Workshop Proceedings

Redcedar – Challenge or Opportunity

University Plaza Hotel and Conference Center
Springfield, Missouri

August 9-11, 2007

Edited by: Michael Gold, University of Missouri Center for Agroforestry
Craig McKinley, Oklahoma State University

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Preface

During the initial planning of the "Redcedar - Challenge or Opportunity" workshop, the program committee anticipated that some 100 individuals might attend. Obviously, it was a pleasant surprise when actual attendance topped 170. The interest expressed in the management, utilization and marketing of eastern redcedar during this workshop has now provided an impetus for developing the redcedar resource into a new and exciting wood product field.

These proceedings were developed by transcribing tapes made of each presentation. By employing this method of recording and then transferring spoken word to text, mistakes did occur. As examples, speakers, at times, spoke too low to be recorded, tapes required changing during presentations, technical words were not always enunciated, and the list goes on. Likewise, not all individuals who made comments could be identified. A concerted effort has been made to correct recording errors. Thus, a few changes from the original presentations have been made. However, to keep with the informal nature of the workshop, the words of the speakers have been preserved to the extent possible.

We apologize for any errors which may still exist, and trust you, the reader, will accept these proceedings as one avenue of expanding our knowledge of redcedar, albeit not a totally perfect mechanism.

The program committee wishes to express its sincere appreciation to the participants, speakers and sponsors of this regional workshop. The committee also wishes to thank those individuals who diligently assisted in the transcription from tape of the various presentations for these proceedings. In particular, we recognize Ms. Colleen McDevitt for her efforts in this regard.

Again, thanks to all who made the three-day workshop a complete success, and who have since provided the creativity, knowledge and imagination to carry this first effort forward to the benefit of the redcedar industry.

For the Planning Committee,

Craig R. McKinley
Oklahoma State University

Michael Gold
University of Missouri Center for Agroforestry

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Ecology and Biology of Redcedar

Rod Will, Oklahoma State University

Presentation

I'll talk about the range and environmental prowess of redcedar, some historical distribution, and habitat, some about reproduction, some about biology of redcedar both in forests and prairies. I'll then talk about some genetics, and growth of natural stands and a little bit about heartwood formation in terms of the biology and ecology of the tree.

First, redcedar is actually a juniper, *Juniperus virginiana*, not a true cedar, and in North America there's probably twelve, maybe fifteen or so juniper species. Redcedar has by far the largest geographical distribution, second only to red maple in terms of extent of geographical distribution for eastern trees. The range of redcedar goes west all the way to western Kansas and Nebraska, south to Texas, from south Georgia, north up to Minnesota, New York, New England, and all the way to the coast in the Mid-Atlantic states.

Redcedar has wide ecological amplitude or tolerance to site differences. It grows on areas of average temperature ranging 40 to 68 degrees F, with the average maximum temperature being 90 to 105 degrees F. Minimums range from -45 to 20 degrees F and the range of growing season is from 120 days all the way up to 250 days. To me, probably the most extraordinary thing is that the redcedar can grow in areas of over 60 inches of annual rainfall all the way down to 15 inches of rain; a very tough critter with a wide ecological amplitude.

Given its wide ecological amplitude, it also does well on a wide variety of soils. We usually see it across landscapes on dry rocky areas and glades. But it actually grows best on well-drained, alluvial soils. An alluvial soil would be one created by a movement of water: flood plain or coast. However, there are issues of competition from other species on these fertile sites. Therefore we often see it most prominently in glades, old fields, and rocky outcrops.

<u>Soil pH:</u>

There's a notion that redcedar likes more basic soils. A pH of 7 would be neutral, above 7 would be basic, and below 7 would be acidic. In actuality, redcedar does very well in acidic soils. Part of that notion came about because when people would measure soil pH underneath the cedar stands, they'd find a higher pH under those stands. This is because redcedar litter contains lots of calcium which subsequently raises pH.

Also given the species' geographically wide range, redcedar is a member of many different forest cover types. It does appear in pure stands, especially on abandoned, agricultural fields. In the southern part of the range it is also found with species like shortleaf pine and Virginia pine. In southern Missouri you see it a lot with various white

oaks, red oaks, hickories, walnut, and also because of its wide range, it's a varying and minor component of numerous other forest types.

Trends in time for redcedar:

In pre-European settlement, redcedar was largely restricted to dry, rocky areas. It wasn't nearly as abundant across the landscape. There was quite a good bit of virgin redcedar out there that wasn't exploited. I found an interesting quote from a paper from 1968 describing some trends starting back from the 30's up through the 60's. The quote from Ferguson was that, "The wood was once favored for domestic use and export because of its exceptional cutting ability and quality. It has now lost much of its popularity because of limited supply." I think that's kind of ironic given the situation now. It points out two things: both that we have this great opportunity with the abundance of redcedar on the landscape scale and that people's attitudes and perceptions and desires change over time. At one point redcedar was highly desirable. For furniture and uses inside the house. I think there's an opportunity for folks like you to change the perception and get cedar to become a popular wood again.

Fire:

Redcedar is very susceptible to fire; thin bark, easily killed by the heat of the fire, flammable foliage, particularly with young foliage near the surface of the ground where there is fine fuels to carry that fire. With fire suppression there's been a dramatic increase in redcedar. In Missouri back in the 40's, people were noting a large dramatic increase of cedar across the landscape. In Oklahoma a little later, I've found some citations from back in the 70's talking about increasing, numerous cedars across the landscape. Of course that's accelerated since that time.

A little bit more about fire in terms of redcedar: when it's young, redcedar is very susceptible to surface fire - fires that go across and burn up fine fuels and litter in the forest or grasses across the prairie. When redcedar are small, they will burn up in surface fires. At about 6 feet tall there is a tipping point where redcedars become fairly resistant to surface fire. In contrast to surface fires, crown fires move through the whole canopy and essentially replace stands of conifers - the kinds you often see out west. Unlike oaks and other hardwoods that don't often carry a crown fire, redcedar stands are susceptible to crown fires when they are growing at higher density. This leads to the possibility for catastrophic crown fire burning up cedar and posing risk to humans and property.

Native Americans were burning the landscape since the last glaciation. This helped shape vegetation communities. I think it's important to point out the dramatic use of fire but also, I throw this out for kind of a philosophical point. Forests and prairies without redcedar were partly a human artifact. Most of the fires have been set by humans. I would argue that the current landscape is dominated by fire suppression – also a human management decision.

Native Americans burned for managing wildlife population primarily, but also to keep down ticks and chiggers, for defense purposes since you could see better if things were cleared up. And I think also people liked to burn stuff too!

Another picture of a fire: upper left there would be cedar, typical habitat without fire, thrived on dry rocky outcrops where there were not a lot of fuels to carry a fire. Here are a few pictures of cedar control on the prairie. Being at Oklahoma State, I talk with range folks a lot. Cedar is the number one ecological problem, and they see it as having a very simple solution, which is to burn. Fire will get rid of redcedar, without a doubt. If you can burn every 5 to 10 years you will keep redcedar out. And that's great to maintain prairie. I would put forth that the redcedar is unfortunately here to stay in the prairie in Oklahoma because people are not going to burn the landscape. Some people will, with the expertise, the time, the money, and the willingness to accept risk. But the vast majority of landowners are probably not going to burn. So, in terms of cedar, it's an issue or an opportunity we need deal with.

Another picture of a redcedar: this is Keystone Preserve, 200 year old tree, dry, rocky outcrop, no fuels - no fire. That would be kind of a native, pre-European settlement habitat for redcedar.

More pictures of burning. This is shortleaf pine, near Waldon, Arkansas, where the Forest Service is doing management for red-cockaded woodpecker. Upper-left, no fire and you can actually see there's redcedar growing right there in the midst of that shortleaf pine stand versus the lower right, an area managed for pine savanna using reintroduction of fire.

Central Oklahoma, showing invasion of prairie by redcedar: upper right, fairly early stage, bottom right, later stage, left hand side we have about a 30 foot tall tree with about a 25 foot crown spread. I guess it points out both the invasion of cedar in the prairie and also, thinking about the form of these trees, they will probably never produce a saw log.

Historical ranges:

The next series of slides comes from Jim Harlan, who was kind enough to send them along to me from Missouri. And this shows the cover types in Missouri from the early 1800's or so. I know you can't read those but you can see distribution of forest, and take my word for it, none of those forest cover types have redcedar as a major component. Post oak, sugar maple, elm, white oak, and so forth, none of those contain redcedar as a major component.

This shows redcedar measured during the initial land survey from the early 1800's where they would keep track of trees at each of the section corners. From that survey there were 370 redcedars. Over 450,000 trees were documented in that survey, so less than 1/100 of 1% was cedar during that land survey. In my discussion with Jim Harlan, he went as far as saying redcedar was an insignificant component of the forests of Missouri.

Okay, let's jump forward to current times: Now though these aren't redcedar points, but canopy cover of redcedar. You see a dramatic increase of redcedar across the landscape, mainly across the Ozarks. Again, primarily due to fire suppression and land abandonment.

In Oklahoma, the map on the lower right shows cedar distribution in 1994**.** Upper left is from NRCS, showing percent canopy cover of redcedar in Payne County. Payne County is where Stillwater is and that is right smack-dab there in north central Oklahoma. The blue is 0-30% canopy cover, from redcedar, and the green and red are more redcedar, but to point out that about 50 % of the county right now has a component of redcedar across the landscape, very dramatic.

If you look at Forest Service FIA data, which is the Forestry Inventory and Analysis, the states with the most redcedar turn out being Missouri, Arkansas, Tennessee and Kentucky. Oklahoma doesn't show up because most of where the redcedar occurs is not inventoried because it's not considered commercial forests. I would argue that it should be.

This is some data from the Redcedar Task Force. In 2002, about 8 million acres of Oklahoma had been invaded by the 15 redcedar per acre. With about 300,000 acres being added each year; very, very dramatic decreases in redcedar. Huge negative financial effects were estimated due to wild fires, catastrophic crown fires, reduced cattle forage, hunting opportunities, and recreation.

Reproduction and Regrowth:

Redcedar is a dioecious species; it's has male and female trees. Dioecious literally translates to "two houses," male and female trees are needed to reproduce. It's a conifer, so the reproductive structures are cones or conelets. Cones begin to develop late summer, release pollen early spring. It takes a month or two for fertilization to occur. Seeds mature late summer, about 4 seeds per cone. Cones stay on the tree until they are either eaten or are dropped in the spring.

Animals are very important dispersers of redcedar. Cedar Waxing is the poster boy for redcedar. There's 30-some species of birds that use redcedar.

During the second spring the seed's need stratification or a period of cold, moist conditions before it can break dormancy. Regeneration is very common along fence rows and perch points because of bird droppings. Redcedar does not stay long in the seed bank. Some species of trees will make seeds that stay dormant for years and years then will germinate once there is a disturbance. Redcedar is not like that. It does not stay dormant for very long. Redcedar does not undergo vegetative reproduction. It will not sprout upon after fire.

Biology of Redcedar:

Redcedar is interesting from an ecological standpoint. It's an early successional species in many regards; it is well adapted to disturbed habitats given its large dispersal from birds and demands for high light conditions. But it also has some traits that are better akin to tolerate stress. It has a strategy of taking it slow and steady, kind of like the tortoise in the "Tortoise and the Hare". It's a poor direct competitor although it can avoid competition largely through its evergreen nature, avoiding competition with hardwoods during winter time and avoiding competition with grasses by photosynthesizing before the grasses come out in the spring time.

In forests, redcedar is specified as being intolerant to shade. In other words, it doesn't survive well in the shade. Although it's somewhat of a paradox, because redcedar does exist and persist in the forest understory. I think we could argue that young redcedar tends to be more shade tolerant than older individuals. Being evergreen in a deciduous forest is great. Redcedar can photosynthesize and gain carbon all year long. In fact, there was a study that showed that bulk of its photosynthesis occurred during winter and early spring before the leaf development of the deciduous overstory. During winter, the foliage of redcedar absorbs sunlight and heats up so it can actually photosynthesize when the ambient air temperature is below freezing. Redcedar is very drought tolerant, which is important because it can't shed its leaves during extended periods without rain. It's got to be able to withstand the worst of everything.

Here's a picture of redcedar growing in the understory - persisting there in a pretty shady condition. In old fields, they start along fencerows, fence lines and perch points. Birds eat seeds, defecate and serve as a seed source. Once there's enough redcedar across the landscape, it becomes a much more uniform distribution of seeds. Physiologically, redcedar avoids competition with grasses by conducting a lot of its photosynthesis during the wintertime and spring before grass has become active. And again it is very drought tolerant and does well in the harsh dry conditions of the prairie.

Here's a picture of from cross-timbers – a big post oak. I show it for two reasons: beneath that post oak is scorched redcedar, so I'm showing it so you see the dramatic presence of redcedar under that oak tree where the birds have dropped the seed. It also shows the difference in fire tolerance of the different species. Obviously the grass looks great after fire and because of the oak's thick bark it survived just fine. However, the cedars beneath the oak burned up.

Here's some data I took looking at photosynthesis. Redcedar photosynthesizes year round; it's active, February, March, April before the grasses become active. Also I point out that the rate of photosynthesis is 10 times greater for the grasses than for redcedar. But again because redcedar has a stress tolerance life history strategy, it does very well. In fact once it gets bigger, it shades the grasses, which tends to have a positive feedback on the growth-rate of cedar. Research in Virginia showed an exponential increase of redcedar across the landscape. In fact, redcedar encroaches very quickly. Within 10 to 20 years, redcedar can fully take over a prairie. Lower right shows an old homestead, about 70-year-old trees and that might be the future of some of our tallgrass prairie.

A little bit about environment and genetics: Redcedar phenotype or outward appearance has a lot of plasticity or ability to change in response to the environment, in particular, shade versus sun. These pictures were taken from the same location; I just jumped into the cross-timbers forest to take the one on the left - growing in the forest, a nice tree-like shape, and small branches. In the open old field it grows like a bush or a hedge. Here its form is maximizing light capture by the crowns. It's okay to stack up foliage and put as much foliage in as little area as possible because the light intensity is so high. Also we could argue that by doing that it tends to shade the grasses, which has that positive feedback on the growth of the cedar. It also points out the branch form of these trees, obviously it's a different critter and has different potential uses and utilizations.

Genetics:

This slide shows two different phenotypes of redcedar growing in the open. The photo on the left shows a patch of redcedar along I-40 near Fort Smith Arkansas that exhibits a very columnar form. The photo on the left shows the typical old-field cedar in Oklahoma. The question is whether the differences are genetic or due to environment. To me this example appears to be one of genetic differences. In fact there have been lots of studies looking at genetic differences in redcedar. Provenance differences are differences between geographic areas. Provenance differences have been identified related to growth rate, form, drought resistance, crown size, germination, disease resistance and so forth. There also might be genetic differences between the old field form and the forest form I showed earlier. There was some work in the Ozarks looking at northern and eastern ecotypes. To really test the question of genetics, you we need to do a common garden experiment. In addition, there definitely is some introgression and hybridization with Rocky Mountain Juniper in the western part of the eastern redcedar range.

So, is that an opportunity? In other tree species, tree breeding has been very successful at increasing growth. If you talked to geneticist, (they might be a little bit optimistic), they claim that 13 to 21 percent gain with a first generation improved loblolly pine and a 26 to 35% increase in growth, 2nd generation. Up to 50% increase in growth for improved full - sib families.

Additionally, the use of clones is becoming big. The increase in productivity with clones in southern pines is unknown at this point. They have great, great potential. I'm not advocating that somebody spend millions of dollars to start up a redcedar breeding program, but I am saying that given the wide range of genetic variation of redcedar there could be a potential to exploit that variation for growth rate, tree form, branch size, so forth.

Damaging agents:

Fire, we've talked about it. I think there are some talks later today about insects and disease, but insects generally really not a big problem. Bagworms are probably the most common. Root rot when stressed - cedar-apple rust being the big one in terms of tree

production. Phomopsis blight when seedlings are young. The nursery for the State of Oklahoma lost their juniper crop this year from Phomopsis blight because it was so wet.

Let me talk a little bit about growth of natural stands. Later today I'm going to talk about growth of managed stands, and growth of potential plantations. But for now I'm going to refine my talk to just natural stands.

Growth rate:

Growth rate is highly variable depending on site quality. Twenty to 30 year-old trees reach 18 to 26 feet tall, 2 to 3 inches in diameter, with fairly slow growth in natural stands. Mature trees can reach 40 – 50 feet tall, 24 inches diameter. They can reach 120 feet tall, 5 feet in diameter.

Very little work is in the literature looking at redcedar growth and development. Going back to the 1950's there was some work out of Arkansas that looked at natural stands. The average production in a 40-year-old stands is about 28 cubic feet per acre per year In plantations, it looks like 70 cubic feet per year might be possible and, I would argue with more intensive inputs, maybe up to 100 cubic feet per acre per year might be possible. The net effect is that you can grow sawtimber in maybe 40 to 60 years, as opposed to 25 years in southern pine.

Here's some site index information. Site index, for people who aren't foresters, is the height of dominant trees at given a base age. In this case, you're talking about base age 50, so how tall are the trees on that site at age 50? Alluvial, the best sites, kind of flood plains, cove sites, deep soils; 60 feet tall at 50 years old. Upland site, deep soil: 50 years old, 50 feet tall. Shallower soil: 40 feet tall. Very shallow soil: 30 feet tall. The question came up on the field trip, "How old are these trees?" We took cores, but it was hard to tell from the core because it was rotten in the middle. I would say given that site, we were probably on an upland site with fairly decent soil would be my guess, and I'd say about a foot a year would be the height growth rate in that stand. I should point out that height is used for site index because height growth is mostly a function of site quality; using diameter is not good because it's a function of stand density. If there are lots of trees in an area, they tend to have smaller diameters, so people use height as a measure of site quality.

<u>Diameter growth:</u>

How fast can they grow in diameter? My students hate this when I say, "It depends." It depends on site quality; it depends on how they're spaced. Again, alluvial soil is the best soil, upland deep soil, then shallower, open prairie soil. Growth rate is better on the better soils and slower on the worse soils, as you'd expect. Growth is also, affected by density, under stocked or well stocked, rather than overstocked where you have lots of trees that grow to a smaller diameter.

<u>Growth rates in prairie:</u>

Here's some work from Oklahoma: upper-graph is western, middle is central, the bottom is eastern. At 30 years old you're looking at about a 27 foot tall tree in western Oklahoma, a little bit taller 8 meters, you'd be looking at lower 30's in eastern Oklahoma and comparing the growth rate of these trees to those growing in Arkansas, in a more closed situation, they grow okay. These old, field trees grow okay in terms of height growth. This site, eastern Oklahoma, compared pretty well to the uplands type 2 or type 3 sites even though precipitation declines as you move west. In terms of canopy size, these open-grown trees take up a heck of a lot of territory. In central Oklahoma, bigger trees take up 130 feet square surface area, eastern Oklahoma over 400 feet square. If you're raising cattle, obviously it's a bad thing. In terms of wood production it's fairly slow. These old field trees they have a lot of taper and not a lot of stem volume.

