. Okay.

Who put 2 on Technology Transfer? Two.

who put 2 on Delivery System? Eleven.

Who put 2 on Public Awareness? Nine.

Well, Bill, did you put a number 2 on either one of those three? What did you put 2 on?

SPENCER: Awareness.

KORNBLUH: Okay. We've got yours counted to make ten. My goodness. Delivery System has eight No. 1s, eleven No. 2s, and Public Awareness has eight No. 1s, and ten No. 2s. So what I'm going to do is discuss the Delivery System issue next--if time permits.

QUESTION: Marvin, did you skip Coordination and Cooperation?

KORNBLUH: Only because it only received only two No. 1 votes. I took the ones that had the most No. 1 votes, eight, nine, and ten. Then, I took a second vote on those. No matter what method is used, I'm afraid not everyone will be pleased. I have to confess that to be true. I'd be delighted to hold another workshop at some future time to discuss any remaining issues, should any of you desire to do so. I'm delighted there's such interest; that says to me that all of the issues are very pertinent, very relevant, and I'm just delighted to have that reaction. So, I guess, with your permission, I'd like to say that Incentive will be No. 1, Evaluation No. 2, and

Bill, I'm going to ask you to begin the formal part of our program and make a comment on that issue.

SPENCER: Well, fortunately, distance is between us, so any brickbats or assorted vegetables you want to throw at me won't hit me.

In respect to incentives, my feelings are the following. I don't think we have made a sufficient analysis of those products; first, are they usage ready--those we consider to be technological? In other words, can the products be taken directly "off the shelf" and be purchased by the consumer or the provider or are they "medical prescription items" which have to be customized and specially adapted to handicapped persons?

Now, why do I think that's important? The answer is because I don't see how we can decide on who are the potential manufacturers and distributors until we understand the match between what we have ready, what will be over-the-counter, what will be prescription, and how many people there are potentially who makde up the market. I'm going to be cynical; I don't think manufacturers--certainly, the large manufacturers--are much in a position to deal with small volume systems because their incentives are, (a) money and (b)--now I'm not cynical--social values. And, finally, (c) market forces. Market forces are greatly influenced by financing, by the public demand, and by political pressure.

Now, if you consider these, I think the incentives are going to depend on knowing where the production is likely to occur, to

KORNBLUH: Thank you very much, Bill. To continue, I'd like to turn to Joe Heil who's a representative from the business establishment. I had conversations on these points with Joe before, and I'd like to ask Joe for his comments and response, please.

JOSEPH B. HEIL, JR.: Marvin, I think at the outset a very important thing should be highlighted, namely, I'm here. I think in the past we in business have been very absent from discussions like this. I think this was due partially because of our lack of awareness, and I won't say anything more to prove my point.

KORNBLUH: Excuse me for one moment. Bill, are you picking this up?

SPENCER: Marvin, it's chopping up. And I think maybe if you can direct the speaker toward the microphone more, it would help.

KORNBLUH: Okay. We're just moving the microphone a little bit over to him. Could you continue, Joe?

HEIL: Yes. Bill, you made an extremely good point out there in Texas that I think is worth repeating. You said that there are items that can affect all of us that must be in the marketing process. I don't think the unique, one-of-a-kind solutions to a very serious problem are ever going to have the market potential of big volume.

I think it's very important that business become aware--and I think Pat Forsythe mentioned awareness in the earlier discussion. If business can become aware and knowledgeable of what the needs of all of its public are, if it can recognize that disabled people are a sizable market segment of 36 to 40 million, depending on whom you

share this information somehow. I go back to the beginning as my way of closing this portion of it, and that is, it's important that we're here and it's important that you invite other business people. We've got a job in business to create awareness; and, certainly, recent meetings by Andy Zucker at HEW, being invited to Smith Ketterwell by Dick LeClaire, are ways to do it. I would hope this meeting is the beginning, and I would hope our business communities, both large and small, will respond. So I thank you for having me here.

KORNBLUH: Thank you. John, perhaps you can give a perspective from the consumer on this private-public relationship.

JOHN WILLIAMS: I think business must also expand its communications program to the whole community. If you look through newspapers, you will not find any manufactured product that is aimed at helping disabled people advertised in The Washington Post, The Washington Star, or any major publication; yet there are large segments of disabled people out there who need specialized products.

SPENCER: Marvin, can he get closer to the microphone, please.

KORNBLUH: Okay.

WILLIAMS: How's this?

SPENCER: Much better. Thank you.

WILLIAMS: Okay. I am sure that business must be aware of more of the needs of the disabled community that--let me rephrase that.

Bill Spencer's comment in terms of developing the worldwide market. While we speak of 34 or 36 million Americans who are disabled, there are any number of more disabled individuals in the world; if we could develop on that scale, we might then have a sufficient market. But there are many impediments and barriers to this kind of international exchange of technology, and perhaps we'll get into that a little bit later.

Lastly, I think that there will always be the issue of the individual product for the individual client, and this is perhaps why in my vote I voted for Delivery Systems as No. 1; because I think that the mass market items we were talking about will only solve a certain share of the over-all problem and that perhaps the major overriding issue will continue to be the development of individualized devices, systems, for handicapped individuals. And the question then becomes, "How do you pay for these systems--often when they're very, very expensive?" Oftentimes, the problem with the State rehabilitation agencies, for example, is that they simply can't afford in any great number to pay for some of these systems.

KORNBLUH: Thank you, Don. I'd now like to turn to the woman on my right who's from Gallaudet. What I'd like to do is ask Janet, one of our interpreters, to mention to Ros that we would like to hear some of her opinions and, if you would please interpret for us; perhaps you could possibly move the chair closer. Is that possible, Janet? Now you can speak into both of the microphones.

Ros, if you would, please.

of it. So that leads to a communication problem, language development problems, which, in turn, lead into other areas of problems including emotional and social and academic retardation. There are about 11 to 15 million hearing impaired people in the United States, 500,000 of whom have a severe loss. So keep that in mind.

I would like to respond to the question on incentives; it's a little bit difficult to respond to that in itself because all the issues here are inherently related in the sense that we need public relations efforts to get many societal sectors interested in meeting the needs of handicapped people. We have to find out what handicapped people themselves need. They also have different opinions and different needs and, of course, different preferences in products.

We also need laws. There are already some laws on the books, but they are not being enforced; for example, the barrier-free environment. It's not a requirement for all public and for some private companies; but programs, different things, without public awareness, without the consumer advocacy, nothing will happen, nothing will be done, without financing, without funding. The programs will use that as a "cop-out" in their duty of making their program accessible to all handicapped people.

There's no question on the need of incentives which, as Bill mentioned, and as some of the other panelists have mentioned, should be in the form of outright donations, outright grants, or tax breaks, or some great publicity to get the manufacturers interested in developing products with the potential for spinoff

incentives, that the companies, the public, the manufacturers, will begin to meet the needs we have been discussing.

KORNBLUH: Thank you very much, Ros. I do want to take special note to agree with you very strongly that these issues we are looking at, indeed, do overlap. They are not mutually exclusive. But I had to arbitrarily make dividing lines in order to ensure some concentrated discussion; but there's no question that all of these issues interact.

I'd like to provide now the opportunity for Jim Reswick to make some comments. I'm sure he can make them from many perspectives--from the medical perspective, from the consumer perapective, and from the business perspective. Please.

DR. JAMES RESWICK: Being last, there isn't much more I can do but to reinforce a number of the things that have already been said. It seems to me that we have to start from a free enterprise system where private enterprise is successful primarily from a marketing point of view, and the issues are primarily marketing issues. These are clearly stated in Marvin's succinct summary in his issue statement. He lists them and they're really the tips of a number of very significant icebergs--the issues of product liability, of FDA approval, of the customer being the practitioner rather than the consumer primarily, maintenance, the requirements for education, and so forth.

What this means for me is, as Don Galvin said, that the real issue lies in the delivery of rehabilitation engineering

slight change in the way you organize your daily activities." And that requires, then, a careful look into the activities of daily living and how the client is coping with a wide variety of problems.

And, secondly, when a technology does seem to be appropriate from such an interview, very often the cost and the device itself are a small part of the cost and effort to make it actually available to the person because each person's needs are quite different, the device often needs special kinds of input--transducers, let's say--to take advantage of the limited ranges of motion and function of the client; and, secondly, the simple things like supports, and so forth--mechanical brackets and the like. But what I'm driving at is that the delivery, the adaption of the technical device to the patient, is often more expensive in terms of engineering time and actual cost of materials than the device itself.

And so, for a manufacturer to market effectively this particular device, he's faced with introducing it into a system that does not exist effectively at the present time in the United States; and until it does, I don't see how any pump-priming from the Federal Government, subsidizing, or research and development, and so forth, is going to make a significant difference.

