THE PANEL-AUDIENCE DISCUSSION SESSION

When the six speakers had completed formal presentation of their papers, they served as a panel in the exchange of ideas and information with the audience. This was an open forum in which the panel and members of the audience participated under the guiding influence of the moderator, Dr. Helmuth Resch.

The written record of the session that is presented here is a shortened and edited version transcribed from the recording tapes. A serious effort was made to preserve the intended direction and meaning of the oral presentation. However, if I am guilty of gross omissions or misrepresentations of material, I sincerely apologize.

It is fitting and proper to extend a hearty "thanks" to the members of the panel, the audience, and Helmuth, for a job well done. The ideas and viewpoints presented are timely and stimulating. I consider it fortunate that we can retain this part of the program as archival material.

Respectfully,
ROBERT ERICKSON

Chairman, Annual Meeting Program
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DISCUSSION SESSION

Moderator: May I hear the first question. Please identify yourself.

Bob Wellwood, University of British Columbia: This is a comment, rather than a question. Last week in Vancouver the American Society for Engineering Education held its annual meeting. Two sessions were relevant to what is being discussed here today. One dealt with the area of communications in the engineering curricula, and the agreement would be 100 percent with George Atherton's survey finding that this is of major importance. A second panel session considered wood as a material in engineering curricula. I think it was generally agreed that wood is a logical material for study in a material science course. It has some of the attributes of other materials, its properties are well known, and its use can illustrate the properties of many materials. However, in the application of wood as a solid material in engineering design, it's a complicated matter that we haven't yet resolved. But my impression is that we can't leave this to the civil or mechanical engineers if wood is going to remain an important (engineering) material. Basically, we (wood scientists and technologists) must promote it and educate the people using it.

Moderator: Thank you. Would someone like to respond?

George Marra, Washington State University: A few years ago the National Academy of Science produced the Cosmat report. FPRS and SWST had an opportunity to contribute and I was instrumental in some of that work myself. I think the most important part of that report had to do with a redefinition of the materials that should be of interest to material science departments in colleges of engineering. Most of these departments are converted from departments of metallurgy and they had a great deal of difficulty trying to embrace materials other than metals. The Cosmat report redefined those materials—I think in a very good way from the standpoint of wood. One thing they said was, "Materials of biological origin are proper for study in material science departments." That's extremely important for getting our wood materials considered in the same pattern of study and techniques used for studying other materials. In our university we went through this process of injecting ourselves into our department of material science. It was a very, very painful experience for me and my faculty, but we accomplished it. One of the most important things we had to do was convince the metallurgists, who are in the saddle and in control, that the material wood has a scientific base. Another thing we had to do was convince them that wood can be considered from the standpoint of synthesis. Materials like metals and plastics are capable of synthesis at the molecular level. We can tinker with the properties by tinkering with the molecules. You can't do that with wood! For that reason they tried to argue that wood does not belong in the same classification of materials. To counter this argument they were asked to consider wood as something to be taken apart and put back together, as with plywood. Plywood has properties that the tree does not confer to plywood. We can say the same thing about laminated timbers. For particleboard, fiberboard, flakeboard, etc. it's obvious that you can take wood apart, reconstitute it, and change the properties.

Once that story was obvious to them, our wood group was readily accepted into the family of material scientists on our campus.

Therefore, might this be one way to achieve an expansion of opportunities for training people for this field? That is, in colleges of engineering that are converting their metallurgy departments to material science departments, make sure they begin to consider wood as important. I think by virtue of the Cosmat report many of these departments are getting the message. Furthermore, many of these departments are fighting for their lives and therefore looking for ways of solidifying themselves in the universe of specialists. They have discovered wood and are quite eager to move into wood as a means of expanding their grab on the materials used by engineers. I'd like some comments from the panel as to whether or not this would be a viable way of greatly expanding the source of our trained people. Jim, would you like to comment on that? You expressed the idea that forestry schools probably will be unable to expand and meet the needs. How about the colleges of engineering, Jim?

Jim Bethel: I'm not sure whether forestry schools can meet the demand or not. I think the forestry and engineering schools have the same problem in that they both live in a climate where they generally represent a small group. I think the suggestion that Frank Guthrie made earlier of drawing on the strength of people trained in engineering, whether we do it by getting engineers and giving them graduate education in wood technology, or doing the reverse, is good. And it's increasingly possible. They don't necessarily run into the roadblocks of a string of requirements that used to be the case. Historically I think the programs in pulp and paper technology have probably had the strongest link with engineering. It certainly is true at North Carolina State and at our place, and I think it's true in some other places as well, that a student can get a degree in chemical engineering and a degree in pulp and paper technology, in either order, in 5 years. This represents the kind of gluing together of these disciplines that I think is useful and should be increased.