How does the growth rate of natural redcedar stands compare to other species? I searched the literature and pulled some numbers up in relation to redcedar in relation to other species. It's all in cubic feet per acre, per year averaged over the life of the stand. MAI is "mean annual increment." It is the total volume on the site divided by age. MAI for unmanaged cedar I came up with about 20 to 60 cubic feet per acre per year. These data are mainly going to be out of Arkansas. Multiply cubic feet by 12 to get board feet - redcedar plantation, higher, I'd say 50-70 and productivity might even be greater with proper management.

The growth rate of natural loblolly pine and loblolly pine plantations is greater than redcedar. Shortleaf pine - I'll give you a fair comparison given that shortleaf pine is often found on similar sites as redcedar in Missouri. Natural shortleaf pine, 30 to 110 cubic feet per acre. Plantation boosts that to 200 to 300, so again if you're trying to maximize volume production then you're probably going to want to grow pine. Although they're not equal in terms of utilization, the yellow poplar, fast growing 100 to 200, cottonwood, the sky's the limit. How about species that we saw yesterday? It's kind of dry in those areas - red oak 20 to 40, white oak 15 to 40. Cross-timbers: post oak, black jack oak, less than 10. So, compared to those species, those alternatives, redcedar is very competitive and does really well.

Briefly about heartwood:

In the context of biology, the study in Oklahoma found no heartwood development until after age 10. There's a slow increase up to age 20 and after 20, heartwood cross sectional area increased exponentially**.** So, if you want heartwood, you have to wait.

In terms of open grown versus closed grown:

Open grown had a lower percentage of heartwood than did closed, 34% versus 50%. And why that is, we can speculate age, closed grown grow trees slower. The slower growing trees tend to have more heartwood as a percentage than the fast growing trees. And my opinion is that there's a direct functional relationship between leaf area and the sapwood. Sapwood is needed to the carry the water thorough the foliage. If you've got a big

canopy, a lot of foliage, you need more sapwood. It's not going to turn into heartwood until it's no longer needed. So, anything that causes a big canopy causes a greater production of sapwood.

And very briefly, oils and extracts:

Cedarwood oil makes up 2.5% to 5% of tree weight, and it's a function of heartwood volume. Some of the literature seemed to indicate that the properties of cedarwood oil did change and vary with age, especially during old growth versus second growth and then there's other oils and extracts found throughout the tree, that do depend on male versus female and also the site.

Questions and Discussion

Q. You had one little thing up there, you had mentioned about the cells in the wood are resistant to cavitation when there's a drought. Is that the reason that when you dry pieces of redcedar it shrinks little?

A. The xylem cells which make up the wood of redcedar are very narrow and they're very resistant cavitation during drought. Like a straw, water is sucked up those elements and if you have a small straw you can pull a lot harder before the water column snaps. And so the question is how does that affect the drying and the shrinkage. And I don't know. I would guess though that they are related because of the geometry. If you have less hollow space per unit of cell wall laid down you probably have less shrinkage when during the drying process. Although this is speculation.

Q. Just a comment about that, you showed that picture of the two different phenotypes of juniper. I know of a case where seeds were collected from different areas and grown on the same site and they didn't maintain the shape of the parents. To me it appears to be a site influence rather than a genetic. Any ideas?

A. This situation would indicate that there is something about the site rather than genetics. It could be plasticity in the ability to change their phenotype in response to environmental characteristics of a site; something about that site causing that shape would be definitely interesting to know what that is. Another possibility could be that pollen flow. The seed that was collected would've been open pollinated and the seed source could've been contaminated by pollen from a different area. But yes, very interesting. I think someone should do more of that.

Redcedar Market Analysis

Michael Gold, University of Missouri Center for Agroforestry

Introduction

Mike is working on Chinese chestnut as a new horticultural orchard crop for Missouri producers and works on developing market information for a variety of specialty crops including shiitake mushrooms and elderberry. Mike is a native of Michigan and he received his B.S. and PhD. degrees in forestry at Michigan State University. Mike, welcome!

Presentation

Hello everyone, it's a pleasure to be here and I agree with Craig that since there are 150 people at this workshop it clearly demonstrates a lot of interest in redcedar. The work that I will be talking about was done jointly with a couple of my colleagues at the Center for Agroforestry, Mihaela Cernusca (we call her Ina) and Larry Godsey. We decided about 6 years ago to take a look at the broad outline of the redcedar marketplace because we couldn't really find any data about it. The redcedar information that we have acquired was accomplished through survey work that will provide a broad overview of the redcedar marketplace. There are a number of people in this room that know a lot of specific details about all aspects of redcedar. I'm going to start out with the big picture about the redcedar market.

To restate the obvious, there are many different kinds of products derived from redcedar; we saw some of those products yesterday on our field tours. Here is an outline of what is going to be covered in the next 45 minutes.

<u>The Roadmap to the Market - What We Learned in our Research</u>

1. Five Forces Model to Study Redcedar
2. Conclusions (begin at the end)
3. The Ugly Duckling Tree (no respect!)
4. Five Forces: Results
5. Where is the Redcedar Resource
6. Trends in Supply and Demand
7. Redcedar Markets and Products
8. Conclusions revisited

Something that we call the Five Forces is modeled to take a look at the big picture of the redcedar industry. Redcedar is something I call the "Ugly Duckling Tree" because it doesn't get any respect, I also call it the "Rodney Dangerfield Tree."

I will present some of the results our survey uncovered from looking at these Five Forces, I will show a little more detail from the forestry inventory analysis on where the redcedar resource is, take a quick look at some trends in supply and demand based on results from

the survey, present more information on redcedar markets and products and then provide some concluding remarks that I hope will trigger our thinking for the next day and a half at the end of this session tomorrow morning. There's an agenda item that refers to "next steps" during which time I hope we can have an open exchange of information so that those of us that are very interested in the redcedar industry can use these ideas to decide where we're going to go from here into future.

The Porter's Five Forces framework is a big picture look at the way industries compete and looks at the fundamentals of competition not specifically how a specific firm uses different techniques to compete and helps to develop product market characteristics and it provides a road map to trace how a product goes all the way from a raw material stage in the value chain all the way to the retailer and I'll talk a little bit about what they call the value chain. The value chain, essentially, is all those different steps that a product goes through in case of redcedar: from the tree standing in the woods, to the product that's sitting as a closet liner in a consumer's home or anywhere else, where it goes from a raw material to the finished product. This is a typical look at a market value chain where you have producers, which we saw yesterday, and processors and it goes on to wholesaler, retailer, and then finally the sale with the consumer.

By the way, all those of us that have power points, we're going to collect all these power points and they'll show up on a website and we'll let you know where you can find these presentations after this is over. And we're trying to tape these sessions so that those who don't have power points will have them taped. I'll try to get the tapes transcribed to capture the written remarks; the verbal remarks will also be put into written form. Things that you don't get today will show up in a written proceedings that will be published in the future.

This is called the Porter Five Forces Model (PFFM), Figure 1, and it has 5 elements: looking at the opportunity or the difficulty of entering a new market, the potential interest, the bargaining power if you are a supplier, the bargaining power if you are a buyer, the competition within the industry itself, the rivalry among firms, that also creates substitutes. Some industries, there are simply no alternatives and the product is very strong in the marketplace. With redcedar, depending on where your market is, there are things that can substitute for it and in other cases there may not be.

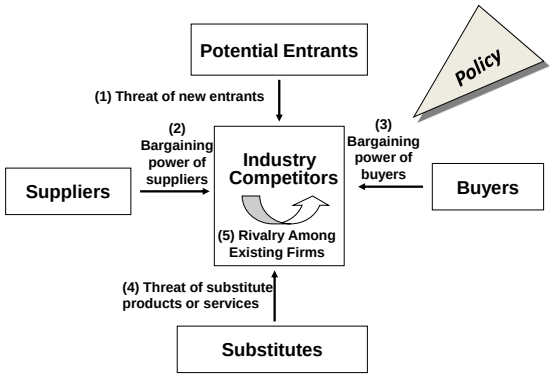

Figure 1. The Porter's Five Forces Model

These are the details of the Five Forces market. I won't go in to it too much but I will talk about these forces in relation to redcedar in what we found in Missouri. The PFFM tells us how easy it is for others to get into the business and how much competition to anticipate, making it tougher to stay in business. If you are a supplier, are you in a strong position to say "I won't take less for a certain product that I want to sell you" or basically do you have to take what you're offered because the product is abundance? The same can be said for buyers. Can buyers dictate price or do they not have a lot of strength in the marketplace? Are there substitutes that can come in and knock your product out if the price for your product gets too high or if you don't have enough volume? Is there a lot of rivalry (competition) within the industry?

We also added another item to the PFFM, policy, that we thought might have a bearing on redcedar and that is: Are there certain government policies, whether it is the federal government or the state government, which might influence how the redcedar industry is working?

In terms of survey development, the first thing we had to do was find out who are the redcedar producers and manufacturers around the country. We developed a database in which we were able to identify 187 companies participating in the redcedar market. We then sent a mail survey to everyone that we identified and about 1/3 of all those folks returned their surveys. From the mail survey we got an understanding of the size of the market, where it's located, production, and a basic understanding of supply and demand trends. We also asked everyone in that survey if they were willing to let us call them on the phone in order to get more detailed information on the markets. We had a follow up phone survey and 25 companies were kind enough to let us talk to them on the phone.

I wanted to make a little plug in order to keep our database up-to-date. On the Center for Agroforestry website (www.centerforagroforestry.org), we have our redcedar market analysis and also have a directory of cedar manufacturers that lists by state what they buy and what they sell. If you are not in our directory or if you need to update your information, contact us and we will add or modify the directory with your updated information. We are trying to update our survey not just for Missouri, but the whole country. In all of our survey data, individual data is kept private. Your particular response is never revealed to anyone, it is reported as anonymous aggregated market information. Since we did this survey in 2002, we'd like to update the survey and keep it current. Your participation, along with others who you might know and are not in our database, would be helpful to the entire redcedar industry. (NOTE: This is still a valid request in 2010!).

Just to reiterate what was stated previously, the heart of the redcedar resource is found in Arkansas, Tennessee, Kentucky and Missouri (Gold et al., 2005). We also heard that there is dramatic growth of the redcedar resource in Oklahoma as well as other parts of the Great Plains.

Alright, let's talk about the "ugly duckling" tree. Everywhere you drive, you see cedar, cedar, cedar. In the Missouri Ozarks, as you drive through the region in the winter when the leaves are off the deciduous trees, you see even more redcedar. It's amazing how much redcedar is out there; it really is exploding. And why do we like redcedar? Redcedar is durable, beautiful, fragrant, insect and rot resistant and easy to maintain. In spite of the abundance of the redcedar resource and familiarity with many of its uses, there is much that is unknown about the marketplace and that's something that we wanted to get more information about.

In Oklahoma, eastern redcedar has been described as "public enemy number one," and in previous discussions at this conference we saw that whole list of detrimental things (e.g., native range habitat, wildlife impacts, fire danger) that are impacted from unchecked expansion of redcedar. At the same time, we saw yesterday on our redcedar tour that redcedar is a viable industry. You will hear a lot more about the industry throughout the remainder of the workshop and about how much opportunity there is to participate in the industry and make profit out of someone else's problem (i.e., making lemons into lemonade).

Is redcedar a trash tree? Well, it depends on your perspective. When we summarized the results of our national redcedar survey were conservatively estimating it at a 60 million dollar a year industry, probably larger, so some people's trash is definitely other people's cash.

In our mail survey we had responses from 16 different states. I don't know if people just trusted us more because we were from Missouri, but more people in Missouri responded. We also had feedback from Ohio, Oklahoma, Alabama, Arkansas, Arizona, Connecticut, Florida, Kentucky, Massachusetts, all over the country really. We had people responding to our mail survey and then the follow up phone survey was a smaller group of people, again mostly from Missouri, but we also talked to folks in New York, Ohio, Oklahoma, Texas, Arkansas, Connecticut, Indiana, and Kentucky.

These are the players that are in that value chain of redcedar. From their survey responses we had people in the essential oil business, retailers in the fiber industry, wholesalers, secondary and primary manufacturers, a couple folks who are brokers for redcedar, raw material providers like loggers as well as landowners and farmers.

The first aspect to discuss from the PFFM is about barriers to entry. It's clear, and this may be true in all businesses, that there are incumbent advantages. If you already have established relationships with people who have access to raw martial or to primary manufacturers of material, then you have a strong relationship and a trust built with them and they are going to continue to do business with you. If you're trying to come into a new business you may have to create those relationships. That's a barrier that you have to overcome. There's a learning curve in the redcedar business as well as others. And realistically, if you want to stay most competitive, you may not want to share everything. Yesterday everyone was very open with us about how they do their business, but you

may not want to tell everybody how you do your business, or some of the fine points, because they're going to have to learn that on their own in the school of hard knocks.

Barriers to entry include cash, required investments in equipment, lack of knowledge and experience, access to whatever raw material you need whether you need trees themselves whether you need cants, cord wood, fiber, or different levels of manufactured products for your business like tongue and groove paneling. Certainly you need access to markets; you have to realize that shipping takes up a lot of the money and transportation. You have to know that the person that you are buying products from, and the person you are selling products to, are in reasonable proximity so you make a profit. If you have an isolated, giant pocket of redcedar way out in western South Dakota, you might have a real problem because you may not have access to all the markets to sell that competitively and your transportation costs may be too high; just a hypothetical example.

Then there's the need for labor. We use a scale, and a lot of times, the larger you get the lower it costs you per unit. The more difficult the barriers are that need to be overcome by those trying to enter the market, the better it is for the companies who are already in the market in terms of an advantage to stay in the business and preclude others from becoming competitors.

Here is an example of a value chain just to show you what it looks like: In the redcedar value chain from suppliers to buyers, there are raw material providers, landowners, and primary manufacturers (like those we saw yesterday making products from limbed raw logs. We also saw secondary manufacturers who take the primary manufactured products derived from logs (e.g., cants) and turn it into a paneling or some other further manufactured item. Further along the value chain there are wholesalers, the fiber industry, cedar oil producers, and retail outlets. So, the complete value chain includes private land owners, loggers, saw mills, shavings and mulch producers, lumber companies, parts and manufacturers, novelty producers, wholesale distributors, retailers like pet stores, farm & supply stores, craft markets, home improvement stores, and then there's the consumer that may be a private individual or a building contractor or anyone who uses that final product.

There's also a fiber component to the redcedar business, so again you have loggers, mills, wholesalers and landscape contractors, and then you have retailers like pet stores for pet bedding and kitty litter as well as bagged redcedar mulch. That's just one component within the redcedar business. There are a number of individuals in the redcedar business that are earning a fairly large income.

About 1/3 of those that responded to our survey have redcedar sales exceeding 1 million dollars. There are small scale businesses, medium scale businesses and there are redcedar businesses that are quite large scale, just from our small number of people who we were able to speak to over the telephone. Now you just look at the supplier part of this PFFM for just a second, and we're just thinking about who sells what to whom. We've got the land owners, loggers, saw mills, processors and wholesalers and each one of those supplies somebody else, the supply chain.

Is there any bargaining power in the suppliers? Well most of the purchases are done on the spot, not with contracts, which means it's a relatively informal market, which means there isn't a whole lot of bargaining power for the suppliers because, as we heard yesterday, anybody that comes up and brings a load, they'll buy it right on the spot. If I'm the one that's harvesting their resource right out of the words and I take it to someone who mills it and they basically tell me what I'm going to get for it, and I can't say, "No, I want $10 more per cord." They'll say, "Go down the road somewhere with your pick-up load, otherwise forget about it." It doesn't seem to be a lot of bargaining power for suppliers from the data that we have. Again the redcedar market relies heavily on personal relationships and reputation. The three major suppliers of redcedar materials were loggers, landowners and primary manufacturers.

Where is the resource? In Columbia, Missouri we have a U.S. forest service research unit that ran the eastern U.S. Forest Inventory and Analysis (FIA) data where you can see graphically, millions of trees per county and as you get in to deeper green you get into more intense pockets of redcedar. You can also see the 4 states with the majority of the redcedar growing stock, as we mentioned before, Missouri, Arkansas, Tennessee and Kentucky. You can also see a whole bunch in Oklahoma. It was previously mentioned that the redcedar resource is growing exponentially in places like Oklahoma. It may not be the same quality of resource but there's a whole lot of it that's there.

Putting that data on in another way you get a sense for different diameter classes because the forest inventory analysis does this in two inch diameter classes, 2, 4, 6, and 8. You have to have a log that is 6 inches in diameter or larger to be a commercially viable redcedar tree. That's a whole lot smaller than for hardwoods which are typically 12 inches and up in DBH before it can be commercially harvested. Redcedar is different in that you can go down to 6 inches DBH commercially. Again, with most hardwoods you harvest a 16 foot log but with redcedar you're talking about an 8 foot log. When Skip Mourglia was talking with us in the woods, she was counting logs, if you're thinking about hard woods you're confused because she was talking about 8 foot lengths off that tree not 16 foot lengths. There's a whole lot of resource and there's a whole lot more coming out of it. That's basically the sum of all this bunch of data. It shows the 4 states we talked about with heavy amounts of redcedar and more of it coming out into the future and assuming some kind of modest growth rate there's going to be yet even more resource available if you look out 10, 20 and 30 years compared to the present resource. We are talking about millions and millions of trees coming on to merchantable size in the coming decades.

We asked people in the mail survey, "What do you think will be the supply of redcedar products in the next 5 years?" Respondents were optimistic about the market actually in terms of demand for the next few years, which I'll talk about.

We are going to look at the value chain relative to buyers and again each one of these folks down the chain buys from somebody from someone else in the value chain. Sawmills buy from landowner and loggers, whereas woodcarvers and processors and

contractors buy from saw mills. Pet supply stores buy from wholesalers. Discount stores and craft markets buy from retail. So, there's a whole, huge group of buyers and this is just part of the market. Predictive demand of the redcedar market, next 5 years from the buyers prospective: 50% of the folks that responded think there will be more demand for redcedar products in the next 5 years. About 1/3rd (37%) said demand would remain steady and a very small amount (6%) said it was going to decline.

Now what about just the good quality redcedar? When we got people on the phone and we could ask more questions, we said, well there's good quality redcedar, there's average redcedar and there's low quality redcedar. When we were in the plant yesterday and we looked at those boards we saw some nice boards and some pretty lousy boards. The higher the number of good quality redcedar logs that go into the production line, the higher the number of quality boards that emerge after processing. Also, a smaller amount of boards need to be discarded. In terms of good quality materials there's a huge demand. Seventy percent of respondents indicated that there will be more demand for good quality redcedar. Likewise, you can understand that the future demand for low grade material is not very high in the coming years because the quality standards are higher and higher for redcedar. The good news is, even though they don't want low grade material, there are a host of other products (in terms of fiber) that you can use derived from lower grade material products.