KORNBLUH: Thank you very much. What I heard you say, Jim, was that we have devices which may be new or may be modifications

needs that new knowledge and use of existing knowledge and technology provide, and connecting the problems of the handicapped, with the fact that the continuing social-economic development of a country like ours really needs their contributions and their productivity. We have to--as the engineers say--close the loop so that there is a continuing process of movement according to progressively refined goals and objectives; this should include the people affected, the people with the solutions, and the people authorizing or deciding on the disposition of both private and public resources. This thing can't be solved by one element. The handicapped alone can't solve it, the practitioner alone can't solve it, the engineer alone can't solve it. Certainly, from my recent experience, the politican and the administrator can't solve it; therefore, I feel that we're in a situation where we need to develop some small models of the thing that we think needs to happen, that is, in fact, a system, and that system should include the elements for early success in areas that can be solved with existing knowledge. Also, we need to define the boundaries of how to create this interactive system.

In other words, we have to, in proper phase relationship, if you want, and in proper timing, connect the development of better data bases on needs, experiment with distribution and service delivery systems, improve the linkages with private industry, and develop coalitions across the private-public sector to finance. Unfortunately, even the most apparently trivial problem is way beyond our current available resources.

technology, I think, in the sense that you all are defining it, is going to require this same sort of very deliberate and carefully planned interaction and good models. Further, each model has to really be sufficient to go all the way to solving a perceivable problem and need, and be something that handicapped people themselves recognize as helpful.

Then, at the same time, try to understand the problem of customizing and individualization because that's going to be with us forever as we deal with the unique problem and unique condition of an individual handicapped person in his own environment.

KORNBLUH: Thank you. Joe, did you have another comment to make?

HEIL: Well, I think a couple of things were pointed out to us from Texas, and I don't want them to slip by us, Marvin.

One of the difficulties of the consumer and sometimes the businessman is distinguishing between research that is consumer-product or consumer-solution oriented and research which is basic. We have a little research organization of our own. A lot of our work starts with me, the Market Manager saying, "I have a need that must be addressed and must be solved." My need is for a product that will go into the market place at X-number of dollars--because that's what the customer has said he's willing to pay--and I need you to develop it. Now, we have another group of people, God bless them; we throw them into a room, throw

question of any member of the panel, you can ask and answer the same question if you like, or any contribution you wish to make. I'd like to say, "Keep it within a reasonable time" and I'll determine what is meant by "reasonable."

Don, please?

GALVIN: Stay very close to the microphone. It's the loud signal that captures this system.

KORNBLUH: Okay. We'll set one up right over here. Would you mind, can we put another one over there?

DON VARGO: I'm Don Vargo from NASA, and I have a couple of comments I'd like to make very briefly. The problem is extremely complex, as you've heard. We have made a stab at part of the problem, and this is, "How do you get small volume products out?" I think we've solved that. And what we do is, first of all, a market study. We have the mission agency involved so we're sure there's a need for this because they've told us there's a need. We then get a manufacturer in as soon as we can, and the manufacturer will do things like cost-share in the product if he thinks there's a big market. If he doesn't think there's a big market, NASA has to come up with all the bucks. But we involve the manufacturer, and we are getting small bits of technology manufactured and out into the public. I think that it's a scheme that you can look at.

Now, we haven't addressed the problem of product liability or insurance at this time, and it needs to be addressed; I think the problem of service delivery, particularly, that Jim Reswick brought up,

KORNBLUH: Is there a question from anyone in the front row?

SPENCER: I'd like to respond to that, Marvin?

KORNBLUH: Okay.

SPENCER: We have that question that many of us agree with the idea of how can you get purchasing power in the hands of handicapped people. The Teague Panel Hearings clearly brought out how to widen science and technology programs to benefit the handicapped person. The difficulty, though, that you come into here is that there is no public system to reinsure loans and financial assistance as we have for housing purchases, for example, or for automobile purchases. There are no special arrangements of this sort. The second problem is that when you do set up systems that will provide financial help to the handicapped person, you're dealing with public and personal attitudes. Let me illustrate. It is extremely difficult for a handicapped quadriplegic, a young person who is fully capable of working--in fact, may even have a job--to get a loan from the bank in order to have a van that is wheelchair accessible; with it he can get back and forth to work. The banker says, "Well, my God, you're disabled, you're handicapped. You couldn't possibly pay us back." And even ignore the fact that the man might even be working for his own bank.

So I'm very concerned about the public acceptance and the evaluation that individuals place on giving this opportunity of purchasing power to the handicapped so that they can, in turn, pay it back. There is not a simple solution to this problem. I

We started off the meeting with the presumption that the society somehow or other ought to make available monies or incentives to private manufacturers, academic professors, nonprofit organizations, so they could make available products for disabled persons in a way that provides an incentive for them to participate in the society's work. I think this is a basic difference in philosophy, and I'd like to turn around the first point and say, there should be, instead of an incentive, a social commitment in the society so that all these devices become entitlements to needy people rather than incentives to manufacturers.

The second point deals with some of our experience in terms of developing worldwide markets for products. We've found in terms of making and selling products overseas, that the problems of little foreign exchange and little real money are critical. Also there are problems of a very limited rehabilitation philosophy abroad, and little of a social integration of disabled persons into the mainstream of education and employment. These realities go pretty far to reduce the viability of solutions that would mean the development of products for worldwide markets.

The foundation, as I mentioned, makes available a wide range of products, some of which we developed with our own funds, seed monies from public contributions. In the last few years, I'll give you an example, we've made available a talking thermometer that substitutes for a 98-cent thermometer to take your own temperature or a thermometer to measure the temperature of your roast turkey

research when it goes into the Department of Education that is also being conducted by the Department of Education.

Unless we are somehow or other able to reduce the red tape and reduce the duplication, I feel that any kinds of tax incentives to private industry are really going to be set aside because private industry will find that the bureaucracy is too time-consuming. They just will not put in the time in order to get the tax incentives because it would be too costly to them; thus, the monies that they might save ultimately by getting a tax break they will spend in terms of doing all the paperwork.

So I would like to pick up on the point, again, and make the comment that it seems to me that we've got to put more money in the hands of persons who need the aid, and that kind of demand will result in organizations all over the country getting more involved.

KORNBLUH: The idea of incentive versus social commitment sometimes brings to my mind the opposing forces of the bottom-up theory and the trickle-down theory of our economy, and what each conveys. They certainly represent two points of view, and this is one reason we have elections, generally speaking. Susan, you had your hand up before. Could you come over here, if possible, please. Then Andy we will get to you.

SUZANNE BRAINARD: I'm Suzanne Brainard from Control Data Corporation. However, I am speaking as an independent citizen rather than a representative of Control Data.

KORNBLUH: Thank you very much, Suzanne. Andy, if you would?

SPENCER: Can I comment, Marvin?

KORNBLUH: Okay, Bill. One comment.

SPENCER: One comment. We now have a tool. It's called Public Law 95-602 which established two things--a National Institute for Handicapped Research and a National Council for the Handicapped. Now, if they'll ever be announced and put into motion, there is a process explicit in that law which is worth trying to achieve a national agenda and a national policy on these matters. But the only thing I would caution you is that to translate from law to administration, to change behavior of practitioners and, yes, of consumers also, is going to take time; but I think the intentions and the methods are there. I hope that we can find the means to support adequately those processes because it is possible to get the act together. The law now requires it and the mechanisms in the law would permit it; but we're still dealing with human beings and their interests. The first thing is not to assume that the problem is soluable by any one sector of society but rather recognize the fact that we're all part of the problem and part of the solution.

KORNBLUH: Thank you.

ANDY ZUCKER: My name is Andy Zucker, and I work in the HEW Telecommunications Policy Office. It still surprises me the degree to which technological capability is so closely related to questions of justice. There have always been famines and it has

this goes way beyond the question of the handicapped to such things as medical science and organ transplants that we all have to deal with. I don't have any answers to offer.

KORNBLUH: Thank you. I'd like to entertain one or two more questions, if it's possible. We have another question--or comment, I should say. I see that we could easily devote three hours to this one issue of incentive without any problem; but I'm just going to limit it to one or two more comments.

RICHARD KEELEY: I'm Richard Keeley, representing Congressman Walgren of Pennsylvania. I want to make a comment on the business sector and the handicapped. I think that busines can become aware of the needs much more readily if they employed more handicapped people. A comment was made that banks have difficulty in justifying loans to people needing adaptive equipment, particularly vans. If those banks employed the people, they would see very quickly that the handicapped person who got to work and did a productive job deserved the loan.