Moderator: Frank, since you have stimulated quite a bit of thought along these lines, would you care to comment on it also?

Frank Guthrie: Since I have the floor, I would like to comment on some points that Bob Ethington made. Jotting down my estimate of how many people with a strong wood science background that we would like to hire into Weyerhaeuser, I was surprised at the numbers. Every year, into research, we would be talking about hiring 10 or 20. Into business and operations, probably about 50. Now mind you, those are my estimates. In our operations we went through a little study and found that 80 percent of the people promoted into management are not even college graduates. And the corporation has made a conscious decision that is not the way we want it to be. So maybe my 50 was small. But I'd guess that we will actually hire less than half of those numbers this year and in the next few years, until the composition of the training that these people are getting changes to be a little bit more along the mechanical engineering electrical–engineering line. I see no reason why it can't be accomplished the way Dean Bethel states. In fact, that would be preferable, and I come to those kinds of conclusions simply because of the new technology that I've run across. If you recall from my introduction,

my background is pulp and paper. When I was asked by our senior management to take over wood products research, I choked and coughed and I did it saying, okay for two years and then I'd like back. Well, it's been 4 years and I don't want back. I like it here. I found that the opportunity is greater than it ever has been in the history of pulp and paper.

When you dig into the technology, you find we have a lot more than what we are using. I don't know how far behind our actual implementation is but it appears to me right now, that those people who are doing a good job of bridging whatever gap that is, are those who are on the push side—very knowledgeable about operations. Very knowledgeable to me means a good engineering understanding, not just wood chemistry and morphology but what really goes on out there, the day-to-day operational problems. They are knowledgeable about sensing, decision-making, and control. And those doing the best job of recognizing that these eggheads in their ivory tower really do have something I can use, are those who also have the same kind of background. They are able to understand what you are telling them. So you will have to fill the need coming from both sides. And I have a very strong bias—when the basic need is in wood, you're better off to have a specialist in wood, and teach him a little bit of engineering, business, law, etc. than to go the other way around. But we're not doing well at that today, so right now the engineers and computer scientists have got a leg up on us.

Moderator: Thank you very much. I might add, that as far as the western United States is concerned, there seem to be tremendous opportunities for new people to move in at the ground level of forest products mills. We were surprised to see so many students going to lumber. As Frank can tell you better than anyone else, there is a tremendous revolution going on in lumber processing, and the traditional promotion within the ranks from the green chain up, will not do in the future. There will be tremendous possibilities. Other questions, please?

Herb Fleischer, formerly of Forest Service: Over 20 years ago the educators in this field were discussing questions of course content and problems of attracting students to programs. From what I hear today, they are still talking about the same thing. Twenty years ago, we founded this Society and it had the name of American Institute of Wood Engineering. Some of us didn't like that for it was not broad enough. We ought to encompass the whole field. There are chemists involved, physicists, and you name it. After hearing these reports today, 20 years later, ought we try to redefine ourselves or the product of our educational program? Should we zero in on a narrower field? It seems to me from what I have heard today, that the wood engineering field is the area in which we should be concentrating at least for the immediate future. Would we be better off in our educational programs if we set out to teach wood engineering rather than a subject that we still haven't been able to define, namely, wood science and technology?

Moderator: Anyone who picked up *Fortune* magazine this month will find that suddenly the business community has found wood engineering. There is a new article about the wonders of wood engineering. I think Herb is addressing that point. However, in an industry of many production facilities, managers are needed as well—managers with knowledge of wood as a raw material as well as the best processing techniques. George?

George Atherton: In the industry survey which we conducted and which I reported on here today, I don't see the message coming through loud and clear that our graduates should have strong backgrounds in any of the engineering disciplines. As a matter of fact, the business courses were ranked higher than engineering. Maybe we didn't poll the right people, but we did poll 730 people in industry. We had about 250 people with forest products educational backgrounds and 500 that didn't. I just wanted to make that comment.

Moderator: Yes. Walt Smith?

Walt Smith: Many in this room may be like me. I graduated from silviculture, but soon became a forest products technologist. I've had occasion to work for and with the people coming out of the universities, both in the Forest Service and in more recent years as a consultant. These surveys pointed out what I still believe very strongly, that we have to get the basics and number one is communication. The ability to speak and to report findings in writing is lacking in so many of our people. Since most of us never go into the things that we train so intensively for in college, we need to train ourselves to be able to find the kind of information we need and then to adapt. Now comes my strong point. Our universities should give us continuing education programs so that periodically we can go back to college and develop skills in engineering, data processing, etc. I say we should get well grounded in basics, learn how to get the other information and call on our universities to keep their doors open on continuing education.

Moderator: Thank you. Yes please . . . .