What did telephone survey respondents think about availability? Will there be enough redcedar to meet their supply needs in the next 10 years? Sixty eight percent said yes, 16% said no, and another 16% said that there will probably be enough redcedar to meet their needs over the next 10 years but they are not concerned at this point in time.

Getting back to the PFFM, do the buyers have a lot of bargaining power? Well again most of the buyers purchase on the spot market and only 40% use a contract. Based on our survey we found that the buyers did not have all that much bargaining power in the marketplace. We didn't talk to Lowe's or to Home Depot. We didn't talk to various largest firms but those that we talked to we didn't feel that they were in a really powerful position to dictate price or to really increase their prices. There was not a lot of bargaining power either for suppliers or for buyers with the redcedar resources.

Where do people market their redcedar according to our survey? Well 76% are marketing in the local, 32% market regionally within about 200 miles. Forty eight percent market nationally and 32% market internationally. Some companies market part of their product locally, some regionally, some nationally. We also heard that yesterday. Some of that tongue and groove paneling is going to the east coast.

Respondents across the value chain identified a number of different top redcedar product categories: cants, dimensional lumber, closet lining, chests, outdoor furniture, animal bedding, mulch, cedar wood oil, raw material, plus other items like burial caskets.

The PFFM looks at the threat of substitutes. Just like any product there are things that, depending on your market niche, can substitute for redcedar. In terms of construction,

western redcedar is used more often in construction than eastern redcedar. Treated lumber (CCA or alternative options) can be used instead of eastern redcedar because of its rot resistance. In terms of furniture and gift items there are other cypress species, western juniper, pine and oak. There's many other species that are used for mulch: pine and cypress bark, pine straw and so on. In terms of the shavings market, there are pine shavings, rice hulls and sawdust. Clearly, there are substitutes for redcedar.

The PFFM looks at competition among firms. We're talking about the number and size distribution of the competitors. How similar is the product that the different competitors make? How specific are the tools and the machinery that you have that makes your product? Is it the same as everybody else or is it unique and how stable is the demand? We ask everybody, "How fierce is the competition within the redcedar industry?" Forty four percent of phone survey respondents indicated that it's moderately competitive, 48% said not particularly competitive and 8% indicated that were a lot of competitors in their area.

We also tried to get a handle on the impact of government policy on the redcedar industry. In our lack of wisdom, our research team at the University of Missouri thought that when they banned chromated copper arsenate (CCA) because of health concerns there would be a real great opportunity for the redcedar industry, which is natural drop resistant, to capture some of the CCA market. However, there are already other chemical alternatives to CCA in the market and there hasn't been a real boost in redcedar sales to capture some of that naturally rot resistant market. I think the opportunity would be out to grow market share if the natural rot resistance of eastern redcedar was promoted.

Land management practices supported by government agencies have become a major concern when it comes to redcedar. If people are putting land into conservation reserve program and taking the land out of production it often leads to encroachment by invasive species and that includes eastern redcedar. Depending on your perspective about redcedar it may be a good thing or a bad thing. Paying land owners dollars per acre to clear redcedar creates incentive to use (remove) the resource. There was some concern that Home Depot and Lowe's would not want to purchase "unmanaged" redcedar products because they made a commitment to buy only sustainably managed timber. However, these companies have made an exemption for eastern redcedar because there isn't a whole lot of management that goes on with redcedar other than cutting it down. The field tour and other talks at this workshop have and will discuss how you can manage redcedar for better growth.

As mentioned earlier, there are four states that have the bulk of the U.S. redcedar resource but also that there is a rapid expansion of redcedar into Oklahoma. Richard Newton, one of the individuals who are on the workshop program, has moved a redcedar operation into Oklahoma because he's taking advantage of the fact that there's state government payment available to landowners to remove redcedar. Richard Newton has an operation in Oklahoma to exploit the redcedar resource for mulch. Even it if the invasive redcedar doesn't produce quality cants or quality dimensional products it will

produce quality mulch products. Somebody's problem becomes somebody else's opportunity (trash into cash).

The redcedar marketplace (Figure 2). There are a lot of uses for redcedar that everyone is familiar with including cedar chests, but our research turned up many other uses. Now let's look at some of the prices. These are 2007 prices from the company W.W. Cedar over in Vienna, Missouri and basically they are buying redcedar in 8'4" lengths and the price is somewhere between $300 and $400 per thousand board feet or $0.30 to $0.40 a board foot. They will also take 53" lengths and we heard yesterday that they want a 52" length so they can cut off the ends and end up with a 48" cant. For a 53" log the values are somewhere between $270 and $300 per thousand board feet.

Here is a reality check from the landowner perspective. If you have a whole bunch of redcedar on your property and you think, oh I'm going to make a fortune just to have people come in and log it, you will be disappointed. I just quoted some delivered prices, $300, $350, and $380 dollars per thousand board feet. If you have that raw material on your land and have a logger (who then sells and delivers it to a mill) come in and harvest it as part of a timber sale, they aren't going to pay you very much. They pay based on quality, $80 to $150 per thousand board feet. This still provides you some revenue from your redcedar resource (and you get rid of it), but you are not getting rich. In spite of the fact that there is a growing market place, the price to the landowner is not all that high for redcedar.

Landowners have limited financial incentives to have redcedar removed by a logger. Where the money is made in redcedar is once it's harvested. You started to see that value chain yesterday where you went from that raw log into manufactured materials (e.g., cants) then into tongue and groove paneling in a box that goes to New Jersey, and they keep adding to the price up the value chain (Figure 2).

Here's a question: While it's not the typically the way in which redcedar is harvested, is mechanical harvesting the way to go to meet industry needs for raw material in the future? We went over to visit Webb Farms and near them there were some folks mechanically harvesting redcedar. It's not a whole lot of fun to work in redcedar stands or in redcedar thickets. In Scandinavia where they've got a lot of dense small diameter pine they have the kind of equipment that we might be able to use to move up and down hills to harvest redcedar. I don't know that this is the way to go but it might be an option in order for us to provide a large quantity of material if the demand for redcedar keeps going up.

Here are some 2007 prices paid for logs delivered at W.W. Cedar in Vienna, Missouri: Cord wood is $90 a cord, 53" logs are $270 to $300 per thousand board feet, and if you bring in the 8'4" inch logs you receive $300 to $400 per thousand board feet. Let's take a closer look at how "value-added" works with redcedar. If you bring in a log, you get $150 to $400 per thousand board feet. If you turn that into a cant, it might be worth $500 per thousand board feet. If you turn that into tongue and groove paneling it might be worth $1,800 per thousand board feet. As you further manufacture it, the price goes up and up.

There are all kinds of other products to mention. Anything related to your bedroom and your closet can be made from redcedar - redcedar hooks, belt hangers, shoe racks, mothballs. You put 24 little marble or golf ball sized redcedar balls in a pack and now you've got $6. That's a lot of money for 24 of those little redcedar balls. There are also bird feeders, bird houses, mail boxes and mail box posts and there is a lot of redcedar that can be used for mail box posts and mail box units. You can create all kinds of really nice quality furniture: gazebos, chairs, rockers, tables, shelves, chests, and beds, and prices range from the hundreds to thousands of dollars. You can find some retail sale prices right off the Giles and Kendall website: everything in your closet, closet panels, closet liners. Other items that you can find on the web include shelving for $25, a table for $250, and a whole new card table for $240. There is a lot of value but not a whole lot of redcedar product in there. It's just a matter of the finishing process, the manufacturing process to bring that to reality. Other products, at www.cedarfresh.com, you'll find cedar blocks, cedar balls, little cedar discs, anything you can think of redcedar can go in your closet. And here's another one, Allen-Edmonds, you look on their website and they've got redcedar shelving that slides under your bed, cedar chests, things for your shoes, things to hang your coat, things for every kind of thing you can think of made out of redcedar. This is small-sized stuff. You don't need big planks of wood in order to create this kind of product. Gazebos, and planters, and window boxes, and garden products, and it is rot resistant.

Products		**Unit price**
Logs		$150 - $400 / MBF
Cants		$500 / MBF
Paneling	(tongue and groove)	$1,800 /MBF
Cedar Hook		$7.99 / sets of four
Cedar tie and belt hanger		$29.99/unit (retail price)
Shoe rack		$6 / unit (retail price)
Cedar Moth Balls		$5.99 (24 pack) (retail price)
Bird feeders		$10...$20 / unit (retail price)
Bird houses		$13...$40 / unit (retail price)
Mailboxes		$32.19 /unit (retail price)
Mailbox posts		$19.83 ... $24.97 (retail price)
Gazebo		$2,395...$6,795(retail price)
Square Cabana		$2,995...$9,295 (retail price)
Furniture		
	Chairs	$245 (cedar + cypress)
	Rocking gliders	$385-$535 (cedar + cypress)
	Dining Table	$315 (cedar + cypress)
	Decorative shelves	$56.99
	Cedar Chests	$259 - $2,493 (sizes 24"...72")
Beds		$750...$1086 (retail price)

Figure 2 – Eastern Redcedar Value Added Product Prices

More value added: Now we're talking about the redcedar wood oil. Aromatherapy: $1.83 for 5 ml or $27.61 for 16 ounces of refined oil that contains redcedar wood. Perfumes and cosmetics, and industrial and household uses, here's an example: animal bedding, dog bedding, premier redcedar pet bedding, $9.99 for 5 cubic feet. And then mulch, at W. W. Cedar, was wholesaling in 2007 for $14.40 a cubic yard. You have somebody drop it in your driveway; it's $30 a cubic yard. There's redcedar oil that you can find available, there's "cedarcide.com – Nature's own pesticide". There are a lot of products that are identified for redcedar.

Because redcedar has so many chemicals in cedars red heartwood, one of my colleagues at the University of Missouri, Dr. Chung-Ho Lin has used some fairly sophisticated analytical equipment to separate out different compounds, some that are water soluble and others not water soluble. He's looking at potential uses for specific chemicals within redcedar oil, but not the oil in general, but breaking the oil into its component chemistry. And he's looking to see if the chemicals might be antibacterial, anti-tumor, antifungal, a potential herbicide or pesticide. One of the things he has already noted is that you get some activity against certain bacteria from some of these compounds within redcedar and that the redcedar fruits are 10 to 20 times more potent than redcedar leaves. We're just starting this work, but there may be yet a whole new series of products from the chemicals present in the heartwood oils from redcedar once we break it down into individual chemical constituents and test them.

W. W. Cedar sells "premium" redcedar mulch. They cord wood, grind it up and blow the fresh ground redcedar (mainly heartwood) right into trucks. They get 108 cubic yards per load right out of that cord wood. They also bag that up by themselves and they create they own branded product "Ozarks Best" premium redcedar mulch 2 cubic feet or 56 liters for $2.25 wholesale; very nice looking stuff. And if you take this same concept and make it a little bit finer grind and package it up a little bit fancier you could get $2.50 for less than half that, and that's what redcedar bedding sells: 24 liters for $2.50, this is further breaking the product down and the price goes up and up relative to the quantity of the redcedar. Webb Farms paid $380 a thousand delivered to the mill, $300 a thousand if it's picked up. Some things that I found on the web: $140 for a 36-inch redcedar cat scratching post. And you know when it comes to pets; people don't usually pay a lot of attention to price, so that's good for the redcedar business.

In summary, what did the study reveal? Redcedar is at least a $60 million industry. It is not a little business. The supply of raw materials is increasing based on the forest inventory and analysis. In Oklahoma it's exploding. Critical resources for success in the business: you've got to have labor; you've got to have knowledge about the business and knowledge about marketing; you've got to have raw material; you have to have the financial resources to get in and stay in the business; you have to have markets for your products and you have to have the right equipment.

In conclusion, this PFFM idea successfully gives us a big picture to look at the redcedar industry and helps guide business decisions. If you're going to get into redcedar and you

want to be somewhere in that value chain, you have to know that people you are going to buy from and sell to are there in your area before you get in the business otherwise you may produce something and find out that there's nobody around here to sell it to. Or you've got the equipment but there's no redcedar resource nearby and you can't afford to buy it due to the high cost of transportation. You don't want to do that. Over the next day and a half we will talk about opportunities for the eastern redcedar market.

Some implications for this region of the country: There's a large redcedar resource. The redcedar market is growing, there's opportunity for growth in the industry. If the players in the industry are willing to cooperate and collaboration more directly, there's more opportunity to take advantage of the market and capture more of its potential value. For example, do we need to create a redcedar marketing board or national association to increase awareness of redcedar marketing opportunities? Can we work with federal and state agencies as many other commodities do to facilitate the flow of goods and information through the market? It's not easy to find redcedar market information; it's not readily available like other timber products. Is there an opportunity to create a specific online marketplace just for redcedar? I don't know, but maybe that would help facilitate the growth of the business. Finally, it would be worthwhile to coordinate the industry with research institutions to help develop new marketing opportunities and new alternative uses for redcedar.

Okay, if there's any questions at this point in time, I'll try and answer them and if I can't somebody else here will, I'm sure.

Questions and Comments

Q. Do I see more growth in vertical integration in the industry versus specialization?
A: To the extent of knowledge that I have, I don't necessarily see that companies are trying to do more and more and more things. That's not what we saw. I don't know if anybody else has a different opinion, but it seems like people pick a section of that value chain and really become expert at that and don't try to go from the raw material all the way to the retail, necessarily. It depends on what you're trying to say. If you looked at W. W. Cedar, they buy cordwood, they put it in a bag, you can actually buy it as a retailer but they wholesale their bags. It's a short chain, so they're a big part of a short chain, in that particular case. It used to be that there is some degree of focus within the chain. We heard about that yesterday, that people have the temptation to go into more businesses, but it really has to do with what I think an individual sees as their goal.

Q. Did you look at what research is going on in the future?"
A. Honestly, this is the first large gathering where a whole bunch of people that are all in different parts of the redcedar industry are at and I know my colleague, Dr. Salim Hiziroglu, has been working on this for a while in Oklahoma State. This is a really good opportunity for us to share this information from this point forward. At the University of Missouri looking at the chemistry because we have that capability but I

wasn't even aware that redcedar is going into concrete shingles until yesterday. I'm learning a lot and we're all learning as we go.

Q. The question from the landscape business is "Why is there not more redcedar available?"

A. You can buy small, one and two year old redcedar from the state nursery in Missouri from their wildlife package. You can buy that kind of redcedar, but what you may be describing is a recognition of needing to connect up different players because there may be somebody that has a Vermeer tree spade that will approach landowners that have a bunch of more mature redcedar. For example, if you want to put in redcedar as a privacy screen you may want to start out with larger sized plant material. The question is if somebody wants those, they could probably procure them because somebody is going to be willing to pull it together for the right price.

Q. In my opinion you could sell a 6-foot redcedar for $100, you know to me it's not a very old tree.

A. Well you know, I think the horticultural landscape business tends to promote all kinds of interesting cultivars and trees because they have different growth forms, different seasonal color; many specific attributes so there would need to be some momentum toward the consumer asking for eastern redcedar and we heard from the last talk there's been no genetic selection. There's a lot of variation among trees. I've seen neighbors in my own neighborhood put in about 200 yards of redcedar that they just plucked out of a local field full of growing redcedar and there are very dramatic differences in the form of the individual cedars along that row. Some have a nice sweeping, sort of Japanese look to it and some is just typical of the form you see in open fields. No selection for ornamental markets has been done to my knowledge but the opportunity is probably there. Also, if you harvest and transplant more mature trees you could pick either male or female trees depending on what you want. Males so you don't have the berries or, if really want to have 10 million more redcedars (and berries to feed wildlife along with added winter color), pick the female.

Q. The question is about rot resistance compared to other cedars. Why it is that eastern redcedar is more rot resistant and how does it do on contact with the ground? And I'm going to ask if anyone can answer that question, because I cannot.

A. Richard Newton: I'll be addressing that in the next talk.

Q. What's the raw material used in redcedar oil production, typically?

From Audience: Anything, the bottom of the roots all the way to the tip of the tree, is possible but generally the heartwoods.

A. Everything can be used but heartwood has the most oil content? Right. I know that the heartwood of Eastern redcedar has the most chemical soup for rot resistance of all the junipers. The most rot resistant wood of all is Osage orange also known as hedge or hedge apple. But then the second tier of most rot resistance includes eastern redcedar.

Q. Has there been any research done on bio-diesel, for ethanol out of redcedar?
A. I don't know the answer. Maybe one of you knows the answer. I don't know. I had some conversation with Mike Brittain, this morning and he was talking about bio-diesel. He indicated that you can ferment wood to alcohol and you mix that with other oils that are collected, rendered oils from animals and other kinds of oils, to create bio-diesel oil. It's an additive as opposed to direct.

Q. How do they get the oil out of the redcedar?
A. I believe it's a steam distillation. Is that correct, Steve? Yes.

Q. What about booze from the berries?
A. What about those people who like to drink gin? I don't know! We didn't touch that. We didn't have anybody talk to us but maybe we hit the wrong part of the value chain. That's the happy part of the value chain, is the juniper berries for gin.
From Audience: It's a flavoring for vodka. The berries add flavoring, but it's not from the berries.
From Audience: Seriously, I have seen recipes calling for juniper berries. Food recipes.

Anyway, thanks a whole bunch. We'll have opportunity to continue this discussion.

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Unique Properties of Redcedar and Value-added Products

Richard Newton, Eastern Red Cedar Products

Introduction

Our next speaker this morning is Mr. Richard Newton. Richard has given me an outline of many of his past activities. Some of which are pertinent, some of which are not. Let me go over some of the things. First of all he writes down that he's an electrical logger. And I'm thinking I've never seen an electrical logger, and I've been in forestry a number of years. And he goes on to say that he worked for an oil servicing company, not a wood products company. So, this was an oil-servicing, electrical logger. Richard spent 7 years doing that. In 1983 he purchased a Wood-Mizer sawmill and began his operation. By 1989, he's sawing nothing but eastern redcedar. He has built several operations in Indiana, Alabama, and with his son Aaron, has moved into Oklahoma in the mulch business. As a hobby, he tells me he is a caver, not a spelunker. For those of you who don't know the difference, he explained to me is that cavers go to rescue spelunkers. He also indicates that as much as he loves caving, the holes have to be bigger than they used to be.

Presentation

Thank you. I'm a lot more comfortable in a sawmill than I am up here so you'll have to bear with me as I go through these things.