I think that they would soon also see the modification of environment that's needed. You would have a learning experience both on the part of the employer and the employee. One of the problems we run into is that rehabilitation centers go all out for activity of daily living devices within a closed environment. The patient who leaves the rehabilitation center is no longer a patient, and he runs into unforeseen problems. And quite often he is out of the system of being able to be reimbursed

technology and mass production and the like or whether it requires a special service capability to meet a specific need of a client or patient.

KORNBLUH: Thank you. I'll have another comment. Is there any other comment from the audience?

Okay. I'd like to recognize John, and then Joe. Is there anybody else in the audience who has a comment? Okay, Fran. We'll limit it to those three and then we'll go ahead to the next issue. Should you want a cup of coffee or to go to the rest rooms, feel free to. I want to continue to the next issue without a formal break.

So John, Joe, and Fran. And then we'll continue to another issue.

WILLIAMS: I think that, since we are talking about incentives, we should look at the long-range incentive and begin to realize that unless disabled people in Government, business, educational institutions, and research institutions--unless they all get together now--the long-range economic incentive is going to be very, very dangerous to the country. As the population lives longer, there are more and more disabled people. Sooner or later you may reach a point where you have something like one-half or even one-third of the Nation really supporting one-half or even two-thirds of the Nation. I don't think we can really afford this. I think that the economic incentives have to come from everybody.

the Nation to work with. A deaf man in Minnesota once said, and I think ths is important, "I want deaf and disabled people to be making enough money that they can pay for things themselves." I think this is extremely important on many consumer products. We in business and you in Government and private industry share the burden. We've got to make job opportunities there not merely threshold jobs--jobs that have real progression.

When a blind man went to work in Little Rock, Arkansas, to operate a switchboard, he was very excited that he had a $250-a-year, excuse me, we pay better than that, that he had a $250-a-week job; but he wasn't on that job mingling with able-bodied people very long before he began to think, "I'd like to be the chief operator," "I'd like to be the District Traffic Manager." So I think not only is employment to get people in jobs, but a recognition by Government, private agencies, and business for progressions. So I think business has a long way to go, and I don't think we're alone.

KORNBLUH: Thank you. Our last comment or question will be by Fran.

MS. FRAN LOWDER: My name is Fran Lowder and I'm with the Implementation Unit of the White House Conference on Handicapped Individuals. I have a couple of things I would like to mention. I think there's been a long-time separation of where the stores or the marketplace is for some of the appliances or the gadgets

In some of the materials that the 12-member Interdepartmental Advisory Group developed, and there was a great deal, they launched into the problems then surrounding such items as proving that the import of a transistorized, electronic recorder of some kind is for a handicapped-only purpose and the definitional problems such as whether there can be a conveyance that is a mobility device for a handicapped child with no arms--something like that. What I've been saying concerns the business of proving that the purchaser bought it to offset a disability as compared with the business of buying it for a leisure vehicle or something else. I think it's still stalled, as far as I know. Nothing has happened. This relates to the whole business of trying to keep everything separate. Some of those recorders really would be just like they come on the market. Some of them might have special controls or buttons or levers or something that you do to make it operative.

I would like some of the panel people, maybe Don, especially, to talk about some of these things a minute.

GALVIN: There's not much that I can add to what you said, Fran. I don't know of any success in realizing, to any substantial degree, that sort of transfer of technology products. Some transfer of technology has happened through the exchange of engineers and scientists between countries. Jim Reswick and others have participated in that. We have also had scientists and technologists from other countries who have studied here.

SPENCER: Yes. I think that the words "technology transfer" meant two things to me. One is, transfer between conventional sources that have developed technology and potential new users, and vice versa. And, secondly, the transfer of technology that has been developed to handicapped people. And I think you've covered the latter somewhat in the first discussion.

In respect to the former, of taking what is known, what has been developed, and using it a new ways, there has been both interest and support for this over a decade, to my certain knowledge. The first studied effort--and Don Vargo is quite familiar with this--was done to achieve technology transfer from NASA and NASA's sources of supply and R&D to the handicapped rehabilitation facilities. This was done under a grant from the Office of--called at that time, I believe--Vocational Rehabilitation which Miss Switzer had worked out with the NASA administrators. This was done with intermediaries in engineering, such as the Battelle Institute, the Southwest Research Institute, the Midwest Research Institute, and so on, which tried to connect up, link up, to NASA's information sources. What they had--either in the form of hardware or software--might be of use in solving problems being faced in rehabilitation of handicapped persons. Now, I have to say that there was as much transfer the other way--that is, from the field of rehabilitation, research and development, and practice--as there was from technical sources within NASA.

KORNBLUH: Thank you, Bill. Do the panel members have any comments? I'll turn to my right first, then I'll turn to my left.

RESWICK: As usual, Bill has said it all. The point that I would like to emphasize a little bit more, the need which I heard--or I think I heard--Bill saying, namely that the transfer of technology should be based on a real and careful definition of the need before the actual technology is sought after. Too often, perhaps, the technology exists in some form--an actual device--and goes out looking for an application.

SPENCER: Yes, exactly.

RESWICK: Now, in certain cases, that might not be too bad because, really, the essential issue in transfer of technology is information again.

SPENCER: Okay.

RESWICK: If the problem need can be defined effectively, and the people or institutions or whatever that are concerned with meeting that need have access to the information of what exists, in terms of technology, then the match can occur; that's probably the best way it can happen. One way to solve the information gap is for the device to go out looking for an application; but when that happens, somebody has to put on the breaks and make sure that the technology, in the form that it exists, doesn't dominate the situation. Rather, there is, or should be, a mechanism to really investigate the need and then come back and see if that technology is effectively applicable.

small tools, which either can be taken directly or can be modified and be applied to an individual person's situation.

Also, this kind of application deals directly with the problem of cost, because in these centers, and perhaps in some others, they've demonstrated that they can resolve some quite substantial problems at a cost of less than about $2 hundred a case in purchased material. Still, what we find to be the most expensive ingredient in these programs are personnel costs.

SPENCER: Two of the key words are "modification" and "cost."

RESWICK: And I think very often in applying and in delivering these kinds of services, you need a rich personnel complement. You often need not only engineers but physical therapists, occupational therapists, designers, rehabilitation counselors, and so on. So my point would be simply that when we think about transfer again, we not continue to think only in terms of the rarified atmosphere of space age technology.

KORNBLUH: Ros, you have a comment to make.

MS. ROSEN: I would like to focus on the marriage of the theory with the practice. We have many nice ideas, many nice theories, but many of them are not put into practice. Making a distinction between dreamers and dreammakers. Dreamers are people with the ideas but dream-makers are the people who bring

in technology transfer or, for that matter, in utilization of known knowledge and technology.

KORNBLUH: Thank you, Bill.

MS. ROSEN: Okay. That relates back to the question of employment of the handicapped. If they were employed in places or in agencies responsible for developing or for the utilization of those different developments, then those handicapped people could point out the possibility of modifying specific items to accommodate those greater needs and to other needs.

SPENCER: I think the health industry and the Government are the two largest nonusers of handicapped persons. They certainly do not employ as many as they could.

MS. ROSEN: Okay. And there are many incentives spread over the lot. We, in special education, are aware of the fact that when something new is developed in one area of specialization, we inevitably find another area, and we make modifications and similar applications. So I would like to take this opportunity to point out the need for the handicapped people to be up front--where the action is. They should not to be added on as an afterthought in development of things that might be initially considered to be way off base, as it relates to the needs of the handicapped people, because it may relate in some way later on.

mean that to be limiting; but they can advise, they can counsel, they can emphasize, they can protest. And then if business has got its hat on right or its head on straight, then they ought to be able to respond. But you're absolutely right. The consumer has to be up front.

KORNBLUH: Any comments? Frank, please.

FRANK WITHKOW: Thank you. I'm Frank Withrow from the Office of Library and Learning Resources, and I think I'd like to respond to Ros and to Joe and to Bill and to Andy. I guess, it gets back to two things--access and entitlement. The entitlement and access issue, I think, can be described in terms of the history of the teletype and the phones for the deaf.

The deaf were involved early on in the development of that system. However, it was interesting that the Western Electric teletypes have become an obsolete technology before they began to become available to the deaf. At the time that they were available, there was also in Bell Telephone Lab a much, much better data set that had not hit the market as yet; I assume it will become available on the market one of these days.

So my question is, "How do we get from relatively obsolete technology to the next quantum leap?" For example, in today's technology, we've heard about the caption decoder and the TTY types of things. There is no reason, it seems to me, that microcomputers could not provide both the TTY interface with the

telephone and at the same time provide the decoder for the captioning system, thus having one system rather than two systems for the deaf individual.