Dean Huber: Wood science and technology has historically been oriented toward R&D. And I think if you took a poll, any kid getting out of college would probably say he wants to do something in research and development or in the scientific area. The talk Frank Guthrie gave emphasized the need for engineering in the field of research. That kind of talk understandably catches our ears, but I think we need to heed what Atherton and some of the other speakers have told us, that wood science and technology has been relatively weak in the areas of production management, business management, and personnel management. It is these areas that employ the largest percentage of our people. George Atherton told us that some 10 percent of the people he surveyed suggested we ought to flush the halls of academia periodically and put the professors back into the reality of the business world. That way they can find out what they are preparing their students for.

Moderator: Thank you. May I recognize Alan Marra.

Alan Marra, University of Massachusetts: I'd like to introduce this group, if you haven't already heard of it, to Charlie Brown's first law. I stumbled on it in the last issue of the ASTM Bulletin. Charlie Brown's first law states, "You cannot push a string." It seems to me that all of us in this room are string pushers. We have no ability to influence what needs to be done. I'm wondering, where are the string pullers? I think Jim Bethel's probably our top string puller in this room; maybe Frank Guthrie. And Jim has said that he has only 800 votes out of 31,000. What force can he put on the string? And if he can't who can and how can we get them there?

Moderator: Thank you. Jim, do you care to comment?

Jim Bethel: I'm not sure that I can elaborate very much on what Al said. Pushing a string is a frustrating enterprise. I would like to comment that it seems to me we need to be careful, even though we are dealing with small groups of students and faculty, to resist the desire to create a single model for wood science and technology. I don't think we need a single model. And if we are going to do the combination of engineering with wood science and technology, e.g. we are very likely to do that somewhere at the graduate level. Otherwise we are really talking about too much to include in one 4-year undergraduate program. On the other hand, there are jobs for people who aren't that highly trained in engineering and there are certainly jobs for engineers in the forest products industry who aren't trained in forestry. And we must avoid producing a lot of unemployable people. I doubt there are very many schools represented here with unemployed graduates of their wood science and technology programs. What we're really talking about is can we meet a social need beyond what we are doing now? We can do more with a larger number of graduates, but they need different attributes. We need to find those areas beyond our present boundaries where, by being wise in the way we structure our programs and provide some diversity for combining our resources with those of our colleagues on campus, we can broaden our impact and can get some things done at the margins that are better than the things that are being done now.

Moderator: Questions?

Bob Davidson, College of Forestry, Syracuse, New York: First, I would agree with Jim, we don't presently have any graduates looking for jobs unless they just don't want to work. Second, I think from our perspective, being in the East, and outside of the major lumber and wood products manufacturing industries right now, we tend to look at the whole field a little bit differently. In addition to that, by administrative edict our department has the word "engineering" in its title—we're called the Department of Wood Products Engineering. This has led to some interesting reactions from industry. They will interview our people, think that they might be some good prospects and then call me or one of the other faculty and want to know whether this is an accredited program. Accreditation is a question I'm going to pose for you in a minute. But I think the word "engineering" has an important context in the general industry, and it's one that I would certainly recommend that this group discuss and see what we want to do about it. I have a side comment to George Marra's remarks about getting together closer with the engineers. Our departmental program today is essentially broken into two options. One is the traditional wood science and technology option, except with an emphasis on the marketing area. When they graduate from this option, they are ready to start immediately on an MBA program which they can complete in about a year. The other option emphasizes an area that we don't hear very much about in this discussion, and that is building construction. Basically, that program is wood science and technology biased heavily in the direction of civil engineering. These students take a number of straight engineering courses available from our sister institution at Syracuse University. One of the interesting results is that our faculty have gotten to know some of the engineering

faculty quite well, and there are no problems working with them. Actually, the engineers find themselves very comfortable leaving wood problems to us, and vice versa. But now I'd like to hear some discussion from this group about the question of accreditation. I think that showed up very strongly in Mike Barnes' presentation. To me, this might get at Al's concern about who is going to pull the string.

Moderator: Thank you very much for the pertinent comment. At this morning's business meeting, Mike introduced a motion that we look into accreditation. It was voted that we establish an ad hoc committee to look into the procedures that should be used. I will now turn it over to Mike for any additional comments he may have.

Mike Barnes: In our discussion this morning we talked about what accrues to the Society or to the institution from accreditation. You can think of accreditation as a pry bar that can be used to pry money, positions or whatever from administrators to implement your program. Now that's a real payoff for the institution. Institutions like to be accredited through whatever mechanism. I sat on a university curriculum committee this past year. About 75 percent of the changes that come before the committee were because an accrediting body said change it. So they change it. Accreditation might also provide an excellent opportunity to increase the visibility of programs in wood science and technology. There are a lot of possible side benefits and as you can easily tell, I'm very much for accreditation.