First, I'm going to talk about aroma of cedar. If any of you have taken a cedar board, taken a whiff, or been in a cedar mill, you know there's a rather strong odor given off by the oils. Now for most of us, the only oil we're going to get is from smelling this cedar. For some companies, that do take the oils out of this cedar, it's going to require an investment of somewhere around 1 million dollars and if you don't have the capital you're not going to get into oil business to take advantage of that aromatic property of eastern redcedar. The good thing about cedar oil promotes rot resistance. One of the nice things about redcedar is that it's rot resistant and one of the worst things about cedar is that it rots. Now, you're scratching your head thinking this makes no sense, but if you were on the tour yesterday, you saw some of the cedar paneling planks that had rot spots. This is where the sap wood did not change over into heartwood and if there were fungal spores or bacteria able to get in and with the moisture they found a home and had lunch. So, that's kind of a paradoxical thing about the rot resistance of cedar.

Now, up here I have several fence posts that I pulled out of the ground. I planted those things with a John Deer 450 high lift in 1980. We pushed them into the ground in the spring when the ground was damp. They pushed the plastic soil aside and in they went. I pulled these up and cut them off. We can pass them around so you can see what happens to the wood and the sapwood as its aged over the years.

The first piece here is a round post and if you look at the end that was 6 inches below the ground, there is nothing left on this post except for the heartwood. After 27 years, the

wood just as good today as it was then. It is not uncommon for very good cedar posts that have a lot of heartwood to stay in the ground and be a viable post for 100 years. A lot of them do not make it that long, they get knocked over by cattle, equipment, etc. and they tend to deteriorate. But it does have a property if natural resistance. Ground level was right about here and you can see for those 6 inches above, the sapwood is completely gone. That's because this is the state where there's high moisture content over prolonged periods of time and for the fungus and the critters to work on cedar, they need to have a sustained period of high moisture. And up above you can still see that the sapwood is very viable, still providing structure and support to hold staples. Now one of the key things to do on cedar posts if you're planning to ram one into the ground is to get rid of most of the bark to let that sapwood cure because bark holds moisture. It's also a great home to insects. Not too many insects will work cedar but termites will work the sapwood, but they will not touch the heartwood, in fact they like to run from it. There have been some studies where they put termites in the cedar mulch and they'll head the other direction. Now they will eat it but it's kind of like humans. If spinach is the only thing you've got, some of us will eat it.

The other fence post was an 8-inch log that was quartered. The process of quartering it and splitting it also split some of the wood. But it also made viable fence post for 27 years and this post would still be good, but I didn't need the fencing in this area and needed some examples so we pulled them up and chopped them. And you can see that down in the ground still the wood is very, very viable.

These 2 pieces of wood were from the quartered posts that were in about 2-2 ½ feet in the ground. Here you have almost 100% water saturation at all times. You can still see that the sapwood is still somewhat viable. It's showing some pretty good signs of starting to go but even after 27 years in the ground it's still solid. It's still structurally sound. It's right at that ground level where you get the problem of sapwood deterioration.

How does cedar lumber age if you don't do anything to it?

This board was sitting on top of a pile of low-grade lumber since '01. I ran it through the planer taking off a little over a 16th of an inch. Again you can see the weather ability of the cedar, there is some checking, but when you've got the sun beating down on you, and you've got hail, you've got rain, wet off and on for over 6 years and there's no cupping to speak of. There's really no warpage in this board. If this was an oak board or poplar board, what would this thing look like? It would be disintegrating if it was poplar, totally rotten. But if it was oak, it'd be cupped, bowed and maybe used in rocking chairs. Let's pass this board around.

Shrinkage - Cedar shrinks very little as it dries. In fact in Indiana, cedar shrinks the least of any native species when it dries. I took these pieces, measured the moisture content and used a caliper to measure the exact width of the board, ran it across the joiner to get a nice smooth edge, then marked where I'd measured so I could re-measure at the exact spot. I then place them in the drying room and dried them down from about 20% moisture to 9.5% at one place and 11% at another. The shrinkage on this board was

400ths of an inch out of a little over 4 ½ inches. Heartwood shrinks very little. I used this piece because it was very, very heavy. Sapwood moisture was so high it pegged the meter, so I have no idea what the actual moisture content was. We dried it down to about 9%.

This shrank right at 1/10 of an inch to 11 hundredths. That shrinkage is 1/10" out 4 ½". That is very little. If you air dry cedar t 12% and then dry it on down t 8% or 9%, shrinkage is going to be so minimal as to not be noteworthy. Now I'm not familiar with gluing processes and other machining process to know if there's any advantage to taking it from 12% down to 8% or 9%. But I know we have companies that want our cedar dried to the 8% or 9% range. Since they are paying the bill we dry it down per their request. Let's pass these samples around.

If you take a look at the weathered board that's being passed around you can see that warpage is not a problem. You will get some bowing when you saw cedar, but not much. Some logs will form a little rocking chair when you saw but most will lay very flat. It's my understanding that cedar shrinks very little because the cell walls are fairly thin and there's not much moisture in the cell walls, so when you take that moisture out there's just very little movement and that's why cedar is different from a lot of your species.

Another property of cedar is character: This board has a lot of character. It's got holes. It's got rot pockets. It's got funny grain. It's got marbling. How much character do you want? I've got customers that come in, and they like this board. They don't care for this other board because it's too plain. They want knots. Our job is to market the cedar based on what it is. So, we take the character as an advantage. People want something different. Every cedar board is different, we use that characteristic of cedar, be it knots, variation in color, sapwood, or sapwood inclusions, to provide a board that is different. A lot of people like that.

The weight of cedar: Cedar is fairly light. You can figure, dry, somewhere around 2.8 pounds per board foot. For green, a little over 3.1 pounds. When I calculate weight for shipping I use right around 3, that's going to get very, very close. So, I don't even have to use scales and if I've got 1,000 feet I know it's going to weigh 3,000 pounds plus or minus. We can get about 15,000 feet of 1 inch lumber on a truck and that truck will not be overweight. You can ship a lot of cedar relative to some of the other hardwoods. And even green cedar, since the heartwood is relatively low moisture, allows us to put around 13,000 feet of green cedar on a truck without it being overweight.

Cedar is a rather brittle wood: That's another characteristic of cedar. If you take a dried cedar limb and bend it, it will bend only a little ways and POW! It'll snap. Same way with cedar boards, you bend it a little bit too much, catastrophic failure. It will break right now. Oak, you can bend and bend and it will start to crack a little bit, and it still has stability and it'll have some strength. That has to do with the length of the fibers in the wood. Cedar, fairly short fibers, if one of them goes, then all the pressure goes to the next cell and instantaneously across the board it breaks. That's the reason that cedar is brittle.

Now, one of the nice things about cedar being brittle is that it helps it keep its shape. It's not subject to the warpage and bending and so forth of other woods.

Insect and disease resistance: Another nice property of cedar that's been touched on is insect resistance and insect repulsion. But I can guarantee that there's one insect that's been around for 300 million years or whatever that isn't bothered by cedar, it is the cockroach. A cockroach will live right between a pack of cedar boards and is happy. So, if you want to use cedar to get rid of cockroaches you can forget that. But for termites and some other insects, just the aromas, odors, will make them go someplace else if they get a chance. I have seen termites work on one tree in the woods out of the many 10's of thousands that I've cut over the years, but just the sapwood and it was dry. So, termites will avoid it like the plague. Now sapwood, if there's nothing around, they will attack the sapwood. They will not attack the heartwood.

Carpenter bees, the solitary bumble bees, will bore into dry cedar and make a hole. They're not eating the cedar; they're just simply creating a cavity where they can raise their young. So, there are some insects that will gnaw on cedar. There are some insects that will work under the bark of cedar. The larva will ear into the sapwood, but will not go into the heartwood. There are some people that love the tracks that are made by those insects. So, even though one person might not want it, there's another group of people that find bug tracks a very desirable characteristic.

And so that leads me to the value-added part of this topic. And I look at that as it's my job to find the greatest economic value out of every tree if I'm logging or every log if it's running through the saw. But I've got to do that in the most efficient manner possible. You can get the greatest economic value out of a log, but if it costs you 4 times what it's worth to get that value then it's not paid off. You've got to do it looking at the idea of efficiency and keeping your cost of doing that at a minimum. It's a balancing act. That's what value added is all about. Anytime you process a cedar log, or a cedar tree, you are changing its value. You want to change its value to the positive rather than negative. You can take a tree, cut it up into firewood and you've created value, but you've lowered the potential value of that tree. You need to think in terms of value added in adding that value, creating a profit by doing it.

The speaker before me addressed a lot of the possibilities of what cedar can be turned into, what can be done to make different products. I'm going to try to bring up a few that we've not mentioned, some odd-ball, and exotic things. It's our job as producers to market, to create the demand. CocaCola continues to advertise so that they can keep the demand high. Everybody knows about Coke, but if they don't keep it in before your eyes, you may buy Pepsi instead. Their job is to market. And if there's any area where the cedar industry can improve upon, it is in the marketing of our product to get the general public to know about cedar to create that demand. We can do it as individuals or better as a group or association. We will talk about this some more tomorrow, some way of creating demand.

Here are a couple pieces of tongue and groove paneling that we manufacture. We make it on a much smaller scale than what you saw yesterday. The demand for this is driven by Internet sales. We have sold product in every state of the 50 states, except for Wyoming. And I don't think there's anybody living in Wyoming at present or they would be ordering some cedar. We've exported some exotic cedar overseas as I'll touch on in a minute. We make tongue and groove a little thicker. We want to differentiate from the two big companies that make the quarter inch to $5/16^{th}$ thick cedar. We make it wider, thicker, and longer. If I were to make it exactly like they did, they eat my lunch, because they do it better, they know their business. So, if you're going to get into the cedar business and looking at these properties, you're going to have to think, what's my niche? And that's what all of us are in, in the cedar business. We're each in competition with the rest of the wood industry.

We can pass these two pieces of tongue and groove paneling around and take a look. You saw paneling yesterday; you see mine today. It doesn't mean that one's better or worse than the other. It's just a different way of going about getting business. And I want those customers that are looking for a thicker, wider, longer board because that's what we can do.

Value-added to lumber, when you run logs through a cedar mill, you make all kinds of lumber. What you make should be driven by market forces. If you're just simply running the sawmill, as some people have done when making lumber, and then go out and try to sell, you can be in trouble. Market forces should dictate what you do. You can drive those market forces; you can create demand. But you'd better have that demand there.

One example is that of the mulch business that we started in Oklahoma. I originally went out there looking to put in a sawmill and saw the large amounts of cedar sawlogs that are available in Oklahoma. There are several smaller scale sawmills but there were none using it on large scale, and I thought that was a great possibility. On many of the trips I made to Oklahoma, NRCS people would show me upland cedars. They are scraggly looking things, and say, "Do something with these?" And I would ask, "Why do you want to get rid of these? These upland cedars? I can't figure what to do with them." And then one day we had a tornado go through Marengo, IN and destroy a lot cedar trees. I ended up getting a lot of slash delivered along with some logs. I had the idea of taking these limbs and running them through our grinding hog and blowing the grindings on a tarp to see what kind of mulch it would make. Now these were big cedar limbs that had set awhile and the needles had turned brown. Lo and behold, the needles disappeared. I looked at that and I think, hmmmm, that's not brown mulch. It's nice, good-looking mulch, no needles. I got down to the bottom of the tarp to see what happened to the needles. The needles were very dry and the grinder had pulverized them into very small particles. I boxed it up and sent it to a couple of mulch companies, and they said "Oh, looks good." The idea hit me **BANG:** why can it do that with cedar trees in Oklahoma, I talked to several grinding people, "Well, yeah, it'll work." I talked to another company and they said, "Yeah, we tried it, but it won't work." I go, okay. I almost dropped it right there. Then I thought, okay, why didn't it work? They said it was 107 degrees that day and there was a 30 mile per hour wind, so when the stuff came off the end of the grinder

it was winnowed into a strip about 10 ft. wide and 100 feet long. And I go, okay, so you really didn't get representative mulch. Plus your attitudes probably sucked since it was 107 degrees that day. Yeah that was probably it. So I thought, well we need to do another test.

So we found a company that would bring a grinder and let us test it. Other companies said we want you to buy it, we'll guarantee it'll work though. We're not going to do anything unless we got the mulch sold before we do it. We had a test grind on Monday with one company there. They committed to 80 loads. We had a test grind on Tuesday; the second company committed to 100 loads. We had enough to break even and so after doing that test grind. We knew we were in business that was about 3 years ago. Now we are able to take those dead trees, let them dry and make mulch. You can create something, you can do something different. It means you have to think outside the box, you have to try something different.

The other thing is that when people say that no it won't work, you can either believe them and not do it, or do like we did and just, "Yeah, we'll go ahead." Because you know there are people that keep saying how things are wrong and they're talking to the guy, all the while he's doing it.

Value added, fence posts: round or square? I think the industry could sell a tremendous number of fence posts. I have a standing order for a semi load of nice round, red fence posts from a company in Northern Indiana. Being that I'm not doing much logging, I can't get them. The loggers will not log small stuff. You need to differentiate between the ones that have a large amount of sapwood and those that don't. There's a market there, not being met.

Square Posts. Back at the turn of the century when many of the farms were being fenced, just to fence a square mile in central Indiana with cedar posts on 12 foot center to center, took well over 5,000 cedar fence posts. Think about the number of square miles of Indiana, Illinois, Iowa, and all the places that used square cedar fence posts. There was a huge sucking sound coming out of Tennessee and Kentucky where these trees were grown by mills making the corner posts and tapered line posts. You might think that market doesn't exist because they're planting fencerow to fencerow. But if you look at the number of treated posts at the farm stores and you look at the number people that buy five acres and need a place to put their horses. You realize there is a market there. The cedar industry is not marketing to that demand as I see it. It adds value by squaring cedar logs. Landowners, if you have cedar that tends to be red to the bark, you can go directly to the consumer and capture that value added simply picking up a chain saw, 4" log is all that it takes to make fence posts. Sell them round to capture the value, and there are things that the industry can do.

I've touched on mulch. It's a great way to use wood in the sawmills, use up scrappy trees. Think about how much mulch is used in this country. Cedar mulch is a tremendous replacement for cypress mulch. Environmentalists don't like cypress to be cut. I'm not familiar with the cypress industry, so I don't know if they have a leg to stand on when

they talk about or not, but you can use that in the cedar industry and to play upon that perception: it's perceived that cutting the cypress may be environmentally unsound. Using cedar mulch, man that's the way to go. We're helping the environment by getting rid of cedar trees. And besides its really high quality mulch, long lasting and it'll do a great job. I've bag of double grind mulch. This was made to go into cattle pens. We can pass it around.

Another product value added: sawdust. It used to be a time you paid to get rid of it. Or you'd have to haul it off. Spend some time and effort to get rid of it. Then the horse people found out about it. Awww, that's great stuff. Mike Brittain is using sawdust as an additive. All coarse sawdust is sifted and it goes into kitty litter. Go to Target you will see a product called, Scoopable Cedar, there's about 3 to 5% cedar particles in there. Our sawdust is used and I think it's in every Target store around the U.S. as an additive to kitty litter. We get paid pretty good money. We do have to process; it has to be dried. You saw earlier a slide for Cedar Side in Texas. We supply that company with cedar particles, kind of a large sized cedar particle that they use to put in pails and to spread around plants and so forth. We've taken a negative and made a positive out of it. In fact, we take our low-grade lumber like the board that you saw earlier, shave and process it, and turn it into a nice value added product. Instead of getting $45 a ton, we can gross $1000 a ton. Big difference; focus on value added.

Fuel: There may come a time as the price of diesel fuel goes up, that cedar will be ground and used as a fuel. Right now Wood-Mizer is making and testing what's called a Bio-mizer, an outdoor burning wood stove. You can use green sawdust of any particle size from very fine on up to even bigger than saw dust that you get off of a circle mill. You can burn about any kind of carbon-based product just so it's ground up. You fill the bin, auger it into the ceramic chamber, burns it at about 1800 degrees. Now think about outdoor wood burning stoves with all the smoke coming out the flue. There is no smoke coming out of this stove. It burns at such a high temp and it fully ignites in a circular air stream. That may be something in the future that homeowners will buy to burn biomass. Businesses can use it. It's a very scaleable machine. Two nice things about it are that you fill the bin once a week, and it's smokeless. Another item that wasn't mentioned is house logs. You can make 6' x 6's, 7' x 7's and 8' x 8's. And there's one company in Indiana that only builds log homes. They pay $0.60 a board foot for their logs, the highest of about anybody around. And yet they probably make more profit than anybody else in our area. They will get around $35 to $38 per 6 x 6, 8 foot long. That's about $1.50 per board foot, by making 4 cuts. Value added: they have found a niche; they're exploiting it through advertising in the log home magazines. This can be done anywhere and there are several others.

Large logs: You may have a log that's 16 inches across and be rotten in the center. What do you do with it? Most people send them to the shaving mill. But they could be porch posts. Homeowners with log cabins may pay big bucks to get big, uniform posts that are gnarly looking. Contact homebuilders, construction companies, and let them know that you as a landowner have a bunch of these types of trees on your place. You may get a phone call out of the blue, "Hey I remember you said something about you had these

logs. Do you still want to sell them?" It happens all the time. We keep logs set aside at our mill that we think customers may want. It may take a year. Those logs will sell eventually. I can always send them to shaving mill later. But we can add value to those logs by marketing them in unique places. You have to be creative, you have to get on the phone, and you have to network. It can be done.

Stockade type fencing: Take a look at these little pieces I made. These all came out of 2 to 3 inch, 8 foot peeled posts. We have a little German peeler, that we take small poles, run them through and make a nice rustic-looking, peeled pole. These can be sliced in halve if you wanted to do it. These are stake pointers and other ways to put the point on the end. I haven't sold any of these like this. It was just something that I thought of the other day, and it'll be up me to market them. Nobody's going to call up and say they want these, people don't know they exist. I create demand by going to fencing companies and saying, "Hey, I've got this and I've got that." And some of them may bite. Say, "Alright, make me a panel. I'll put it on the lot and if we get some sales I call you." Others, they won't bite. You know if you're a guy, you're used to taking no for an answer. You know, you keep trying.

Ugly cedar: I got an email about 4 years ago and the subject title was, "ugly cedar." The Bronx Zoo in New York wanted ugly cedar. The definition of ugly cedar is twisted, gnarly, bowed, crooked, swelled, anything but a nice, straight high-grade log. We now have our Bronx Zoo. You can go there today and see it along a walk way. The hardest thing wasn't finding the material. The hardest thing was getting a trucker that would go into New York City with a load of cedar. It took several months. We ended up using a fellow up in New York that hauled hay. He told me stories of going into New York that'd make your hair curl. They'd go in at 2 - 3 o'clock in the morning because that's the only time they're allowed in. When I go into the woods and look at the trees like I did yesterday, I see potential in every tree. There's everything in that tree to the bottom of its roots to the tip of the top that has potential value. I think I mentioned to the audience before, that in Texas, they're taking root balls that have high oil content, grinding them up and extracting the oil out of them. So even the root balls may have value. So you think of different, exotic ways to use the different parts of the tree.