Back on the comment that Bill Spencer made, in terms of hearing aids and the acoustic environment. Don Vargo and I, a couple of years ago, were looking into the potential for taking some of that technology into the hearing aid companies. The problem was it was not an evolution of the existing technology. It was a quantum jump up into a new, larger scale technology and a very different technolgoy. As a matter of fact, I would assume that most of the current hearing aid companies would have gone out of business rather than retool into the new level of technology.

And my question--which is not simple--is, "How do we jump from the technology that is or was to technology that really can make a difference and can bring some of those costs down and can take advantage of large-scale production for other segments of our community?"

KORNBLUH: Magnificent question. Joe, would you like to respond?

HEIL: I think the big problem was stated earlier. I'm not sure I'm wise enough for the solution. Many of us are in businesses in this country--and I, for one, will say, "Thank God." We are investor-owned businesses working within a profit motive. And as I said last week, "A profit in Morristown, New Jersey, is with honor." didn't get any laughs then; I hope it does better now.

HEIL: Ros, I think your point about having handicapped or disabled people involved right from the first is probably going to be the key for industry to meet its obligation. Industry has to recognize needs. I must say that, had I not gone to Gallaudet three or four years ago, I'm not sure my awareness would have begun. I think the thing about involving disabled people from industry has to be a top-management awareness. Let me quote what is done out in Omaha, Nebraska, and not just because it's a Bell System company but it's a leader. Northwestern Bell has a consumer panel. This panel does not let the consumer make all the decisions; this is unreal in a business world. Further, the consumer cannot decide what must be made because he's not responsible for the stockholders and other people in the process. But the consumer can tell us how he feels. In Nebraska, they have a 15-member panel of nonemployees, non-Bell System employees, who meet with us on a regular basis chaired by a non-Bell person. Five of the people are profoundly deaf. We have two interpreters on the job. And people are flown from Minneapolis to Omaha to be part of this panel at company expense to tell us what's happening.

Now, I think we're not alone in this. I think GE has done the same thing in designing kitchens and things of this nature; but you're absolutely right. Business can and should get the knowledgeable disabled people in, and at the same time help disabled people understand their role in the process. I don't

people up front where the action is, where the plans are being made. And I guess that relates back to the need for consumers to become involved, to be in the position to provide input and to give the ideas for the transfer of a piece of technology to the different users, for example.

SPENCER: Marvin, I think that's been a hallmark of the recent developments for the rehabilitation engineering movement in the United States. Surely, this is only a beginning; but many of us have worked with informed consumer groups and heartily agree with you that it not only is their input, it's their participation that's essential in both definition of what they feel is important to get, versus evaluating the utility of what is provided. And I think a number of rehab-engineering centers now are aggressively developing this relationship for a very great effect. I think the problem, though, is that this is not widespread. When you involve a practitioner, not the development center that understands this problem, you've got to modify the educational system. You have to realize that with physicians, and many professionals, for that matter, those in practice are representing what was presented to them as the state of the art minus ten to 15 years. We have got to anticipate the fact that we have at least a ten-year lead time to jump ahead and get in phase or synchronize the educational process for the practitioner when he meets you, the handicapped person. I think that the educational element of this has been ignored--

I think that's a lesson which NASA has learned--perhaps, to a certain extent, the hard way--but now is effectively carrying on. Perhaps Mr. Vargo would have some comments on that.

KORNBLUH: It would appear that NASA has been quite successful in getting its technological transfer program known and publicized. Are there any other examples known to the panel or the audience or to Don Vargo from NASA of successes, from areas, other than space, where we can transfer inventions and products and devices from one area to other areas that are quite different? Maybe the device is invented for other purposes--perhaps for the military. The audience might be interested in knowing of other successes. Please, Don.

GALVIN: I might mention of a couple of engineering projects that I'm aware of which are community-based products which focus upon modifications in the home and the work site of persons with handicaps. One is here at George Washington University, and we happen to have another one at Michigan State. And I think that there are others that are being developed. The interesting point that I wanted to emphasize--and I think Fran Lowder referred to this earlier--was that in the instance of these two projects, I think, they found that the most helpful device to them in transferring technology was the Sears catalog. There were many items that have been developed for the other purpose--small devices,

In a parallel study we did some years ago for the National Center for Health Services Research, we were interested in the transfer of computer technology and software that was developed for purposes of care planning and scheduling for rehabilitation services and hospital services. Both of these experiences--the NASA technical utilization one and the experience with the computer applications--pointed out that you can transfer concepts and, to some extent, methodologies much better than hardware because, often, the hardware has been so tailored--not to an individual, now, but to a particular technical application--that it has lost the flexibility you need for usage with a person having a new use.

And I really have to say I feel that there is going to be a need to support both new ideas and new methods and new technology as much as there must be transfer of things that are quite generic. Sure, I can see where LSI, large scale integrated circuit technology, is going to provide flexibility in adapting communication systems and maybe someday even environmental control systems for the needs of the individual, but outside of those very broad areas, I think that the field dealing with the handicapped person through technology must come up through coalitions of engineers, physicians, and handicapped people and through studies and careful evaluations. I see more in new solutions than just transfer of old, beyond what I've indicated.

They can bring their ideas with them, and their "software"; but their hardware material is still subject to a lot of difficulties because of international trade regulations.

I didn't see this item, but I understand that President Carter made a speech about a week ago in which he called for greater international cooperation in production. And I think this was a generic statement--it didn't deal specifically with technology relevant to handicapped individuals.

KORNBLUH: That would be a good introduction now to the second issue, which is Technology Transfer. And I'd like to limit this a little bit, and what I will do this time is take volunteers from the panel rather than ask everyone in turn.

Let me repeat the issue. "Like all forms of knowledge, technical knowledge gained from one field can be applied to uses different and even remote from the original application. Sometimes a technology can be transferred directly, with little modification, to a new field; and sometimes modifications and/or adaptations are required." The issue, then, "is how can we accelerate, diversify, and make more cost-effective the transfer of technology from space and military and other developments in other areas to products and services and systems for the handicapped?"

I feel I'll again give you the first crack at this in terms of some comments, Bill; then we can just open it up to the panel and to the audience. Bill, do you have a comment on technology transfer?

for the handicapped. As an example, I have spent some amount of time in brace shops and at other times in places where they make prosthetic devices. I've never been in one of those places yet that was in the middle of a shopping mall like Tyson's Corner or White Flint. They're always down in a warehouse that looks like a blacksmith's shop and has magazines that are two years old. They're really out of the mainstream.

Now, just as an informational thing about some of this simple gadgetry that has been made and that lots of people can use; you know, they have a little wire thing that I think was made for lawn chairs to hold your beer can or your pop bottle so you won't have to bend over and pick it up. Just little things like that sometimes are in the stores. A lot of people would buy them for convenience articles as a mass market.

The real thing I wanted to ask about is this. In the summer of 1978, when Dr. Peter Bourne was the Health Policy Advisor at the White House, the Domestic Council Staff there launched a particular project to identify six initiatives that were related to health policy areas. One of those had to do with an amendment to the so-called Florence Agreement; it seemed that the State Department thought they could easily engage in some new revisions there. Now, I suppose most of the people here are familiar with that; but the Florence Agreement really had to do with the duty-free import of basically optical and a certain kinds of lens for vision-impaired people and maybe just expensive lenses, and so forth.

KORNBLUH: Thank you. Joe, you have a brief comment?

HEIL: Yes. I don't know where the small microphone is.

KORNBLUH: Would you put the small microphone over there?

HEIL: Sorry to be so troublesome.

KORNBLUH: It's working out quite well, as a matter of fact.

HEIL: I think there's just one thing I have to add to Andy Zucker's statement, just so everyone is clear. The legislature in California passed a bill saying that all deaf and severely hearing impaired people can have TTY devices; the second paragraph of the bill also says that the Public Utility Commission will design a rate recovery system so that the utility can recover the costs of meeting this bill. An interesting aspect of this is something that Ros mentioned a few minutes ago. To pass bills without funding places severe burdens on the people who have to comply with it; so if it's going to cost money, the bills must have it. I think the second thing that is important is that the taxpayers or the telephone users in California are going to pay for those sets because it's going to cost about $58 million in capital, by best estimates, to supply sets in California. I want to make that clear so that the legislators recognize that somebody has to pay for it.

The second comment, very briefly, from the viewpoint of the entire business community, not necessarily only AT&T, is that we've got five or six years of equal opportunity at every crossroads in

I'd like to ask Dr. Reswick a question. Your point of view, I think, is to focus on the need to tailor devices to individuals. If we are very clever in exploiting this technology, can we simultaneously exploit the very large, consumer-based economy which makes these things cheaply? Can we also exploit the understanding that we have of the need to tailor devices to individual people by using the technological capabilities that are in those devices and are part of that technology?