Moderator: Could we spend a short time on this question of accreditation? Yes, Dean.

Dean Huber: You pointed out that 20 years ago this group was formed and part of its function was to look at accreditation. And I hear people talking about accreditation and the procedures for it, and I guess I'm a little confused. We seem to be making the philosophy that once accredited, always accredited. And I'm not sure that is accurate. I think we need to constantly evaluate our programs and assess whether they are meeting the needs of the time and the future.

Mike Barnes: Yes, but Dean, the point is, that we do not in any way, shape, or form, now accredit. SWST is not an accrediting body and the proposal was to go that route.

Moderator: One more comment on accreditation?

Bob Davidson: I think more and more schools are going to see, as time goes on, that we will have to look to different segments of the industry to place our graduates. Therefore, we are dealing with segments of the industry that do not know groups like this, or even our parent organization, the Forest Products Research Society. So we need to get something on a national scale, at least. That is, a recognized institution of professionals.

Moderator: Thank you very much. Dean Bethel?

Dean Bethel: I think I'll make one more comment on this. I think regardless of how nice and useful it would be for SWST to be an accrediting organization, there are a couple of things that you have to look at. First of all, the reason for

accreditation of any kind of curriculum is protection of the public. It's to protect the person, individual, corporation or government since they aren't able to make judgments about the quality of one educational program vs. another. And it therefore wants the professional organization to make the judgment for it, and then use that judgment. Now the National Accrediting Organization is not even going to talk to you about accreditation unless you can first make the case that that's the need. I think SWST would just be spinning its wheels unless its constituency someplace down the line, people that hire its graduates, are prepared to say that this is a problem for us and we want you as a society to put the educational groups in two categories, the good and the bad. That's putting it rather crudely but that's what accreditation is, separating people into the haves and have nots. And in a sort of general discussion of accreditation in a meeting like this everybody that's involved automatically assumes that if it ever happened he'd be accredited. But someplace down the road, if this exercise has any validity at all, there is going to be a batch that aren't accredited. I'm not opposed to accreditation but I think you've got to look it right square in the eye, and know precisely what it is and what it is you're doing.

Moderator: May I perhaps have two or three more comments or questions and then close the meeting.

Ben Bryant, University of Washington, College of Forest Resources: We get our students in what I call wood utilization technology from two general sources. One source is undergraduates in forest management who are about to graduate and discover there are too many people competing for too few jobs. If they wake up fast enough, they take a few background courses in wood utilization or wood technology and get a job in a lumber mill or a plywood plant in an introductory, supervision-type job. And this works. We also get people at the graduate level from other disciplines that have an adequate background in chemistry, physics, and math. In some cases, we even invite people in business who have a pretty good background in chemistry, physics, and math. In two years' time, we can turn them into very employable people. Now they are not always the kind of people that Frank Guthrie would specifically like to hire, but some of them go to organizations where their particular background and education fits like a glove. This is simply reinforcement of what Dean Bethel said about keeping the model broad, not getting it too narrow. With this type of opportunity for people to retread themselves, they can meet the need in the field for jobs and they could care less about accreditation. They don't care what people call them as long as they get paid well enough and have a challenging opportunity to work in their field of interest.

Moderator: Thank you very much, Ben. Peter?

Peter Koch, Forest Service: If somebody laid it on me to predict what the major demand might be for people graduating from wood science and technology, I would suggest between now and 1985 that two classes of people would be highly employable. One is processing engineers in the wood industry, and the other would be a man who knows how to get the raw material off the land. I suspect that those might be the two fastest growing areas of our technology in the next 8 years.

Moderator: Thank you. Comment, please?

Frank Guthrie: I agree Peter, very strongly. I think there is a third category though. There needs to be the guy that can pick it up from the raw material specialist, get it into the marketplace and get the money back. Somebody who can push a string, incidentally. They know that you can starch it and do a lot of other things. Those are the kinds of people we're talking about. When you talk about emulating yourselves, I worry about a survey that asks people who are already out there, because those people are failures in my mind. They are not pulling the string. It's an overstatement, but in a lot of cases they can't plan past 5 o'clock tonight.

Moderator: At this time I would like very much to express my appreciation to our panel for their work and insight. I also express appreciation to all of you for coming and for your thoughtful comments. Now I'll turn it over to Bob Erickson.

Bob Erickson: Thank you very much, Helmuth. You did a terrific job on moderating this. And I want to echo what you said; my thanks to each and every one of the speakers. They were very cooperative about agreeing to be on the program, about preparing their material and I think they made excellent presentations. I'm very happy with the good attendance that we had and with the excellent response of the audience to the program. Let's give a big hand to our speakers, and I hope this has provided some seed money for the question at hand, and that there will now be a lot of thought given to education in wood science and technology. Thank you.