Architecture firms: Have any of you heard of Wolf Lake Lodge, the water theme park? I know there's one in Williamsburg, Virginia, one in Buffalo and others. The cedar that is in those for the most part came from our operation. They wanted logs that were peeled, either with German peeler for the small stuff and pressure washed big logs. They wanted the bark off. We get really good money out of these logs because we are willing to buy long logs. We keep a lot of tree length logs on hand. I know sooner or later customers are going to call and they will want odd length material. "Oh, you have that? You are the answer to my prayers." You put a price on them and we will come get them. "You know that's music to an entrepreneur's ears.

Another thing that hasn't been mentioned is split rails: Homeowners, landowners, you can do this yourself. The hardest part is just the actual, physical work. Get on the phone and market it. You find the markets first then you supply the split rails. Take a log that is

10 foot 6 inches long, 6 inches in diameter and it is worth about 5 or 6 bucks at the mill. But remember you're going got be cutting these yourself so you can cut them the length you need. Most loggers and most sawmills will cut any length you want, as long as it's 8 feet. Kind of like Henry Ford and the model T cars in the ol' days, you can have any color you want as long as it's black. So our niche is to have other lengths of wood that you can cut to 10 foot long. If you can split them with a sledge or a wedge it's doable. Sale price on those split rails is 4 bucks a piece. Take a piece of log that's worth about 5 or 6 dollars add 10 dollars to that by making 4 split rails. You can do it the hard way or you can figure out, if you have a tractor with hydraulics to make a long splitter. You don't need a 10 foot cylinder; you can do it with a 2-foot and slide the entire cylinder mechanism down and put a bolt behind it. It's a little bit slow process but you can design one that will split all four at once. Takes about 3 or 4 minutes per log. Geeze, I've got 10 bucks, I've got my wife sitting on the tractor operating the hydraulic controls, I've got my son out there at one end and I'm on the other. We're making 10 bucks profit for every one of these that we split. Woooo! Just got a contract with a federal park supply: 8,000 sassafras rails.

We do a little bit of sassafras because a lot of farms in our area have sassafras trees. They can't believe that sassafras pole's worth money? "Can I bring it in?" they say. Yeah, I'll give you 6 bucks for that 10-foot log, 6 inches in diameter and it could even be a little bowed. "You gotta be kidding me. How many of them do you want?" They add. and so, you create a demand. I shipped a load of split rails from Indiana all the way down into southern South Carolina. I had what they wanted. They even paid trucking on top of that; they were tickled to get them. That opportunity exists out there. But you've got to let yourself be known through marketing. And that can be tough but my point here is showing that there are a lot of different ways that you as landowners with cedar that can be marketed.

There is a good demand for small 2,3,4-inch posts. Think about this. We shipped one semi load from Oklahoma to eastern Pennsylvania. The trucking cost almost as much as the material. We did very well on those posts. Furniture makers wanted them. They wanted them dry; we were able to provide. Think of all these 2,3,4, inch posts that we ground up, huge vast quantity of posts into mulch but we did take a certain percentage and sent them to Pennsylvania because they had a higher value as posts put on that semi them putting them through a grinder. A lot of these small posts used didn't have any limbs on them for 8 or 10 feet, just whack it off at 8 feet, throw it in a jig, steel strap it and load it on the truck. We were able to capture that added value by people knowing that we could supply them. They found out about us through an ad in one of the post peeler brochures that listed our company into for free because we were a source of poles. They want to sell post peelers. The people making furniture need a supply of posts. So as a favor to the people that were buying their machines, they would tell them where they could get the posts. There's nothing like free advertising.

Here is a 3" post. I've had calls for these, but I've never supplied it for coyote fencing in New Mexico. Winford Bates who is here, has shipped several loads, so if you're interested in that, Winford can give you the skinny on coyote fencing. They are just 2, 3

inch poles. They put them side to side and make a fence. I guess it's to keep the coyotes out, Winford, is that what the deal is? "Hopefully."

I had a call one night from a company that asked "Do you have grape stakes?" "I don't know. What are they? Never heard of them before." "Well, they're split wood." "Need a little more information." "Well, we want straight edges on them and a flat back." "Just what are you doing with these?" "They're going to be a ceiling at Disney World." "So you're telling me you want boards of uniform width with a flat back and a split face?" Well, I'd never heard of such a thing BUT being an entrepreneur I thought this would be neat just to have my product on the ceiling at Disney World; I thought "How am I going to do this?" I took a sledge and a wedge and went out and split posts. I took 4 inch posts and I split them. I took it to the Wood-Mizer mill, placed it on the mill bed and cut a slab off. All right, so far so good. Then I edged it on the Wood-Mizer. I said, "Yeah I can do it." This is going to be labor intensive, so I put a heck of a price on it. It's going to take a lot of work, I can use a lot of posts doing these slats. You know what their comment was when I told them the price, "We thought it was going to be a lot higher than that!" OH! I left money on the table! But oh well, you know. I set the price. They're not trying to beat me down. Whose fault is it? It isn't theirs. So I designed a splitter that would split these long rails to speed up the splitting. Then I noticed that we were going to have to learn to read cedar logs. Some cedar grows twisted like a corkscrew. If you split that log, the split can twist 180 degrees in 10 feet or 8 feet even. We had to learn to look at the log and read the grain from the outside so we could split 8 foot logs and not have much of a twist. Nice thing about it was that they would accept short lengths. Then I thought I'd better have a different process for making a flat face. We'll run them through the resaw. We can do 4 pieces a minute running through the resaw. Just like you've seen re-saw work in mills where they run cants through and get 2,3,4,5 boards at a time. We used our resaw to make a nice piece. We took that piece and were able to run it through the edger. So we figured out how to mass-produce grape stakes very efficiently. It was a one shot thing but I was, what should I say, open minded and receptive to make something new. I let my creative juices flow, and figured out a way to satisfy the customer and make them happy. You shouldn't look at our cedar trees through a very narrow view. Open your minds to all the opportunities, all the possibilities that are there, I could take the idea of grape stakes for Disney World and I could let architects know that we can do this, and other companies. But I'm too busy doing other things. We're just swamped with work. You know, it's something that is out there for someone else to pursue.

One time we got a call for a Viking fence. I asked, "Just what is a Viking fence?" Well in Scandinavia, I guess back 1000 years or so ago they made fences with little poles; 1 to 1 ½ inch in diameter, weaved in between 3 horizontal pieces of wood to make a fence to keep critters out. We received an order for 8,500 cedar poles about an inch to inch and half diameter and 8' to 10' long. They wanted a little sprig left on the top to wave in the breeze on some of them. I'm thinking before I could commit to it I need to have a source. As luck would have it, I had worked with the Nature Conservancy in Tennessee seven years earlier clearing a bunch of cedar on the glade. We cleared it for all of the cedar that we wanted to take. It helped The Nature Conservancy and helped ourselves. I remembered a big section with just thousands and thousands of little poles. I asked The

Nature Conservancy if they wanted to get rid of them? "YES," they said. So we took a bunch of chain saws, and with 3 or 4 people, we head to Tennessee. You can cut about 60 of poles per hour per person. Take a chain saw, zip it up and down the sides, wack off at the top, cut the base and that is it. Then go back, collect them, put them in a jig with a little bailer twine around them. My son, the young one, not Aaron who's here, was driving the 4-wheeler. He just died and went to heaven being able to use that 4-wheeler pulling a cart to carry the poles out of the woods. And I didn't even have to pay him anything! We got them out, the container showed up and we threw them in. I think we ended up with about 85-90 cents for each one. They were kind enough to send a picture back and it looked really neat. But, I think the Russians heard about it and said they could do it a lot cheaper, and so we didn't get to make any more Viking fence. It was a government-funded project to restore a historical site.

The call came from a broker in North Carolina that I had sold sawn lumber to and he knew that I'm in to some weird stuff at times and if there was anybody that might want to do it, it'd be me, so he gave me a call. That's the kind of reputation that I have. I'll do some weird things.

What if people wanted privacy fencing for just 2% of the homes built in the United States each year? That is 20,000 homes each using 1800 sq. ft. of fencing. That is about 360,000,000 sq. ft. Another value-added product for saw mills I don't think was mentioned earlier, privacy fencing. You know how many square feet of fencing that is? 36 million! There's an opportunity. That doesn't include the posts and the cross rails to hold it up.

Just in the last few years we've been getting more and more calls for eastern redcedar. It can take the place of treated wood and western redcedar. I think western redcedar has the problem of availability and fluctuating price. Eastern redcedar tends to be very, very stable in price. So fencing companies can bid on a project and they'll know 2 to 3 months later the price isn't going to change. That's a great bonus for cedar. Tomorrow I'll be giving another talk on the future of redcedar and I'll touch on this.

Shavings: You can get a portable shaver; they can even be used on site. Salsco makes a portable shaver. Put logs in, make bedding. You need to run the numbers on paper and see if it will work. But first thing is get a contractor who wants shavings, get a market first. That's another great product for cedar. I think American Wood Fibers at Lebanon, Kentucky, are using 35 loads a week of logs. At least that's the number I heard, I could be corrected on that. That's an enormous quantity of cedar. They buy slabs also. It's a great home for those cull logs that are either crooked of have rot that you don't want to run through the saw.

That just about sums up my idea on what we do and what we think of as value added. Now I run our operation quite differently than others. It doesn't make ours good or bad. It's just my personality. I get bored with doing the same thing day in and day out. I've been an electrical logging engineer, a math teacher, custom hay bailing operator, saw mill owner, mulch maker. I don't know what I will do next. I kind of like the changing aspect

of things, but that's me. So the point of that is, you have to identify within yourself what you like to do. If you like to do something in a narrow niche and do it very, very well, that can be a ticket to a good value added operation. Or if you're like me and you think there is an opportunity and you put some R & D into it, research and development. Maybe this will go some place, maybe not. But it was some fun doing the research.

Questions

Q. What is known about the insulating property of cedar?
A. Wood's pretty good since it is light in weight. It works very well for log cabins.

Q. You'd showed the tongue and groove boards and you said they were bigger than the ones we saw yesterday. Yes. I saw the ones yesterday were applications for drawers and closet lining. Same thing for yours?
A. Mine tends to be used for walls and ceilings. We also make ¾ inch and 9/16 inch thick for flooring. People usually like the thicker board, especially for the ceilings and walls in dens because they're going to nail things to it. Closet lining can be thinner simply because its purpose is to provide an aromatic aroma inside the closet.

Q. It sounds to me that a lot of your products are because of your own mechanical ability. You know, because you have the tools it took to make them.
A. That is true. I have a certain set of skills that I can draw upon. Each of you has your own set of skills and so you'll take what you see on the tours, what you see today, and you'll say, oh I can do this or I can do that. You don't have to have my set of skills, but using your own to the maximum is the way to think about it. For example, equipment repairs, I'll do some of the mechanics work but when it comes to the engine I hire it done. I sell wood, so I can pay a mechanic to fix the engine. Each person has their own level of what they're capable or what they want to learn. I'm capable of learning and using Power Point, but I've just never taken the time to do it. I let others do it. Take my website. For example, I could probably do it, but my daughter who designed mine does it 100 times better. I'm going to use her skills and hire her to do it. The same thing can be done with cedar. Do what you can do best and hire the rest out.

Any other questions?

Thank you.

Redcedar Growth and Management

Rod Will, Oklahoma State University

Presentation

As I began searching for management in redcedar, it's amazing how little is out there. People have not been managing for redcedar growth and productivity. People have been harvesting what's out there. And I guess I'd put forth that things are working just fine, but how much are we leaving on the table. How much growth are we not achieving by not managing? That's the theme I would put forth for this presentation.

In brief outline we'll talk about competition control, herbicides, a little bit about yesterday's stand for the field trip and what I would think of as a prescription. Of course there's room for discussion and argument with that. I'll talk about artificial regeneration, plantation management, about growing redcedar for biomass in terms of carbon. Also maybe look at potential values - not an economic analysis but at least kind of some ball-park figures about what potential return might be or value might be at some of these stands, and then maybe a couple other opportunities.

I guess I'm defining management as purposeful production of wood or biomass. If you choose to do nothing to grow cedar it's still management. If you're growing cedar by neglect or by happenstance, from a philosophical stand point I would not consider that to be management. Of course with management come decisions about what you do to influence growth, growth form, wood quality, and so forth. We're specifically targeting talking about how to grow redcedar and hopefully increase growth of redcedar.

Generally redcedar can be managed using a variation of even-aged silviculture, all one age. Plantation management, starting a stand after clear-cutting another stand, or leaving trees to generate reproduction and then removing those trees so the reproduction is released to form a new stand. Both would be examples of even-age silviculture. Even-aged silviculture in particular because redcedar tends to be fairly shade intolerant and doesn't do well growing in the under-story of older and bigger trees. There are methods of uneven-aged management where there are different ages and sizes of trees in a stand. But in terms of redcedar I'm not going to talk about uneven age management because you'd have to open things up too much to get the establishment of new redcedar that it would cause lots of branching and poor wood quality and you'd have competition problems from other species. So, redcedar management really is best suited to even-aged management.

So types of even aged management: clear cut, clear cut and plant (plantation management), also shelter wood and seed tree. You go through and you'd cut leaving enough trees to produce seeds for regeneration, and then once that's established go through and remove the residual trees which should be of fairly high value and allow a new stand, all one age, to grow in their place.

Q. What spacing would you use?

A. I'll get to that. Nobody really knows for sure, but I'll speculate. One thing that's apparent to me is that you use shelterwood or seed tree and rely on natural reproduction, at least in this area, you're going to have to control for competition. Otherwise I think the competitors will have a leg up and eventually take over and interfere with your reproduction. I'll talk a little bit more about that, about the stands of yesterday.

I want to talk really briefly about a couple terms that were mentioned yesterday on the field tour. Diameter limit cutting - this is not management. That would be a method of logging, a method of harvesting. A true diameter limited cut would remove all trees of a certain diameter whether they are good or bad. If they're bad and you're not going to make it to the mill you still cut it. That would be a true diameter limit cut. My guess is that's not going on around here. A true diameter limit cut can be okay in certain situations, certain forest types. In the oak/cedar stands that we visited, a diameter limited cut I think would not sustain redcedar into the future because you're going to have sprouts from the oaks that you're cutting, not from the redcedar because that doesn't sprout. So diameter-limited cutting would be okay to harvest the trees out there but in terms of producing the next generation I don't think it's feasible.

High-grading is similar to diameter limit cutting but it's truly taking the best and leaving the rest. It'd be done by someone who has no long-term interest in value off of that land and by someone who is interested in just maximizing profit at that point in time. It's bad for several reasons. By leaving the worst you're leaving the worst genetics to produce the next generation. You're also leaving big, gnarly trees with no value but that are taking up growing space from what otherwise valuable trees. So from a forester's standpoint high-grading is a cardinal sin. So if I owned land and somebody wanted to come in and cut cedar, I would insist that they cut the low grade, unmerchantable hardwoods as well. Unless you wanted them there for recreation or hunting or wild life purposes.

Competition control: What I mean by competition control is using herbicides to kill unwanted individuals to increase growth of desirable individuals. Redcedar does respond well to release of competition from hardwoods. In fact a lot of this is done by happenstance back in the 80's, early 90's where some of the range folks in Oklahoma wanted to convert cross timbers, post oak, blackjack oak, into range. They sprayed and that killed all the hardwoods. Basically what they did was release cedar and now that's exacerbating some of the cedar problems.

Here's some data showing the effects of release from hardwood competition. On the x-axis are crop-trees bigger than 3 inches and the y-axis is growth for a 10 year increment. And different percentages here show the percentage of hardwood competition removed. So stands with varying amounts of oak and cedar. We just take say 200 stems per acre greater than 3 inches DBH, no competition control, 10-year growth increment at 125 cubic feet per acre. 100% the same stocking, about 400 cubic feet per acre per 10 year interval so 40 feet per acre per year at least on that site. So this one study documents the potential to increase cedar growth by releasing it from hardwood competition.

A prescription should be fairly simple to do because cedar tends to be fairly resistant to many herbicides. An example prescription might be arsenal, which would kill the hardwoods, a little bit of Oust, which would kill the herbaceous competition as well. Cost as of a couple years ago when fuel prices were lower would be about $65. My guess is that it's probably approaching $100 now. Anybody know the cost of a helicopter right now, per acre? Yes, so largely more then, about $70 - $75 per acre to treat and release from hardwood. If you have enough cedar you can double or triple growth of residual redcedars.

Yesterday on the field trip we visited an oak/cedar stand with about 50:50 oak and redcedar. To me it appears that those types of stands will not perpetuate and regenerate themselves without active management. The reason I say that is that those stands are an artifact of land abandonment. Oak entered for the first time along with cedar, so they had an equal advantage in getting started. As these stands are cut for whatever reason, the oak is going to have a competitive advantage over cedar. If you cut an oak tree it is going to sprout and it grows very quickly because it has a lot of resources stored in that root system. A cut cedar is not going to sprout. Looking through that stand there's a lot of advanced oak regeneration that responds well upon cutting, and a little bit of redcedar regeneration that was very small. So my thought about that stand is that unless there's active management the next stand will not include the cedar component to the extent that it currently does. It will be a minor and varying component rather than a major component of that stand. If my goal was to maximize redcedar production and regenerate redcedars in the next stand and I didn't care about recreation or hunting, I would spray to kill the hardwoods. Once the redcedar reached the size that might be susceptible to heart rot, I'd cut the stand to release the smaller cedar to grow. I would also keep out fire. That's what I would do if my goal was to maximize redcedar production and regenerate redcedar.

What we've been discussing is starting a new stand through natural means. The other alternative is through planting. Is this a new idea for redcedar? Here is a paper from 1947. It says in the caption, "What is believed to be the first plantation of eastern redcedar in Arkansas and possibly one of the earliest in the United States. It was set out in February of 1902 by Lewis Walton Roe and his brother John on their father's farm in northern Independence County, Arkansas. So a couple of farm boys decided to go out and plant themselves an acre of redcedar. They went out and planted at a 6' by 6' spacing in an old field. They planted in February using 10 to 20 inch tall wildlings they collected and transplanted. Also a mix of limestone and sandstone. And after 45 years the basal area was 163 feet square per acre. The basal area is the cumulative cross-sectional area of trees cut at 4 ½ feet.

DBH, 6.6 inches, height 42 feet and total volume of 3137 feet square per acre with a mean annual increment of about 70 cubic feet per acre per year, which is better than the natural stands that we talked about earlier. The natural stands tend to reach a maximum of about 50 cubic feet per acre per year.

Okay, looking at diameter growth over time in that plantation: 0-15, about a quarter inch per year; 10-25, a tenth of an inch per year; greater than 25 years, about a 20th of an inch. So DBH growth, diameter growth, is slowing. But that's to be expected. Its geometry - as trees get bigger, they can put on the same cross sectional surface area with much less diameter growth. In other words, if you put a thin ring around a big circumference you have the same cross sectional surface area of new wood going down as you would with a fat ring around a small circle. Using the data in that paper, I calculated the basal area development over time. This is the accumulated cross sectional surface area of the trees in the stand. Over time even though diameter growth is slowing, basal area developed and is continuing to up to about 165 feet square per acre. And to me that indicates that redcedar handles competition among equally sized trees fairly well. In terms of plantation management, this is very encouraging.