RESWICK: I think the answer is certainly, "Yes." The issue, though, is to somehow separate out the large-scale kinds of devices which, with the application of technology, can be widely used. For example, a talking calculator for the blind is a beautiful example. It involves very high technology and requires virtually no prescription or special tailoring. Therefore, full speed ahead on something like that.

At the other end of the spectrum is a whole class of needs of the disabled that can't be met with this application of technology but, rather, by being smart, as you put it, in a different way. And I would say that there is a lot of waste or inefficiency available in the delivery of rehabilitation engineering services. Conceivably, by being smart, and without a great deal of added expense, we can meet the kinds of needs that involve relatively simple engineering, with but a very clever and enlightened application of such engineering.

In between there's a gray area that leads to a lot of ambiguity about whether it should be approached through very high

so he cannot get anything. He needs but he can't get. And in answer to technological development and the right to receive, I think what we all deserve is a high quality of life--handicapped, nonhandicapped, welfare, or not, we're talking about people with vital needs. As a country, we've got quite a bit and we should all be sharing. I think that goes right across the board. Also, Dr. Spencer, you know, we've been talking about this for three and one-half years now, and those institutes are there but they're not appropriated. We've got to get them moving.

KORNBLUH: I'd like to say that there are two aspects to your comment. One is that getting more venture capital to allow handicapped individuals to open up their own small businesses in a wider variety of ways--they don't have to be stands such as in public buildings, but they can be manufacturing, marketing, and research kinds of businesses. And second, of course, is the concept of how to encourage existing businesses of moderate to large nature to employ more handicapped individuals. They should recognize that with only slight changes, perhaps, very slight changes in their current mode of operation, such individuals may be able to fit nicely into medium to large organizations.

There are a number of proposals that have been bandied about, and hopefully they will be elucidated over the next few months and few years. For example, I would like to say that what we're discussing here will be published as a committee print, and this committee print hopefully will be looked at and

always been considered that that was just part of life. It's only when you have the technological capability to do something about it that there is some kind of an obligation to do it. And this is very closely related to the topic under discussion.

I think we are moving in the direction of more entitlements. The State of California, for example, has recently passed a law making telecommunications devices for the deaf available at no extra cost to the deaf and hearing impaired. We've also seen entitlements facilitating access to public buildings and other types of entitlements. And this is very closely related to the question of incentives. Obviously, if the manufacturers know that there's going to be a market for 20 or 50 or 100,000 of these devices in the State of California, they have a very different incentive to research them and produce them than if that market is fragmented.

I do want to bring up the uncomfortable subject of the limits of entitlement because I think that's one that the society is grappling with and will continue to grapple with. How much is any of us entitled to that can be done with technology? Are we all entitled to organ transplants because they can be made available to some people? Are the handicapped entitled to every technological device that might be of value to them? Should they all be receiving these $175 talking thermometers and talking scales? And I don't mean that in a frivolous way. I think that's a basic question. Where does need begin and end, and want begin and end? And I think

SPENCER: Get a little closer to the microphone, Marvin.

MS. BRAINARD: It's not Marvin; it's Suzanne.

SPENCER: I'm a little handicapped at the moment.

MS. BRAINARD: I guess the overriding feeling that I'm having right now, and to address your point, Dr. Spencer, the problem is one that is sequential. It seems to me, one of the largest priorities of our Nation should be to establish a public policy by which we address each of the issues of incentive, technology, transfer, delivery mechanisms. We can't sit in this room and talk about some of the minor problems about getting products out into the field so that they can be given to the users. There are basic questions like, "How do the Federal Government and corporations coordinate their efforts so that we are doing something that addresses the needs not only of the handicapped but of the general public?" The issue of incentive itself may be an issue of disincentives that now exist in terms of legislation which allows basic research projects to be put into the hands of manufacturers where they can actually determine which ones are addressing the needs of the handicapped and the people.

To me, it seems like it's several issues; and to begin by saying we need certain products is not the way to do it, but to look at the total picture and to find out which kinds of priorities must be established.

or whatever. We do that by making available a $175 device that talks and tells you your own temperature, the temperature in your room, and the temperature of your turkey; but it's $175 which the individual doesn't have. I would like to reiterate the comment of Steve Mashelo before, namely, that individual needs that $175 if he needs a thermometer; we can't expect him to get it on a loan. This society has got to realize that there's an entitlement for everyone to have a thermometer whether he has $175 or not and to make available that aid.

A couple of other devices of a similar kind are a talking scale, a talking device to measure the glucose and ketone levels of sugar of blind diabetics, from the urine of blind diabetics. We're working on a computerized travel aid using Polaroid's sonar transducer which they've made available freely to us. It's an example of how business helps us. The sonar transducer is used as a one-step camera. And we're now working on a full-page tactile terminal for a tactile blackboard for visually impaired persons that will substitute for computer response terminals that airline reservation clerks and everybody else uses in this society. But they're going to cost.

The point that I want to make to you is that for each of these proposals, we sought Federal monies; and we're shunted from one agency to another agency, from one program to another program, from one duplicated program to another duplicated program. The Federal Government, it seems to me, has got to get its act together so that the National Institute now does not find itself in a situation of duplicating

think this is as tough as the one you're facing in the education of the handicapped child. We're having very great difficulty mainstreaming the handicapped child in the ordinary classroom largely because of teacher attitudes toward the handicapped. We didn't prepare ourselves for people to understand the requirements of successful inclusion of the handicapped person. So I think this problem is one in which you have to connect the development of the constituency group, public awareness, better information, with the methods, both public and private, that you use to provide purchasing power for the handicapped; then you can build up the marketing demand that then the product manufacturers respond to. And that's what I meant by saying, "You have to connect all the elements together at all fronts at the same time or you'll fall on your face."

KORNBLUH: I'm tempted to start further discussion but I'll control myself. There is a hand up. Do you have a question, answer or comment?

MARVIN BERKOWITZ: I have a comment. I'm Marvin Berkowitz. I'm Associate Director of the American Foundation for the Blind. We develop, make, and sell 400 different products for persons with visual problems. Our annual sales of those products is about a million and a half dollars a year. In order to do that work, it costs the foundation roughly $2 million a year, and we depend upon public contributions to make up the deficit. I want to point out or make a comment on what I think are a couple of bogus issues for discussion and then relate a little bit of the experience of the foundation.

needs to be addressed. And it seems to me like we need a team approach that includes engineering that's able to handle any re-engineering that's needed. Thank you.

STEVE MASHELO: I am Steve Mashelo. I'm with the Bureau of Education for the Handicapped, although I am not speaking for the Bureau at this point. I would take a slightly different approach to that which we heard from the panelists in terms of getting products to those people in the disabled community who need them for educational or vocational or some other purposes. When I worked in private industry, I was involved in marketing. One of our big concerns, as was said on the panel, was, "Does the potential target population have the money to buy the product?" Marketing is harder when you use a third party. I would suggest that what we need as an incentive is some mechanism to give the disabled population the money needed to buy the product. I'm not talking about tax incentives. That means we have to lay out the money, and we might get it back at the end of the year. But I honestly believe that if we need something in terms of hearing aid technology, if the product manufacturers know that there are three to however million people who have the suffiecient monetary potential of buying the hearing aid, then things will move forward rather quickly.

We've seen phenominal growth in calculators and computers because the demand existed. Could this not work with products for the disabled, as well?

money and food in, and whatever else comes out--if I have any researchers, I apologize--whatever else comes out, we're ahead of the game. The transistor was a product obtained this way; light wave technology was part of this process. But we don't take that free spirit and expect him to find solutions that are salable. We don't expect him to understand how much customers will pay.

Now, let me relate that to rehabilitation or to solving the problems; if you want to do basic research, give the grant for basic research. But if you're looking for a consumer product, for God's sake, have somebody up front in the process that will turn to somebody and say, "We can do it with two paperclips; we don't need a CDC computer hooked up to it."

I battled the same thing, you know. I'm arguing for bucks--bucks for disabled people; services as compared to the man who is being economical or a woman who is in there proposing a business solution. So, therefore, if I could reiterate Texas's comments coming to us, from Bill, out in Texas; if you want that product to get to the marketplace, let's get some marketing expertise and let's get some very practical buck-oriented philosophy in the beginning. It's no problem to produce a product that will not sell.

KORNBLUH: Well, I want to thank the audience for their patience. I detect an aura here of desiring to participate. Pam and Cheryl, I think we have these microphones here; we're doing this so we catch your name and your organization. Then you can have carte blanche. In other words, you can make a comment, you can ask a

For example, Dick LeClaire pointed out the other day that if we applied to hearing aid technology the tone control systems and equalization equivalent to what we have in our present hi-fi apparatus, that would have very great impact in taking marginal hearing and making it functionally useful for literally hundreds of thousands of people. But to develop that very straightforward problem, identify who needs it, how to get it distributed, how to manufacture it, how to finance it, we're looking at a pilot study in the order of $10 million. That is so far beyond the means of any single source; until we get these elements connected, we won't have what I call constituency support to gradually change the public-private value system toward the worth of these kinds of investments.

We're, sort of, in a vicious circle in which we've got to both bootstrap and gradually acquire more understanding and opportunity to make these realistic models. I don't think this is really very different than what was done with some spinal injuries; because they can be problems susceptible to a system approach with early intervention, with pickup and delivery, with comprehensive assistance, and with follow-up, the models are beginning to show that this is, indeed, an effective way to work and is cost effective. But it took a lot of effort to just get the 15 models we have, and we're only impacting about one percent of the problem; but at least we know more how to do that. And

of existing devices and we have systems consisting of devices--teleconferencing systems, perhaps, computer conferencing; then we also have institutional arrangements and delivery systems, which, hopefully and eventually, will allow us to make full use of these systems of devices and the devices themselves. This is where, perhaps, the incentive comes in. Can we, in some way, have a melange--a mix of subsidies, grants, long-term financing arrangements, tax credits--things of that nature, appropriate to getting some of the simple devices as well as the more sophisticated systems to where they belong--in the hands of the people who have to use them and desperately need them?

Bill, you were the first one to start us off. I think it's only fair now that you've heard comments by our panelists, and before I open it up to the audience, to give you another opportunity either to comment on some of the comments that you have heard or to add additional comments. Bill.

SPENCER: My comment, I hope, will be brief. It seems to me that both what Jim Reswick said with respect to the fact that pump-priming won't work without a good service delivery and an evaluation and information system with high quality information, highlights the fact that our problem is not a sequential problem of finding things that need to be done, finally developing solutions, and then trying to find some way to distribute them; rather, it is to recognize that we have to find dynamic ways of interconnecting the needs, the changing requirements for meeting those

systems or delivery of technology; if the delivery systems are effective in doing their job, then I believe that the manufacturing capability of the nations of the world will easily meet the need.

And going from delivery systems, probably the major barriers in effective delivery of services lie in, first, information systems, the lack of effective information, and, secondly, in evaluation, because evaluation is fundamental to the information being worth anything. There's no point of having a great information system that does not tell the truth.

We have developed a small project in Los Angeles supported by the State of California and the National Institute for Handicapped Research that attempts to deliver rehabilitation engineering devices to relatively severely disabled people. The message that comes to mind from our experience in this area is that the device itself is just a small part of the total process of, first of all, defining the need of the disabled person in a total lifestyle point of view. Typically, the client will meet with a group of people--not just the engineer but an occupational therapist, a social worker, a wide variety of counseling-type people--that look into the total need of the patient during the day.

And it may well be that a problem that was stated initially as, "I wish to buy a certain device to solve my problem," turns out to be, "No, you don't need that device; you must need a

and for meeting the needs of people, in general, instead of specialized persons. They should take some of the gory with the glory. You see, many good things are happening, but not very much that meets the needs of the small number of people.

I'd like to use as an example--caption TV. There is a long story behind that development, but it wasn't until recently that PBS, the captioning network, captioned news to the deaf, so that we also could share that window on the world. And then, tnat program was only for half an hour and at 11:30 p.m. at night when most of us are ready to go to bed; and often that was postponed to 12 midnight or even cancelled; but we wouldn't know that, so we would wait and wait and wait until 12 midnight and then find that we had lost a couple of hours of sleep. Now they are working on a decoder which would mean closed captioning; that development was as a result of incentives made available from BEH to private companies and to Sears, and the Sears Company will manufacture and distribute it; but, again, the problem with it is that those decoders will be available to hearing-impaired people and parents of deaf children at $250--just for the decoder, not to mention the cost of a television set.

There are many people who will not be able to buy these decoders because of the high cost, and they will question the reliability of these new developments; there may be very few programs on TV that will actually be shown. So I think, with incentives, with increased people awareness, with encouragement from the Government to meet the needs of special groups of people and giving them

MS. ROSALYN ROSEN: Okay. Can everyone hear me now?

SPENCER: Your voice is coming across beautifully, in every way.

MS. ROSEN: I would like to start off with a thanks to all of you for including us who are handicapped consumers in this meeting. It often occurs that handicapped people themselves have not been directly involved in the matters that affect them, so a word of thanks.

In my opinion I would like also to mention that the problem of representing the handicapped is that the handicapped group is really, in fact, composed of many small groups of people with different disabilities; further, the needs of each group are very different, which I think was mentioned in the background paper.

Anyway, however, deaf people, or hearing impaired people, do share parallel problems and concerns related to our hearing impairment. As you know, deafness is the kind of handicap that separates people from people as opposed to some other handicaps which separate people from things. So deafness is primarily a communication problem more than anything else. A deaf child brought into a family with no prior experience with deafness starts off with a communication problem, not just in the sense of speech or signs or using the hands but being part of the family and the family understanding deafness. That's a loss to meet the child's needs, so the child starts out in life seeing the hustle and bustle of life but not understanding the meaning

I'm sure that with all the awareness programs that are in existence now, business must be aware of the needs of many of the disabled; and I think that they should do more to become involved. I think if you look at something like transportation and if you look at how hard the major bus manufacturers in this country have been working against establishing something like transbus, it is hard to understand; yet this is a bus that is for everybody, not just for the disabled. I think that business does have an obligation to do its share to bring disabled people into their community.

KORNBLUH: Thank you very much, John. I'd like now to turn to Don Galvin on my left who can perhaps provide more of an international flavor; I know Don has had considerable background in the public sector, and is well acquainted with the private sector.

DR. DONALD E. GALVIN: Thank you, Marvin. I can understand why we didn't have an opportunity to vote on this issue. In looking over the literature of the major reports of the last ten years, I think it's clear that this item, that is, the incentive to develop these kinds of products--it has been identified repeatedly as the No. 1 issue. It will certainly tax our ingenuity and creativity here to try and solve it.

Speaking of taxes, by the way, I think one of the options that needs to be considered is some sort of subsidization or sponsorship to both commercial enterprises and developers and to university researchers so that they can turn their attention to these kinds of issues, particularly on mass-market items. I was also interested in

listen to, that if we can identify the needs, we'll soon find that out when we're designing a new telephone or we're designing a new communications device. If we understand the needs of deaf people, if we understand the motion-impaired people, and so on, there is a better possibility for us to put those needs into new products design. Strangely enough, a lot of able-bodied people don't understand this; when we do something to meet some of the needs of disabled people, we're also going to make life better for able-bodied people.

I think, for example, we modified some push buttons on phones to make it easier for a person with limited motion; but let's not forget, we're also making it a heck of a lot easier for an able-bodied person. I think there is one other thing that is important to business. I share your views that the big corporations are not always the most likely target market for the researcher to get his product made.

SPENCER: Absolutely.

HEIL: My concern is that if I had not met Don Vargo from NASA, as a businessman I might not know that NASA has some techniques and technologies, that are available to manufacturers. Had I not met Dick LeClaire and Joe Traube, I would not know that some of their facilities are available to manufacturers. So I think in addition to businessmen, Marvin, learning that there are opportunities to use some of the knowledge in the public domain, that people meeting the needs of disabled people and rehabilitation have an obligation to

meet what kind of market and then move into the development of the best methods of financing and achieving appropriate incentives for production.

Now, in fact, we already have a law--one incentive--there is in the new NIHR, the potential of subsidizing pilot production and early considerations of marketing and distribution of products for handicapped individuals among for-profit industry. I have discussed this matter with our own trustees in business. With a vocational center which produces devices for the handicapped, we were very interested in how those productions could be transferred to regular industry. The answer is that it is really a volume problem. That was the reason a suggestion has been made to try to open up worldwide markets through changes in restrictions on sales in other countries and taxes so that there would be a large enough volume to justify, for some items, this kind of distribution.

Now, finally, I think the problem of justification is going to come from a separation, in our planning and in our implementation, of those items which have general value such as transportation, public transportation access, which affect the elderly and many others, and those things that deal with communication which can affect a much larger segment than the handicapped person. That way the handicapped person can be brought along--piggybacked, if you'll excuse the expression--on something that has very large market potential, while we use other methods for the customized, small-volume types of devices and systems.