In another study, out of central Oklahoma: This would be akin to a very bad site in Arkansas. In fact, in the paper it talks about "poor soils." But even here at age 65, 165 feet square per acre, 40 foot tall, 7 inch diameter trees. Pretty low site index and 50 cubic feet per acre per year. It's right outside Stillwater. It was planted by Professor Michel Afanasiev, who was one of the founders of the forestry department at Oklahoma State.

Even at these fairly tight spacings, and this is about a 6 x 7 spacing, the tree form, is not that great; there's a lot of convolutions, some fairly large branches. So to me that's a little bit disappointing that tree form in fairly tight spacing wasn't any better.

Artificial regeneration, planting: Where do you get your seedlings? If you want to do this, if you have this crazy notion to do this, where would you go? Different state nurseries offer redcedar for sale. Oklahoma sells them for $ 0.38 each. However, they are prohibited to distribute them in the state of Oklahoma by state law. Typically the seedlings are sold as two-year-old seedlings. Previously, somebody asked about stocking or planting density. Not a lot of information out there. There have been a few plantations that use 6' x 6' or 6' x 7' spacing. I did find a recommendation that suggested 6' x 6' or to add 6 to the diameter size at that time if thinning. If you're starting off with a 6' x 6', if you're coming in to thin, you'll want to maintain a 16' x 16' spacing for 10 inch DBH trees. After reading all these papers – what's the best spacing? I don't know. I'd say keep it tight initially, 6' x 6', primarily to maintain good wood quality (small branches) and to reduce the old field-type nature of the trees and try to maintain or develop the tree like individuals.

David Gwaze is going to talk about thinning and pruning in the next hour. I think there's potential for thinning and to maintain and enhance with quality.

Okay, so what's it cost? Let's see the numbers. For the seedlings and planting, just off the cuff thought $400 per acre. Loblolly pine is about 7 or 8 cents - much cheaper than a redcedar. Say about $75 for site prep spray and knock down the competition. See if you need to get in there and subsoil to enhance planting and survival. $525 to establish a plantation. That's just a guess. If you have your own tractor you can do your own subsoiling to save money.

Okay, land, who knows? Taxes, who knows? Making some assumptions, say 60 years at an average annual growth rate of 70 feet cubic feet per acre per year. Convert that to board feet, we have 50.4 thousand board feet. At a price of $135 per thousand board feet would give you $6,804 in terms of value. Now you could do the analysis yourself, I don't pretend to be an economist. You'd have to inflate those dollars to compare things on current value. Given the long rotation time of 60 years, probably not a good investment.

Management for biomass, there's a lot of interest in carbon sequestration and the potential for bio-fuels down the road. So what potential does redcedar offer for managing for carbon sequestration? In particularly, if we're talking about old field cedar, we saw some convolutions yesterday right? Well check this out. There's a cut stump. My guess is that you couldn't get much of a usable sawed product out of that regardless of how you tried to slice it up. So some of these trees' value might only be in terms of biomass. So here's some data from an old field stand of redcedar in Kansas. They calculated biomass and the carbon. But they calculated three stands, three different ages, different trees per acre, the total above ground biomass accumulated in those stands, so: stem, branch, foliage. About 50% of the weight of the total biomass is carbon and then from the annual production, you can see what is possible. But in general, if you divide this you're looking about 3 to 4.5 tons of dry biomass per acre per year accumulation.

Compared to prairie: the production of the cedar, an example is an old field stand that developed on what had been prairie. The aboveground annual production of that cedar stand is about 2 or 3 times greater than the prairie in terms of carbon gain. In terms of standing carbon, stored carbon, 22 times greater because in the prairie they burn. To maintain that prairie you must burn, when you burn you lose your carbon to the atmosphere. So those cedar stands hold 22 times greater carbon. And the authors of that paper, I like this quote, "The substantial increase in annual aboveground productivity associated with conversion of prairie to redcedar-dominated stands could lead to a significant increase in regional carbon storage". Is the loss of biodiversity and other ecosystem services worth carbon storage? Probably not.

So how does that match up with other species? This is dried tons per acre. If you want to convert to tons of CO2 you can multiply by 1.83. One to 1.5 tons per acre per year accumulation in unmanaged cedar. Managed cedar stands, 1.5 to 5. I don't know. The future is unknown, maybe potentially higher. Comparing to loblolly pine, potentially much greater depending on the level of management. There is a carbon credit program in place right now. There are some numbers that I got From Arkansas where they provide base-line credits they will give you for different aged stands. What does that mean in terms of financials? Currently the Chicago Carbon Exchange will pay you $3.65 per ton of carbon dioxide sequestered. Right now in Europe it's 12 cents. It's $27 for future carbon in Europe.

The carbon market in Europe has been declining. What's the future for sequestration in the United States? Further comparison: softwood pulp is $8 a ton; redcedar saw timber at $17 a ton. I converted this to value for thousand board feet to tonnage. The biofuel

industry is potentially huge. When someone finds an economical means to convert cellulose to ethanol, which they're working on, woody biomass may become much more valuable. I just threw this out there for corn, which is currently being used to make ethanol; you're looking at $120 a ton.

It's an opportunity. Put it all together. You could grow 3 tons per acre per year or sequester 6 tons of CO2 per year, multiply that up by 50 years, you'd be looking at nearly $1,100 for carbon. If you can go in and do mid rotation thinning in your plantation for cants maybe for biofuel market down the road, that's more value. Then you have saw timber at the end. Let's say you can really jack that production, 85 cubic feet per acre per year for 50 years, who knows what you could do. Maybe $8,000 per acre at the end of 50 years. Again I'm not an economist. The question, is it possible to make it pay? The downside is the long time. 50 years is a long time to spend money and hold money. It still is probably not profitable unless the value of carbon and biomass increase.

Another opportunity, cross-timbers out in Oklahoma, post oak… forest. Richard Newton was talking about going NRCS and seeing all the old field cedar. That old field cedar is not valuable in terms of a sawed product. I think there is a lot of this good quality stuff hidden out there that people don't see because they're not out busting through the thick forest. Driving by and seeing old field cedar is easy. Drive down the interstate at 70 miles per hour you see an awful lot of acreage. But getting out there and busting around, there's a lot of this out there. In terms of a habitat restoration perspective, a logical perspective, no one can argue about going in and taking that out, because that was not there except through fire suppression.

Lots of unknowns: future prices, genetic selection, growth potential with intensive inputs, saw timber production, thinning and pruning, fertilization. I didn't talk about fertilization but that's a possibility. Effects of silviculture on wood quality: How do you improve stem form? How do you increase heartwood production?

And as one last plea, I'm very interested in pursuing research opportunities in redcedar and David (Gwaze) is also. Please contact me if you know where there are some cedar plantations or cedar questions you think might be important.

Questions and Discussion

Q. When you spray those hardwoods, are you not risking? Because there are some decent-sized hardwoods, when those start coming down they're going to knock down the cedar as well.
A. Perhaps, but the dead hardwoods would decompose on the stump which would lessen the impact of falling trees on residual cedars.

Q. I think you're going to have to spray twice. Because you're going to knock the tall hardwoods out the first time which is going to release oaks on the floor.
A. Great point.

Q. Also, increasing the rate to 20 gallons per acre will help get better coverage on some of the lower hardwoods.
A. Good suggestion.

Q. Are you applying that during foliage? Because I would think that you get a lot of flow down the stems.
A. Yes, you have to. At the rates applied, stem flow is not a problem.

Q. Would treating stumps be a reasonable alternative?
A. That's a lot of work. My guess would be that the cost for going around and treating individual stumps would make it uneconomical.

Q. You could do it while you're cutting the trees down.
A. You'd still have the advanced regeneration. And it's expensive to do anything by hand.

Q. This is a Mayberry question. Why would you take all the Andy Griffiths out and leave the Barney Fifes to make the babies?
A. So you mean taking out the larger trees approaching the size where they become susceptible to heart rot?

Q. Taking out the very best ones, which would be your ideal seed trees. Why would you take out the best of the best?
A. To capture the maximum current value from those big trees before they get heart rot. And I would say that in terms of leaving the seed source, you want to consider that with the ones that you'd want to leave. As you went through, say you cut the big trees that were approaching the point when they get heart rot. You want to leave trees that don't show genetic problems with nice and straight and may be a little bit slower growing because they were a little bit suppressed but still have a good genetic source.

Q. You could take your drill along and see if they've got heart rot. If you're serious about genetics; you might have one that gets this big before it reaches heart rot. You're never going to have the opportunity to find that one.
A. Sure. Good point. However, you may not have the people to go out and core all these trees. But genetics would be a big part of it. You would not want to leave trees that would possibly be genetically inferior.

Q. What's the pollination distance in trees like that?
A. Well, we hear about the allergy problems in Oklahoma and they talk about pollen coming in from Texas. But you're always better off at least knowing that your female parent is going to hopefully be good genetic stock. You have no control over the male. The probability is going to be greater to be fertilized by something close by assuming they had receptivity when the pollen was being produced.

Q. What is your maximum size before heart rot?

A. Do one of the producers want to answer that? Is it greater than 12" diameter? Greater than 14 inches?

From Audience: It depends on the environmental conditions you can cut trees 20 inches and they'll be just perfectly sound.

Q. So on what kind of a site can you go for bigger trees before heart-rot becomes a problem?

From Audience: A fairly good site is where the roots do not get wet or damaged. Fast growing trees with less heartwood are most susceptible. Sites where the roots get wet, swampy areas, for some reason those trees tend to be almost junk.

Q. So we can almost put a caveat on here, parentheses, depending on local knowledge of when heart rot becomes a problem?

From audience: I see trees 4 inches in diameter just loaded with rot. So, I think it's environmental and it's location specific. We have areas that you could go through about a 2 mile wide span for 6-8 miles north and south, half the trees in there are going to have major problems with rot. You go 2-3 miles to the east, trees are going to be perfect.

Q. Some of the defining characteristics on that rot is north hillsides, something where they don't dry out good underneath; they stay damp all the time. They seem to be a lot more prone to heart rot stuff than ones that are out in the open with good air and good drying.

A. So it kind of makes sense that high moisture, more fungal growth to that.

Cedar Scale and Log Grading

Sam Warren, Giles and Kendall

Introduction

The next topic is "Cedar Scale and Log Grading", and the speaker is Sam Warren. Sam has served for several years as mill manager with Giles and Kendall. He supervises the yard in Gainesville, Missouri. Sam also has a number of years of experience in logging and cutting. And we have 45 minutes. Take your time, Sam. You don't have to fill it, but if you do, that's fine.

Presentation

I want to show you some samples of logs that we buy at the mill. And just kind of give you a general idea of what we do and don't buy. The smallest log we bought at Giles and Kendall comes down to 6 inches at the little end. That's the smallest I can buy. The simple fact our product, as you can see some of the samples being passed around, is closet lining. We have to start at ¼ inches to get your tongue and groove. That's the smallest product that we make. I'll pass around some of these and I have samples here if you want to take them home. The plate boards come from Alabama, some people like to put those in their closets as a liner. Sometimes they put both.

One of the things that we talk about when we buy logs, I always ask when someone drives up and I see a log that's very big, I ask, "Did you cut this out of a fence?" "No." Well, it's extremely hard to tell. My background is oak and pine logging and white oak. This is a piece of metal that's in cedar. It doesn't show blue. Oak does, pine does, white oak, If you have a fence in it, it show. Cedar doesn't, so if we start hitting metal in a log, we throw the whole thing away. For the simple fact that we might hit a fence here, you may have a horseshoe, you may have insulator. Insulators blow head saws up and it'll kill you. I don't want to hit insulator, we've already it one. We try to avoid that.

Another thing is you come up and you bring me a log and you say, "I've got a log that is 16 inches in diameter." Okay, check for rot. Everybody that's got cedar, most logs that we buy, a lot of them have never cut down a cedar tree in their life. They've cut oak trees or whatever. They bring me something like this and to keep communication. It's called circle rot. It's what I call circle rot. It may go up 53 inches in a log, it may go up 6 feet, and it may clear up in 2 feet. I ask people to butt them off until they clear up because I can't make closet lining out of rotten wood. If we're sawing into it and we hit rotten pockets, we throw it away. Now if you bring it in like that, I try to meet with you in the middle. I take a tape measure and go across it and try to deduct the rot. But I'm going tell you heads up, I can't give you full scale for that if I'm going to throw half of it away, sometimes half, sometimes not. Then you have to meet in the middle with the logger.

Cedar is the hardest tree I've ever cut in my life to get on the ground. Now a field cedar, you may cut one of them, and you reach up and you cut the limbs around the tree as close and as high as you can. You may fall it and it may roll and the stump may be 10 feet in

the air. You never know. The more experienced people, cedar is a very hard tree for most loggers to cut.

Now I said this earlier and a lot of people laughed at me: a lot of my loggers, the biggest investment to have is a $350 chainsaw and a $550 pick-up. Probably 60% of all logs that I get are hauled in pick-ups. We'll probably buy 1 ½ to 2 million board feet per year of logs. If you think about it, that's probably 67% that were brought in with a pick-up and a chainsaw. They do it by hand. I buy most of my logs 53 inches from the land; most people don't even have a tractor to load with. Log buying yards, still if I have, I buy several 8-foot 6 from them. We use knuckle booms to load with. In scaling logs, cedar is probably one of the hardest things that I'd have to scale yet. It's because of the defects. I asked people when they cut a tree down, cut your limbs as close to the body as you can. We have a manual sawmill and most people that cut cedar in the cants have a manual sawmill. That means you roll the logs by hand, dogs come down. A lot of people in Bradleyville are still doing it the manual way. They take their leg and put it against it. They pull on the handle to make it go forward. So we asked people to cut it close.

One of the things that we get into, a lot of people through the years went down through their fields. They're going to be brush-hogging under their cedar trees and stuff, just a few in their field. They take a chainsaw and cut them right level with the tree. Water comes along, gets around the knot, cedar gets inside the tree and rots it out. A lot of people will say to leave your limbs out 3-4 inches. I've seen it everyplace I go. A lot of people brush-hog, but for some reason it doesn't hurt the tree if they cut them up flush with the tree, then we deal with them when they come in to the mill. I don't want to sound hard or cruel, but we have some of the best people you've ever seen. We have people in the woods today, running the chainsaw as hot as it is, and they'll bring in a load of cedar logs and they do it every day. Some people slack off in the summer but this summer we bought more logs than I could ever imagine. The economy is apparently the reason behind it. It's a very, very hard job the way they do it. We don't have any mechanical loggers, we have I think, one logger with a skidder and it's an old one. We're in the Gainesville area and I guess, just no up to date, or we're up to date or as good as we can be for what we have.

I'll also buy a cant, which is mainly in the Bradleyville area. A cant is something that's 4 ¼ inches wide. As far as thickness it starts at 1 ¼ inch and go up to 12 inches. The reason I stop it a 12 is with a 6 headed bandsaw, a 12 inch piece will fit, anything over 12 will not. It stops at 12 inches and you don't get a lot of cedar cants 12 inches or above. 4 ¼ inches wide, clean and bark free and there's no circle rot. Anyway, we buy those. Depending on the year we probably buy between a ¼ to a ½ million board feet of cants per year out of the Bradleyville area. If you come to Gainesville, in the log yard you'll see a bigger percentage diameter size logs than you'll see at some of the other mills. That's because I go within a 100-mile radius of Gainesville, Missouri. We go into Arkansas. I'll draw you a picture, just how far we go. In the Bradleyville area there's a lot of competition. And they've cut their timber a litter harder than probably we have so naturally the diameter of their logs is going to be a little bit smaller.

Is there anything that anyone wants to know before we go any further? Because I'm about out of things to talk about.

Questions and Comments

Q. So what would you do with a piece like that?
A. I'm going to talk to you if you bring it in. I'm going to tell you how much we are probably going to throw away. I'm probably going to take a tape measure. I'm probably going to go from this point to this point. And that's how much, it's 12 or this is probably 14 inches. I'm going to deduct that much. It might be an 8-inch log. That's really hard for the logger. He brought something in that size and we're going to throw this away. And you're going to be paid for 8, maybe 9, maybe 10-inch log. That's really hard on a logger. So what I caution people even when they call and they tell me they are going to bring me some logs, I tell them to watch for circle rot. Other things that I tell them to look for: trim your knots close, and I try to be extremely upfront with you. I have a logging background so I know what it's like to take a load of logs to a place and not feel like you got what you should have. I know what it's like to lay a scale stick across a log and know what it scales.

Q. On this one here, would you suggest that if you cut that one down, this is at the bottom? On the butt cut would you move up 53 inches and cut it off…?
A. Move up about a foot and a half, 2-foot and see if it clears up. If not another 2 foot, see if it clears up. People go in 2-foot increments. Because if you go 53 and it cleared up in 2 foot, you've lost 2 foot. And cedar tapers extremely quick.

Q. The other thing is, do you use metal detector on them?
A. No, we hit metal. If I hit insulators on a regular basis, I would. We've hit one insulator in the past few years. It's a common thing to hit metal and fence. I think it was either January or February, I started a new row where I could put any log that I had hit metal in. Right now it's probably from here to the wall and it's probably 3 feet tall. And I've got several stacked up and bang. Probably when I get done with that I'll take them to the wood splitter and make mulch out of them. Try and split some of the defects out and see what's in them.

Q. You wouldn't bet on any tree in the country?
A. No. I ask people, it's more of a joke than anything. "There's no fence in this. I've owned the property 5 years, and there's hasn't been a fence in and it's 300 years old." And they don't know. Then I've had people, if I suspect something. I look at it and there'll be a piece of fence and they've taken a hammer and beat the fence down. And then I'll say, "Well where's your fence?" You know I'll have to call it. "Well I thought I'd beat that down." That's not going to help your headsaw, but that's just, you expect it.

Q. How much more is a cant board compared to a log?

A. A cant is worth $0.56 a board foot a log is worth $0.42 a board foot. And sometimes if you take in consideration, depending on what type of mill you have whether it's a push mill or a band-saw mill certain mill, how many board feet you can saw in a day. And you also take in your yield and recovery because you're not going to buy the log sawed out at 100%. Sometimes you're better off selling in log form. That's what I encourage a lot of people to do.

Q. Do you have a minimum amount that you buy?
A. We buy everything. Not just from a Chevy that we bought logs out of. We bought logs out of horse trailers, one log. Money's really tight right now. I should be close to out of logs right now. I should be within 30,000 feet because I buy an extreme amount in the winter to make it through the summer months. We had a wet fall and a wet spring. I have 200,000 feet of logs on the yard now that I'm still bringing in. They should've quit a month ago. Why? I don't know. I guess it's the economy. That's all I can think of. It's not been a really good year for anybody and our sales are down.