Technology Transfer No. 3. I don't think we'll have much time for No. 4; but if we do, according to the count, it's Delivery Systems. I feel the ones that we are discussing are of interest to the majority of the audience. So, from that point of view, I don't think we're being very unfair.

Okay. The first issue to be discussed will be Incentive. I'd like to read it first, and then I'd like to have comments from the panel. I've tried to arrange it so that I could see the panel, but it's very difficult to get a "catty-corner" arrangement in this room--there are some logistical problems; but I'd like to read issue No 1, Incentive, and give you one interpretation of what incentive means.

> The cost of devices and systems for the handicapped are inherently high because the market is so subdivided, thereby keeping the volume low; product liability and insurance are high; selling is not usually directly to the ultimate consumer but rather to other members of the handicapped community, such as physicians, counselors, and insurance administrators who usually also have to be informed and sold; many products are not standardized and have to be custom-made and fitted to work satisfactorily, and frequent product maintenance and service is required. Thus, it appears difficult to obtain sufficient venture capital to develop, improve, and market technology for the handicapped."

So the issue is, succinctly, "How can we provide existing or potential manufacturers and distributors with sufficient incentive to research, manufacture, and widely distribute devices and systems needed by the handicapped individuals while, at the same time, ensuring that the cost itself does not prevent handicapped individuals from obtaining the products and services they need?"

KORNBLUH: You can't vote twice. You have to have only one No. 1, Bill.

SPENCER: You're talking about all ones first, okay.

KORNBLUH: You're only allowed one No. 1, you know. It's a tough choice. I realize that.

No. 8, Research. No. 1. Five. Is that correct?

No. 9, Public Awareness. Seven. Is that correct? Pat, do we tally seven? I see it is eight. Apparently, Evaluation received ten votes--the most; so Incentive will be discussed first, then Evaluation will be discussed; then, Technology Transfer--which received nine votes--will be discussed.

QUESTION: Shouldn't we consider second and third choices also?

KORNBLUH: Well, we could but I'd like to use this method. I guess every method that can be used has a bias. I will admit that right away. I'm trying to discuss the issues that most people feel are most important. If I go to second and third choices, it will just be more difficult to tally and take considerably more time. In other words, ten people here--which is about 20 percent--feel that Evaluation is the most important, and then nine people feel that Technology Transfer is the next most important. Now, it so happens there's a tie between Delivery Systems and Public Awareness.

QUESTION: But if you took 2s and 3s, you might end up with bigger numbers around certain items.

KORNBLUH: Perhaps it might take 15 minutes to do it. Do you feel strongly about that? I'd like to compromise and add the 2s for

GALVIN: Well, I guess my point is that sometimes on some of the issues, a brief explanation of what's going on might change people's minds, and they'd say, "Well, that's not as important as we think it is. That's already being done."

KORNBLUH: I could only say, "Yes," to what you say; but then we have quite a number of people here this morning. I've even received some correspondence--verbally and written--to have certain issues discussed. Everyone has his pet issue and "beauty lies in the eyes of the beholder." That sort of thing. I can say, "I agree with you," but I tried my best to give at least a brief discussion of what I felt the issue meant. Thus, I won't say, 'You're wrong,' but I feel that would take up 15 to 20 minutes of counterquestions."

SPENCER: Would you repeat the questions asked by the audience?

KORNBLUH: Yes. I will do that.

SPENCER: That would be helpful, because you can't hear them.

KORNBLUH: Okay. When the audience asks a question, I will repeat the question; and when you have a question, perhaps, for the panelists, or you like to participate in the discussion, you could either say, "Marvin," and we'll hear you and we'll get to you. Also, I will occasionally ask if you have any answers or comments as we proceed.

SPENCER: Thank you.

KORNBLUH: Bill, I have the microphone in my hand, and I will try to rotate it in the direction of the noise.

SPENCER: Very good. Thank you.

with respect to the application of technology to handicapped individuals.

After the panel members interact with each other, we're going to open it to the audience, and we'll have two people with roving microphones on either side of the aisle. If you have a question, an answer, a comment, any sort of contribution, would you kindly mention your name and the organization you are from, and then proceed with your comment or question--which could be addressed, incidentally, to any member of the panel, including myself; although I may have to bow to superior authority and understanding to my panel members here.

I want you to be aware that we have a diversity of perspectives on the panel; we have a business representation, an international flavor, an engineering orientation, an educational representation, a consumer slant. The different perspectives represented on the panel was done, you know, with malice and forethought to ensure different viewpoints.

I'm going to exercise my prerogative as moderator after I feel a certain period of time has elapsed in the discussion of the first issue to go to the second issue, and then to the third issue. It's close to 9:30 now. If we limit discussion to around 45 minutes per issue, we should be able to get through three issues. And I'd be happy if we get through three issues. In case we want to start the fourth one, we may start it; and those of you who wish to stay a few minutes, we may continue with it. It all depends.

We also have another very distinguished person on the agenda. We have Dr. William Spencer. Dr. Spencer is now at his home in Texas and is with us via a telephone conference hookup; and so we're trying to use modern technology. I don't know how modern it is, but it is technology. Let me just say a few words before I ask Bill to say "hello" to the audience. Bill, I'm not sure he still is, but he was until recently, Acting Director for the National Institute for Handicapped Research in the Office of Human Development and Services in the former Department of Health, Education and Welfare--which is now in the Department of Education. That's quite a mouthful. I think I got it right, I'm happy to say...since I used "former." He's currently, also, the Director of the Medical Rehabilitation Research and Training Center in Baylor College of Medicine in Houston, Texas.

Bill, I want to say "hello" on behalf of myself, the panelists, and the audience here.

DR. WILLIAM SPENCER: Thank you for including me and providing the opportunity for interaction with your group which represents a lot of the people who can make significant change in the future of technology for handicapped people.

KORNBLUH: Okay, Bill. I want to thank you again. I'm happy it's working out well. I still have my fingers crossed. I was told that there were a number of conditions--atmospheric and human conditions--that could interfere with our telephone hookup--but it seems to be a success. I'll stop right now and won't say anything further, and hopefully we'll continue to have a good hookup.

PANEL/WORKSHOP PROCEEDINGS

MARVIN KORNBLUH: I'm very, very happy to welcome all of you this morning for the last of three workshops dealing with the application of technology to handicapped individuals. I'm simply delighted to see the turnout here this morning; what I'm going to do is, first, quickly introduce our panelists--who they are and where they're from, and then also introduce our invisible panelist who is on a telephone hookup now in Texas. Then what I'd like to do is explain the procedure of what we're going to do here this morning.

The workshop will last until around noon, perhaps a few minutes after; it's going to be devoted solely to discussions of the issues that could arise from the use, misuse, and nonuse of the technologies that were discussed in the previous two workshops. To refresh your memory, this was Information Resources Technology, Educational Technology, Rehabilitation Technology, Communications Technology, and Environmental Facilities Technology--all of which we had panelists discuss with reference to the application of these technologies to handicapped individuals and handicapping conditions.

This morning we have a panel of six--five you see on the left and right of me and the sixth is on a telephone hookup, and I'd like to introduce them one by one. There have been some changes from the original agenda.

8. Research

Handicap research emphasizes the prevention, amelioration, and reduction in the severity of handicapping conditions. However, there is no agreement as to how much to allocate to basic research and to applied research respectively. There is also disagreement on the amount of support to give to technological innovation and research per se as compared to research on ways to refine, adapt, deliver and transfer the technology. Finally, there is controversy regarding how much to emphasize high and sophisticated technology such as complete systems and low and appropriate technology such as specific devices. HOW CAN WE ESTABLISH A BALANCED AND COMPREHENSIVE RESEARCH PROGRAM TO AID HANDICAPPED INDIVIDUALS?

9. Public Awareness

Mass media such as television, films, newspapers, and magazines frequently portray handicapped persons as objects of pity, or at the other extreme, individuals who have totally overcome their problems. These biases towards handicapped individuals probably arise out of a lack of understanding of their capabilities and limitations. Further, the mass media as well as public and private organizations do not always provide an equality of service and objective service for all their constituents--handicapped as well as nonhandicapped. Public attitudes always affect the development and the delivery of technology--especially technology focused on improving functioning

. Standardization

Various devices and systems for the handicapped, serving essentially the same purpose, may have different timings, different electronic requirements, basic operational differences, and may be different in quality and safety. Further, compatible accessories for aids and standard interfaces, which allow devices manufactured by different firms to be used interchangeably, are not readily available. HOW CAN STANDARDIZATION AMONG DEVICES AND SYSTEMS FOR THE HANDICAPPED BE ENCOURAGED IN THE LIGHT OF THE MULTIPLICITY OF TECHNOLOGICAL APPROACHES AND THE FREQUENT PRODUCTION OF ORPHANS--THAT IS,SINGLE, CUSTOMIZED DEVICES FOR ONE OR A VERY FEW HANDICAPPED INDIVIDUALS?