Q. With the ice storm I had a lot of damage to a lot of trees including my cedar. If they are down but not on the ground, how long before they are a bad log for you? Or is there a time limit?
A. If you mean by down and not on the ground, they're just leaned over, and they're up-rooted. It could still be alive actually. If they're alive they could last 50 years leaning that way. Cedar can grow on a limestone rock. I've never understood that. If it's not on the ground, no if it's laying flat on the ground and it's been knocked over; it's still in tree form. The instant that you start cutting on it the sapwood is going to start to deteriorate. Anytime it's been cut. This sapwood is going to deteriorate really quickly. It depends on what time of year you cut it. If you cut in the winter the sap's not up, I'll last longer. If you cut it when sap's in full bloom and a lot of moisture in it deteriorates quicker and it dries out. The sad thing about it was if I'd cut this probably a month and a half ago when sap was in full bloom, the sap starts to dry out this is going to shrink. The bigger the tree, the more shrinkage. So when the sap starts to deteriorate, all I want to buy is the center of the sapwood, because if you look it'll still be good. It has to be a full 6 inches of sapwood or combined, so that 8-inch might be a 6-inch afterwards.

And I like to be upfront with everybody. I've done this at Giles and Kendall for about 12 years. I plan on having something like this in the future. I am very much up front with everybody. I try to tell you something that you're going to do that'll make you more money by cutting them off. I'll tell you the lengths. If you've got really short-bodied timber, cut them at 53-inch lengths, tapered. You'll gain on the taper. If you've got an 8 foot 6 maybe 9 inch, where you cut it off. 5 ¾ , 6 inches up, at 8 foot 6 you might actually gain if you cut it to 53-inch lengths.

Q. You still take trees that have been down for quite a while? I've got something that's been cut up into logs now for a couple of years.
A. It depends on how much of the sapwood is split. If you look at it the bark is probably started to deteriorate off of it or peeling. It depends if it's split down into here. If it's

split down very much and it has 6 inches of hardwood, I'll still buy the hardwood, but I won't buy the sapwood around it. So I take the tape measure and go from here to here.

Q. What log rule are you using?
A. We're using… in the pamphlet. I don't know if anyone has one. Skip put them in our pamphlets. You've got one right behind you there. It's the cedar scale. I can't tell you how many years it's been in effect.

Q. Kentucky cedar scale?
A. Just a cedar scale. That's all I can tell you. Yeah, big logs would be fine.

Q. If cedars aren't symmetrical… how do you do that…?
A. Give and take. A lot of people say as a log mill I have 100% recovery; I don't have 100% recovery. One of the reasons I don't is because I used to be a logger. Most people that do have they're taking the smallest way across and I don't do that, it's a give and take. And you can stand there and watch me; I encourage people. And pickups, everybody watches you. You've got 10 logs and they're right there, they sign the ticket. My wife is the office manager there and she'll probably write 200 or 300 log checks a week sometimes. It's amazing how many people come in there.

Q. So just a clarification, if a person is cutting some cedar trees and wants to get a big enough load to bring them to you to help justify going a certain distance, in the winter time it's okay to work some weekends and go a couple months…?

A. I buy logs all the time, some 6 months old, some 3 months old. You know, I've got logs around the yard now, and I don't know how many months they've been there. We buy 300,000 feet and we only saw 65,000 feet and do it 4 days a week, by the time you recycle you know some of them are getting old. But that's where the 53 inches and 8 foot 6, if they're starting to crack a little bit we can usually trim it back to help with the cracks and splits.

Q. Six inches in diameter on the small end will be the minimum accepted - that includes the sapwood if it's fresh?
A. If it's fresh it includes the sapwood. The only time I've dug into the sapwood if it's lying around and started to deteriorate. I take a pocket-knife and start flaking it apart; at that point in time it's of no use to me. And if you'll see the piece of closet lining you will see some sapwood in some of these. We can only accept a very small percent of sapwood.

Q. Your market for your product is closet lining?
A. In the Gainesville area the number one thing we sell is closet lining. Any hook up, they call it chip board, flake board, that's all made in Huntsville, AL. The mill is 78 miles from here.

Q. Sam, you don't water your logs like you would in a hardwood mill. Is it because you just don't do it or it wouldn't gain any value? Is it tradition?
A. Actually it's a safety thing for me. I probably need to a little bit at this time in the year to get the dust off because cedar is notorious for dust. One of the reasons I don't is because we cut the cants out of them and I put the slab through the hog and it goes into the bin. I don't want dry wood mixed with wet wood in cedar; it puts out heat. It's a personal thing for me. I don't want fire in my bin. We've already went through a couple fires in the bin. One spark in dry shavings in your bin and you have a fire. You've got a 130 or 200 yards in your bin and you have a good fire, so it's more of a safety factor for me. I probably need to; it'd probably help on the dust. We actually blow fans on them to try and get the dust off of them.

Q. Those logs that have the holes in them, you call them rots?
A. I call them circle rots.

Q. Would that make a good shavings log?
A. Actually at one point in time we had one shaving machine in Gainesville and a log like that, that had more circle on it, rot, I put it through the shaver. I thought that's about what they're good for and it truthfully was. The only problem was when you hit that with a shaver or knife, you have dust. At that time we were near turkey farms and they don't want dust. It actually makes turkeys sick, I was told, I don't know, it may be hearsay. But when you hit that you have dust. It's better for us to make mulch. It's worth twice as much as shavings too and a lot less work.

Q. If I were to put a timber sale out for bid and I was to have a logger come in and log it, and then they could do whatever they want to get it out, what's a good fair price I could expect to get for good cedar?
A. If you called me and said I have 40 acres or whatever, first thing I'd do is come and talk to you in person. I try to get with you to find out your boundary lines because I do that on a regular basis. A lot of people call me from out of state. 1/3 stumpage is usually what's paid with cedar. Some people I hear are paying 40%, if they try to pay 50% there's no profit for cedar. 40% there's not much profit, so they usually pay the landowner 1/3. What I do is I hold out 1/3 if the logger brings your logs in, and he's only cutting off your property. I don't really like one logger cutting off of 5 properties.

Q. I'm saying I work for a state agency. If I set up a pretty big cedar sale on state land, your saying we can get 1/3 of the stumpage?
A. 1/3 is what the landowner usually gets. We try to monitor that. If some landowner calls me, we monitor that way. I go check on the property. I'm not involved in it. It's not my money, not my property. We try to put a reputable logger on the property is usually how we work it.

Q. Will the reputable logger also take fiber and leave it clean?
A. It depends. We have some loggers that will go in and clean up, go on in the tops and take the 5 or 4-inch stub. Some of them do and some of them don't. There's actually no profit in doing that. If you're cutting the whole tree and you're dragging it out into

the skidder, it can kind of build up. There are several people that if you had a semi-load of cord wood, especially in the spring when they're low, they will send a trailer down and work with you that way. There's a lot of people around that will do that.

Effects of Thinning Eastern Redcedar

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Presentation

Background

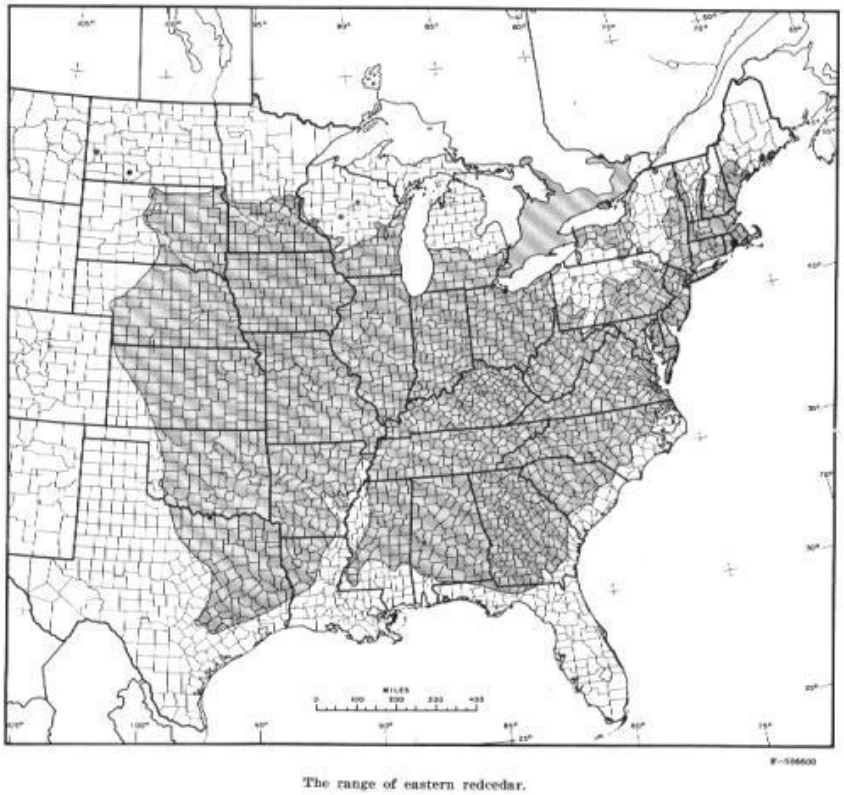
Eastern redcedar (*Juniperus virginiana* L.) is the most common coniferous species growing on a variety of sites throughout the eastern half of the United States (Lawson 1990, Figure 1). In Missouri, eastern redcedar is found in all counties, and is common in the central and southern regions of the state (Moser et al. 2007).

Redcedar grows under a wide range of climatic and soil conditions and can be found on almost any site and in conjunction with almost any plant community (Lawson 1990). It thrives on thin limestone soils and will successfully invade abused, overgrazed sites, abandoned pastures, and limestone rock exposures. It is found mostly on ridge tops and is frequently found on dry exposed sites.

Like most species, eastern redcedar grows best on deep, moist, well-drained alluvial sites. On these better sites, hardwood competition is so severe that it rarely becomes dominant. Redcedar is classified as a slow grower, probably because it can persist on extremely poor sites. Redcedar can grow rapidly, especially on better sites.

State-wide forest inventory statistics show that the volume of redcedar growing stock has doubled over a 14-year period from 250 million in 1989 to 500 million cubic feet in 2003 and the number of redcedar trees increased from 365 million in 1989 to 600 million in 2003 (Moser et al. 2007). This large expansion of eastern redcedar in Missouri is due to land conversions, overgrazing, and fire suppression (Moser et al. 2007). If current agricultural trends and policies continue, the rate of expansion is likely to continue into the future.

Many landowners have a negative view of eastern redcedar, perceiving it as an invasive weed species, often chained, bulldozed and burned. As the resource has spread and increased with age, its utilization and value in an array of products has become more widely recognized. Thus, expansion of eastern redcedar is increasingly being viewed as a growing economic opportunity for forest industries. The economic uses of eastern redcedar could compensate for the cost of removing this species and eliminate disposal problems.



The range of eastern redcedar.

Figure 1. Natural range of eastern redcedar (Lawson 1990).

The significance of eastern redcedar is economic and environmental. Commercially, eastern redcedar wood is highly valued because of its beauty, durability, and workability. Primary products include posts, cants and lumber. Eastern redcedar makes excellent posts because of the durability of the heartwood. Eastern redcedar heartwood is prized for its pleasant fragrance and insect-repellant properties and is frequently used to line closets, cedar balls, wardrobes or cedar chests for inhibiting insects, such as moths and their larvae. Because of its beauty and durability, it is used for many novelty items, flooring, furniture, and bird houses. It is used for mulching because of its appealing color, aroma, durability and insect deterrence properties. As wood utilization by-products, shavings are widely used for large and small animal pet bedding to minimize odor and repel fleas. Sawdust is currently being used to form composite water-resistant decks for houses. Cedarwood oil is extracted from trees as a fragrance base for soaps and cosmetics. From an environmental point of view, eastern redcedar makes excellent windbreaks and shelterbelts because of the dense, compact, long-lived foliage and low branches. Also, many species of birds and other animals feed on eastern redcedar fruit, and the dense foliage provides year around cover for many species of wildlife (Thompson and Fritzell, 1988).

An increased understanding of impact of thinning eastern redcedar is important because thinning can improve not only growth and value of desired trees, but can increase herbaceous growth, and thereby improve wildlife habitat. Furthermore, thinning can

reduce fire risk because dense stands are also highly susceptible to fire, and can increase the danger of wildfires (Moser et al. 2007).

Although there is a wealth of information about thinning conifers, particularly southern pines, in the United States (Moehring et al. 1980), there is little research or experience with regard to thinning eastern redcedar. It is well known that density affects diameter growth, and thinning which releases trees from competitions promotes diameter growth. Generally, thinning affects merchantable yield by distributing volume growth on fewer, larger trees (Smith 1962). Existing information on eastern redcedar from Arkansas indicate that growth and yield are affected by density (Ferguson et al. 1968). Over a 10-year period in northern Arkansas, completely released stands averaged higher growth in diameter, basal area and volume than stands where only crown competition was removed (Ferguson et al. 1968).

The goal of this study was to determine effects of thinning on diameter growth and heartwood formation. A recent market survey by University of Missouri Agroforestry Center indicated that the demand for good quality cedar will increase and that in the future the focus should be on good quality redcedar material (Gold, Godsey and Cernusca 2003). This market survey highlights the importance of this study, which intends to provide scientific information for improving both the quantity and quality of eastern redcedar.

Materials and Methods

Forty-year old pure eastern redcedar stands near Branson, Missouri, were thinned in 1968. Four, one-fifth acre plots were established, two in stands averaging 3.6 inches diameter (south plots) and two in stands averaging 5.8 inches diameter (north plots). One of the south plots was thinned from about 80 to 42 square feet basal are per acre, and one of the north plots was thinned from 66 to 54 square feet per acre. Thinning was carried out in winter of 1968-69. Measurements were taken before and after thinning in 1968, 1974, 1980, 1987 and 2007, thereafter referred to as 0, 5, 10, 20 and 40 years after thinning. These measurements were taken from the inner one-tenth acre of each plot.

In 1987 and 2007, a core was taken from bark to pith on a radius facing plot center with an increment core. The location of boring was moved slightly above or below breast height to avoid nearby branches or other defects. Increment cores were checked in the field to ensure that the pith could be identified. The width of heartwood and sapwood were measured. The 2007 measurements were not available for the north stands because they were harvested prior to 2007.

Analyses were carried out for diameter, basal area, heartwood width and sapwood width for each age separately using “t” test. The PROC TTest procedure in SAS (SAS Institute 1985) was used to evaluate mean differences by treatments and PROC REG procedure in SAS (SAS Institute 1985) was used to test relationship between diameter and heartwood width, and diameter and sapwood width. Difference among treatments were considered significant if $P < 0.1$ to increase statistical power.

Results and Discussion

Residual stand conditions

Prior to thinning, the plots averaged 930 trees/ac for the south unthinned plot; 780 trees/ac for the south thinned plot; 310 trees/ac in the north unthinned plot and 400 trees/ac in the north thinned plot (Table 1). Diameter varied between treatments prior to thinning: 3.58 in. for unthinned south stand; 3.95 in. for thinned south stand; 5.76 in. for unthinned north stand and 5.92 in. for thinned north stand. Thus, south stands were more overstocked than the north stands, and had less diameter growth.

Approximately 48 percent of the basal area and 64% of the trees were cut from the south stand, and 39% of the basal area and 63% of the trees were cut in the north stand during thinning. Because thinning removed the smaller, less vigorous trees, the mean diameter in the thinned stands was higher immediately after thinning than before thinning. Mean diameter in the thinned south plot increased from 3.95 in. to 5.05 in. and in the thinned north plot from 5.92 in. to 7.97 in.

Table 1. Changes in the number of trees per acre, by treatment, following thinning in 40-year-old redcedar stands.

Location	Treatment	Before thinning (year 0)	After thinning (yr 0)	5 yr	10 yr	20 yr	40 yr
South	Unthinned	930	930	780	690	600	480
	Thinned	780	280	310	300	290	280
North	Unthinned	310	310	230	220	210	-
	Thinned	400	150	150	150	150	-

Stand development following thinning

Stand development during the 40-year period was characterized by high mortality in the unthinned stands. The trees in the unthinned south stand steady declined from 930 to 480 over the 40-year period since the study was established. This reduction is equivalent to 48% mortality over the 40-year period, and mortality is likely to continue in the future. In contrast, mortality in the south thinned stand was negligible. There was a mortality of 32% over the 20-year period in the unthinned north stand.

Mortality in the unthinned stands occurred primarily in the smaller, less vigorous trees and may have provided partial release from competition for adjacent surviving trees. On the other hand, thinning removed large numbers of these types of trees in one operation rather than gradual over time. Removal of anticipated mortality through thinning provided much greater relief from competition to the residual trees than the gradual process of natural mortality could provide to surviving trees in the unthinned plots. Thus, thinning increased the rate of stand development in redcedar. The thinning at age 40 probably occurred too late. The high mortality observed in unthinned stands as early as five years after applying the treatments indicates that the stands should have been thinned much earlier to avoid stress and mortality. Our results differ from other early studies that reported that redcedar stands do not thin themselves naturally (Williamson 1957). For

example, in 1903 an acre of land in Arkansas was planted with 1,225 seedlings and 44 years later 1,027 of these trees still survived with only 3% of the trees being overtopped (Arend 1947). In general, mortality is a reflection of stand quality with high mortality indicating poor stand quality. In our study the unthinned stands were of poor quality.

Twenty years after thinning, basal area increased by 33% in the unthinned south plot, 95% in the thinned south plot, 24% in the unthinned north plot and 63% in the thinned north plot. Forty years after thinning, basal area in the south stand increased by 75% in the unthinned stand and 155% in the thinned stand. Thus, thinning increased the basal area growth rate. In our study, basal area growth rate was a better criterion to judge effects of thinning than individual tree growth rate. The unthinned plots in the south maintained the largest basal area at all ages, but in the north plots the unthinned stand had less basal area than the thinned stand 10 years and more after thinning (Table 2). Although mortality in the unthinned plots of both the south and north stands was high, there was no serious loss in basal area.

Table 2. Changes in stand basal area (ft^2/ac), by treatment, following thinning in 40-year-old redcedar stands. Standard deviations are given in parenthesis. Significance level is indicated.