5. Delivery System

Existing devices and systems for the handicapped are not readily available to all those who need them. There appear to be few methods for reclaiming, refurbishing, and reissuing expensive technology to other needy handicapped individuals once the initial users no longer need them. Further, even if a sufficient number of new products are available, it is difficult to find handicapped persons who need those specific products and to deliver them in a timely fashion at reasonable cost to the interested parties. HOW CAN WE DEVISE AN EFFECTIVE AND EFFICIENT SYSTEM TO DELIVER AVAILABLE DEVICES AND SYSTEMS FOR THE HANDICAPPED TO THOSE WHO NEED THEM?

ISSUES FOR POTENTIAL DISCUSSION

Nine issues were developed for discussion by the panel and the audience. The first issue, Incentive, was felt to be of such importance that it was automatically included for discussion. The audience selected the priority for discussion of the remaining issues. The nine issues were defined and described as shown below:

1. Incentive

The cost of devices and systems for the handicapped are inherently high because the market is so subdivided, thereby keeping the volume low; product liability and insurance are high; selling is not usually directly to the ultimate consumer, but rather to other members of the handicapped community, such as physicians, counselors, and insurance administrators who usually also have to be informed and sold; many products are not standardized and have to be custom-made and fitted to work satisfactorily; and frequent product maintenance and service are required. Thus, it appears difficult to obtain sufficient venture capital to develop, improve, and market technology for the handicapped. HOW CAN WE PROVIDE EXISTING AND POTENTIAL MANUFACTURERS AND DISTRIBUTORS WITH SUFFICIENT INCENTIVE TO RESEARCH, MANUFACTURE, AND WIDELY DISTRIBUTE DEVICES AND SYSTEMS NEEDED BY THE HANDICAPPED INDIVIDUALS WHILE AT THE SAME TIME ENSURING THAT COST ITSELF DOES NOT PREVENT HANDICAPPED INDIVIDUALS FROM OBTAINING THE PRODUCTS AND SERVICES THEY NEED?

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Speech Pathology, Rehab Engineering are all referenced in there; so we can find them and you will know where to go find them if you don't happen to be in all those professions at the same time. There is a place to write in for information and get responses back. We try to discuss the issues and things like that in the newsletter. It is sort of bootstrapped from zero funding, etc. and trying to make its way.

It does a very good job, I think; they have done a nice job of putting it together and that's essentially what its role is, to move information out. But usually, you will find information in there printed, disseminated to, you know, the thousand or so subscribers to it before eight out of the ten leaders in the field even know about the development. I mean it's that good in terms of getting information out quickly.

NICKEL: Mr. Traub has been leading this effort more than anyone and there is the new organization of rehab engineering, which will include this. It is our hope with proper authorization that what the VA has sponsored for many years as a bulletin on prosthetic research will merge into that and be taken over by this professional group. Then there will be a publication of this group.

QUESTION: Have they heard about NARIC, Joe? Elizabeth asked the question so she should know about NARIC. That will be discussed next week I presume.

KORNBLUH: It could be discussed. There are a number of issues that we have. We plan to discuss one issue which is the

NUGENT: We have programs involving the development of clearing houses. They have computer banks with this kind of information. "Accent on Living" is developing one. There is one in the East; I can't remember all of them. In the interim, until these things become realities, I don't know of any journal that is published by any of the organizations dealing specifically with disability like Paraplegia Life, Paraplegia News, Accent on Living, UCPA News, or what not, that doesn't have new products listed in it, that doesn't have advertising listed in it, that doesn't have reports of recent legislation, so that some of this can be achieved through library search and that is not too difficult.

KORNBLUH: I would like to add for your information that this problem is not unknown to us at CRS. I have available maybe 15 or 16 directories of directories, dealing with information on porducts and services for handicapped persons. These are directories which list information about other directories dealing with the needs of the handicapped. I started out by just getting specific directories and that was impossible; they numbered in the thousands. So, I collected directories of directories.

Also, we are exploring the possibility of doing a major effort to find out what research and development, focusing on handicapped people, is being done in the United States. This is a difficult task, but some people in the congressional arena feel that it would be worth a nine-month or one-year effort using the facilities of the Library of Congress where we have access to

chipping away at it--discipline, surveillance, constantly looking over the shoulder, peer review, and all that kind of thing.

KORNBLUH: Are there any other questions addressed to any panel member? Elizabeth.

QUESTION: My name is Elizabeth Pan. I'm with the Institute for Information Studies. I have a question for Dr. Vanderheiden. You've shown us some very interesting devices here. I would like to know what suggestions you might have on how disabled people find out about these devices. If I am disabled, I know where to go to get a tube of toothpaste, but if I needed one of those devices, I'm not sure I know where to go get it.

VANDERHEIDEN: I think this was probably addressed in the previous session on information services. I think what needs to happen in the long run, and in my own view, is that we need to have a national clearinghouse and referral area that refers to the people in the field that are working within the areas of specializations. We need both. We have to know, at least, one place to go to. We have to look at who is doing some work with what we know and were it is being done. For instance, we are working very hard in the area of nonvocal communication. It takes us full time just to try to stay up in that area. So what we've done is to try and have information on the services available; anybody who wants information in particular areas can write to us and hopefully we have it and give it out. Now that's not a funded program. We lose $10,000 to $30,000 a year doing it. We don't

You mentioned earlier a turn toward care in the chronic disabilities like in the acute. When you come in with an acute condition, and you get in and get something done. On the chronic, it's O.K. to just bring him in and sort of have him around for a while. I think we must begin to say such things as: it's not good enough; you can't just make them do things better; you have to make them do them well enough; we have to move them out; if we aren't making progress, why aren't we making progress?

When you start having accountability, that's when you are going to start breaking down all the barriers to, "That's the way I always did it." Because if you are doing it the way you always did it and it's not working, and you are accountable for getting things done, then you're going to start looking around. You're going to get off your duff and look at the new things that are happening, because essentially you are up against the wall. People will be standing behind you saying, "Why aren't you doing something?" That's where and when the innovations are going to get implemented. I can't overemphasize how true I think that comment is, or how right on the mark I think that comment is. In the chronic rehabilitation we've got to get some measure of accountability. However, I don't know quite how to do it.

NICKEL: You do it just like you've done it in acute care. Why was this patient in there two weeks and didn't see a therapist?

VANDERHEIDEN: I didn't think this was happening.

develop their own strategy. That is what is going to happen. We do it all the time. We have models and they are the millions of us; we just watch each other and figure out how to do funny things. But the handicapped, I think, have to learn the strategies themselves.

NUGENT: We give them the ability to recognize a problem and how to attack a problem rather than give them pat solutions. This approach will be good just as long as it takes us to give the capability to them.

I think the example you used, Gregg, is very germane to some of the points we tried to make earlier. That is, there was no readiness on the part of the teachers in the classrooms or the school systems when this was imposed upon them. Their inability to cope or even their lack of recognition of what they are coping with, is what develops some of the antagonisms. This also resulted in their willfully and unwillfully proving that all the other students were being hurt by the inclusion of handicapped persons.

In other words, they were sacrificing 30 students for one; this was a quote that was made on a national telecast. It really isn't necessary that this happen. But nobody had developed a sense of readiness and preparation. Nobody looked at the big picture of how these people should be integrated within the total system.

QUESTION: I would like to go back to a remark that Dr. Nickel made relative to the continuing isolation of physical medicine and functional activity and about the lack of training of nurses, doctors,

all the fields. It should be integrated into all the fields that exist and not separated, because if you separate it, you reach those people that go into it, but you've missed the majority who will be in the position of deciding what those people do.

Now I get so frustrated when we talk to teachers in special education or certain very-much involved community people. We get them all enthused about something, they go back and one principal, one superintendent, or city administrator just scratches it right off. This is because we have not yet reached the people that make the decisions.

So there is a danger in segmenting these things any more than they are. I think they have to become an integral part of a profession; for instance, the design professions. I don't think I would ever want to see people trained to design for the handicapped per se. But I think every architect, every interior designer, every engineer, should have integrated in his courses in design, and construction and what not, those concerns that are germane to facilitating the entire population. That's where our real measure of success will be.

VANDERHEIDEN: I was just going to say the exact same thing. All teachers ought to have at least some, at least a course, one full semester course, in special education. We're talking about mainstreaming the kids, and the teachers are having people come into their classroom and they don't even know how to pronounce the names of the disability that these people have. They have no idea of