Location	Treatment	Before thinning (year 0)	After thinning (yr 0)	5 yr	10 yr	20 yr	40 yr
South	Unthinned	83	83	94	105	110	145
	Thinned	80	42	55	71	82	107
North	Unthinned	66	66	64	75	82	-
	Thinned	88	54	63	78	88	-

Diameter growth

Although there are no differences in diameter growth rates between thinned and unthinned stands after thinning, mean tree diameter of thinned stands was higher than that of unthinned stands (Table 3). Thinned stands had 27-29% greater individual-tree diameter than unthinned stands 20 years after thinning. Forty years after thinning, the thinned stands had 15% higher individual-tree diameter than unthinned stands. Thinning created significant differences among treatments in mean individual-tree diameter that persisted through the 40-year period after thinning in the south stand. The increase in diameter observed in the thinned stands was largely due to thinning at the beginning of the experiment and also growth of residual trees. Similarly, increase in diameter observed in the unthinned stands was due to mortality of small trees in addition to actual diameter growth of surviving trees. The mean diameter in unthinned plots is expected to be smaller than those in thinned plots because smaller intermediate and suppressed tree are in the average. On the other hand, diameter in unthinned stands was also somewhat inflated by death of small trees. These confounding influences on diameter growth may mask important differences among treatments in individual-tree diameter growth. The inability of the trees in the thinned plots to have a higher growth rate than those in the unthinned plots was at least partially due to the relatively poor site and age of the stands. Also, the relatively long period of intense competition prior to thinning may have affected response of the south stands. However, the primary benefit of thinning was that it concentrated all

the growth on the most desirable trees unlike in the unthinned plots where growth was spread across desired and undesired trees.

Table 3. Changes in mean stand diameter (in.), by treatment, following thinning in 40-year-old redcedar stands. . Standard deviations are given in parenthesis. Significance level is indicated.

Location	Treatment	Before thinning (Yr 0)	After thinning (Yr 0)	Yr 5	Yr 10	Yr 20	Yr 40
South	Unthinned	3.52 (1.91)	3.52 (1.91)	4.28 (1.98)	4.88 (2.06)	5.38 (2.22)	7.06 (2.37)
	Thinned	3.95 (1.81)	5.08 (1.40)	5.45 (1.81)	6.34 (1.90)	6.97 (1.82)	8.11 (2.06)
	P value	0.152	<0.001	0.005	0.001	0.001	0.054
North	Unthinned	5.61 (2.58)	5.61 (2.58)	6.67 (2.59)	7.55 (2.18)	8.04 (2.64)	-
	Thinned	5.92 (2.36)	7.97 (1.51)	8.65 (1.18)	9.60 (2.87)	10.25 (1.70)	-
	P value	(0.597)	0.002	0.012	0.008	0.008	

Heartwood and sapwood formation

Over a 20-year period, thinning did not significantly affect both the heartwood and sapwood widths in the south stands, but it increased both in the north stands (Table 4). Although thinning did not affect both the heartwood and sapwood width at 20 years in the south stands, it increased the heartwood width at 40 years. It appears that the south stand responded much slower to formation of heartwood formation after thinning and this could be due to severe competition prior to thinning. The north thinned plot, aside from larger diameter trees, was a more open stand and responded better to formation of heartwood after thinning.

When heartwood width per tree was plotted against diameter for all trees a strong linear relationship was evident ($P < 0.001$, Figure 2). In other words, heartwood formation is a function of diameter growth as indicated by the polynomial equation:

$Y = 0.34X - 0.13$, $R^2 = 0.94$

where: Y is the predicted width of the heartwood in inches. X is tree diameter outside bark in inches. In contrast, the linear relationship between sapwood width and diameter was relatively weak ($Y = 0.10X + 0.5$, $R^2 = 0.52$, Figure 3). The strong relationship between diameter and heartwood width serve to underscore the importance of thinning. Thinning which promotes diameter growth also promotes heartwood growth, increasing both productivity and quality of the trees.

Heartwood width was higher and sapwood slightly lower 40 years after thinning than 20 years after thinning. Thus, tree size and age are the key factors influencing heartwood formation in eastern redcedar. Sapwood turns to decrease with age. Thinning stands

increases the growth, stand quality and timber quality of redcedar. Managing redcedar could be profitable.

Table 4. Changes in the heartwood and sapwood width, by treatment, following thinning in 40-year-old redcedar stands. Standard deviations are given in parenthesis. Significance level is indicated.

Location	Treatment	Heartwood (20 years)	Sapwood (20 years)	Heartwood (40 years)	Sapwood (40 years)
South	Unthinned	2.38 (0.63)	0.90 (0.29)	2.65 (0.93)	0.80 (0.36)
	Thinned	2.42 (0.77)	0.90 (0.26)	3.10 (0.91)	0.88 (0.27)
	P value	0.80	0.98	0.04	0.32
North	Unthinned	3.12 (0.92)	0.97 (0.32)	-	-
	Thinned	3.86 (0.77)	1.15 (0.14)	-	-
	P value	0.02	0.04		

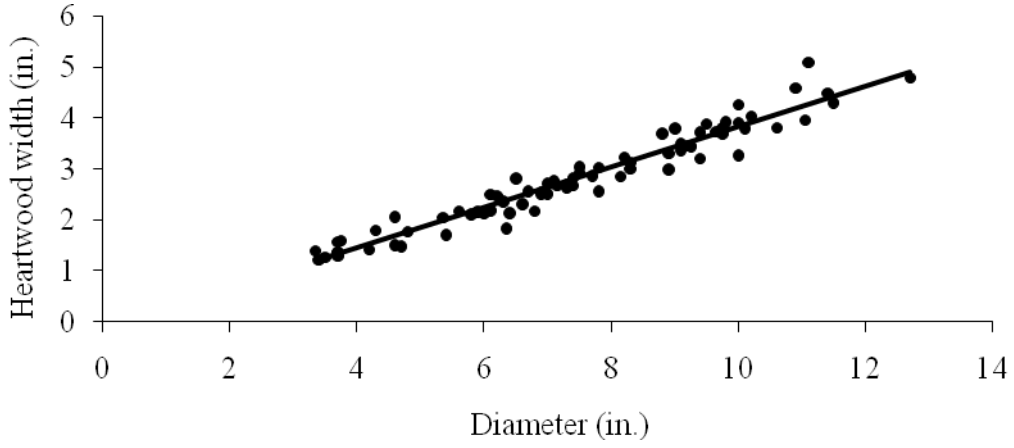


Figure 2. Eastern redcedar heartwood width as a function of tree diameter 40 years after thinning.

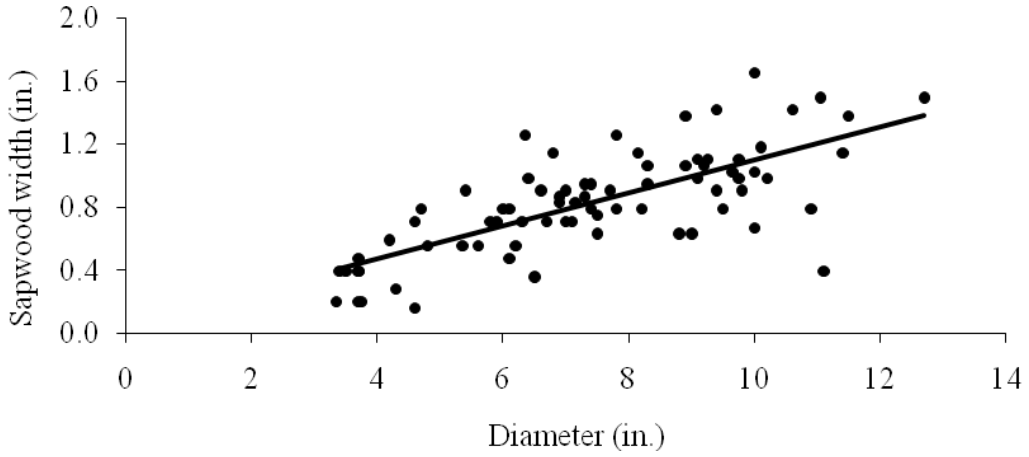


Figure 3. Eastern redcedar sapwood width as a function of tree diameter 40 years after thinning.

Conclusion

Good news for resource managers and private landowners who may wish to actively manage eastern redcedar stands is that thinning improved mean individual-tree diameter growth, basal area growth rate, improved the health of the stand by reducing stand mortality, and above all it improved the economic value of the trees by increasing the heartwood formation. We believe that if the stands were thinned at a younger age that better growth and heartwood formation would have been obtained than reported here. Our results show that potential exists for managing naturally regenerated stands to promote yield and value of timber through thinning.

Acknowledgements

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Questions and Comments

Q. Would you speculate the same linear relationship between heartwood width and diameter would be evident in other species?
A. No, I would not. I do not know if the relationship holds in other species.

Q. Mortality was greater in the unthinned stand than in the thinned stand. Doesn't that mean the unthinned stand is thinning itself?
A. Yes, it does, but the process takes much longer. Mechanical thinning quickens the stand development.

Q. When you are talking about thinning, are you talking about cutting other trees that are not redcedar?
A. No, we started with pure redcedar stand so thinning is removing other redcedar trees.

Q. When you're talking about thinning are you talking about cutting the little trees or harvesting the big trees and letting the little ones grow?
A. We are talking about removing the little trees. So, we thinned from below to promote growth in the best trees.

Q. I have noticed that when you prune evergreens, and none of those are specifically redcedar, they grow a lot faster. Basically you are taking a bunch of mass away from the tree, and the food that would have gone to those branches is now going to the rest of the tree. Wouldn't that make sense that the tree get taller faster because it has less branches to feed.
A. When you remove branches and you are likely to reduce photosynthesis because you reduce the amount of foliage. So the risk is that if you remove too many branches you will actually reduce the growth rate not increase it.

Q. When you prune the tree should leave a stud or not?
A. When you are pruning a larger tree, the recommendation says you should leave a stub. On a little tree you do not have to leave a stub. If you cut big tree and you do not leave a stub you have opened the door for every bacteria, virus and fungus to cause rot in that tree. So, if you do not leave a stub on a larger cedar tree after pruning, you will lose a large portion of the tree to diseases.

For the conifers, you need to prune smaller branches. So prune early. And you need to also thin the stands so that you promote the growth of the pruned trees. This will enable the pruning wounds to close faster. You do not need to leave a stub as long as you prune early and thin after pruning.

Q. I have not pruned a lot of redcedar, but if you prune flush to the bark of the tree, sometimes you cause disease, but if you prune to branch collar, branch collar heals over. So, I guess my question is how strong is the branch collar on eastern redcedar? My recollection in cedar is that as long as you stay on the outside of that branch collar, you will be fine. We always say let us be safe rather than sorry. Should you be leaving a 4-inch stub rather than a 2-inch or 1-inch stub? I believe that if you do a flush cut you have destroyed that tree's natural ability to heal itself.
A. The length of your stub would be determined by the size of your tree. When that tree reached maturity, and you cut it, you do not want the growth of that tree to overgrow your stub. That is going to leave a hole. So, the smaller the tree the longer the stub you should leave on the tree. You do not want the growth of the tree to grow over the end of your stub because the wood will not be solid. Once that tree grows over that stub, there will be a cavity in that tree for its entire life. So, the common sense answer would be that the smaller the tree, the longer the stub. If you're going to cut that tree in 3 or 4 years a 2-inch stub would be great.

Q. I was just wondering if the cedar guys consider the stubs left on the tree a problem?
A. When you log the tree you are going to cut the stubs off and haul it in as a smooth log. They'd cut that off just like a limb. So, it is not a problem.

Q. The younger you prune your trees the more clear wood you'll have.
A. Exactly. If your objective is to have a clear wood you should prune your trees early, but I don't think that is the objective of most of the redcedar resource managers in attendance at this workshop.

Q. I was going to say, anybody who leaves a stub, the reason that we are getting all these loose knots and pruned lumbers is because they're leaving stubs. That's where all those loose knots are coming from. If you pruned it down to the branch collar you wouldn't have a loose knot because it grows over the stub.
A. Okay, this is a different opinion.

Q. As far as wood quality, is there a difference between cutting at the branch collar versus cutting at the tree, do they both screw up the wood quality?
A. Cedar trees do not grow like other trees! It's not the same as cutting the collar on a cedar tree as cutting on an oak tree. An oak tree will grow right over it and a cedar, you've created a blemish for the longevity of the tree, unless it's a little tree.

Cutting to the tree or branch collar depends on what your objectives are. If you want to produce premier logs for veneer pruning flush to the branch collar would be good. Again, I think that most problems that we are getting, I think everybody mentioned it, is that with pruning big branches, you have problems because you are leaving that wound for a long period of time. Then it is better to prune young trees with small branches to avoid those problems. There is no question that we need more information on pruning of redcedar. Thank you!

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Cedar Insects and Diseases

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Presentation

I like Dave's summation, "Scientists always say, 'Send more money. We need to do more research.'" But if you think about it, decay is one of those things that happens in the forest, naturally; and if anything we're trying to do to stay out in front of disease perhaps by growing cedar. As you will hear throughout this talk, I think redcedar should be the state tree for Missouri. I will be making a 'big' pitch for that at the next legislative session, though I'm not holding my breath.

I've been called to talk to you about whether or not it's a 'challenge' in this case to prune or not to prune or an 'opportunity'. And I'm going to talk to you about the fungi and the bugs that like your redcedars. Hopefully, as we go along we will learn a little bit. As Hank points out it's a pretty bulletproof organism and a very well suited tree for this area. In fact, as I was driving down here somewhere south of Buffalo, Missouri, I noticed several redcedars growing right out of the rocks. So it's a great tree to talk about though you should be warned I guess, as I always come bringing with me some doom and gloom. However, in redcedar's case, I bring good news; this tree actually might be something that's holds a bright future.

I always start out my talks by asking the question, why is 'disease' important? And today I give you, the Seven P's for successful tree growing. Does everybody know what the Seven P's are? **P**roper, **P**reventative, **P**lanning, **P**revents, **P**oop, **P**oor, **P**erformance. So if we start with the end in mind with redcedar, I think we can avoid some of the pitfalls that happen as a result of poor planning. Disease or as shown here some really good 'decay' going on right about here has resulted (much to this unlucky homeowner's surprise), in a hazard tree situation that failed and toppled over right on top of his brand new house.

I come to you today from Columbia, Missouri. You've probably heard of CSI: New York or CSI: Miami; I work in a lab up there known as CSI: Columbia. People say I can't see the forest through the trees and I don't get out much and that I spend too much of my time playing with fungi. I am the 'fun-guy' in the basement up there and trust me there are a lot of molds and spores to play with. Interesting things take place in my lab where we get excited as we apply the whole Crime Scene Investigation approach. As I was putting this talk together I thought okay today we're going to talk about the production and the maintenance of a wood commodity perhaps. This represents a shift in my normal routine where I deal primarily with homeowners or landowners that are calling about some specific tree dying in their front yards.

So I'll be bouncing back and forth between two realms: the urban forest and the regular forest. Hopefully, you will be able to get some insight into pests that bother redcedars. I would be remiss not to start out as your pathologist to get us to look at the concept of a disease triangle. Are you getting sleepy? We as pathologists talk about the disease triangle a lot. It's like the Bermuda triangle, it's imaginary. So I've tried too as best as I

can represent it here. There are many things that can be predicted that occur every year specifically to bring about disease. Disease is a relatively 'unique' event so you can really think about the sides of the triangle as influencing a moving target out there. We call this moving target an 'infection' court. Sometimes it comes into focus, sometimes it goes out, and sometimes it comes back again. We say there are three sides to this triangle. I'll give you the first one, after we try to get this moving raccoon represented here on our MDC logo. We have the 'pathogen', these are what I'm going to be talking about; but there two other sides that play a role in disease development? Any ideas?

Hosts? Humidity? Sure - these represent the other two sides of the disease triangle, right? Certainly the redcedar 'host' is what we're interested in here today, but we also see that the 'environment' can play a big role in bringing about successful infection. I would further suggest there is even a fourth factor that we may have missed; any ideas? I suppose we could consider 'ourselves' as a factor. Yes, indeed I think WE may be onto something here. So YOU are important when it comes to this disease triangle.

Pathologists say you get a disease happening when you have all three sides of the triangle in equilibrium with one another. So you have to have a favorable 'environment', you have to have a susceptible 'host', and you need a virulent 'pathogen' to have disease develop; again a unique situation in most cases from the tree's perspective.

But YOU, as growers of redcedar, have the ability to manipulate the environment perhaps to prevent a pathogen or as in most cases, invite the 'fun-guys' for dinner, just by planting redcedar too close to one another. Or perhaps, YOU plant very susceptible species of redcedar out there in a favorable environment, again inviting disease. The disease triangle can be a very important way for us to think about disease, as we go along I want you to think about how it may be used to our 'advantage' when growing redcedar. It will make you a better, pathologist-type, or entomology-type and help you to better implement the seven P's for things that may cause problems later on.

Good diagnostics always begins with a clear understanding of 'symptoms' and 'signs' of a disease. In this case, 'symptoms' are what the host is trying to tell you, "I feel bad so I look blue," or "I feel so bad (in the case of a cedar), I look straw-colored." As opposed to 'signs', which are the actual fungi themselves or agents that you can put your hands on and say, "Ah ha, now I've got you!" When taken together, YOU will be a better manager of redcedar by knowing what's causing the problem and responding with an appropriate control measure.

So why are symptoms important? Are there any ideas? I would suggest they are important because they draw or guide our attention to the diseased area, perhaps taking place in the lower portion of the crown, or on a branch, or maybe just a leaf, or needle. So symptoms lead us down the road to diagnosing something. But the problem with symptoms is they are often confounded by other problems going on with the host at the same time. Perhaps you've had a good drought going on or some freeze damage or something that 'mimics' disease symptoms, but not necessarily causes a disease. So you

can't always go based on the symptoms alone. You need to start with describing symptoms but understand that other things may have the same disease signature.

Let's take a look at common symptoms associated with disease.

We're going to talk a lot today about 'blights'. As I said earlier, redcedars are fairly disease tolerant, I was really hard-pressed to find really good examples of disease. But blights in redcedar are bad because you get rapid death of needles and shoots. Blights can be caused by insects, by disease, or by abiotic stressors, or some combination of all three; and often result in this browned out, horribly disfigured looking tree. This is a worst-case scenario for conifers in particular like redcedar, does anybody know why?

What happened with this ice storm that we had down here on the 12th of January? Did you see the trees around town? Aren't they exciting? (ooooh, yes) … Did you notice the cedars? They looked pretty good by comparison to the oaks and seemed to have come through okay. However, problems result when evergreens such as pines lose their needles over a large portion of a branch; perhaps due to late season frost again resulting in disfigured trees. Something else below this permanently lost dominant meristem will now have to take over as the tree's leader. When you have missing branches, as it was mentioned in the last discussion you may actually have more stress to the tree, over the long run this is due to less energy produced as sugar from photosynthesis by the needles to be translocated to the root reserves and less power for the production of next season growth. It's very important for conifers to retain their foliage if you want them to stay 'evergreen.'

Again, we refer to this rapid death of shoots or branches as 'blight', it looks like this. You see this straw colored-looking, purple-browning, or red coloring symptom. Often in a nursery situation you can see it up and down the rows where many of seedlings exhibit a burnt or scorched appearance. I see blight symptoms often in creeping junipers in landscapes, a lot of rapid death occurring here. I am re-emphasizing the symptom here, 'blight' as rapid death of the shoot.

Another symptom associated with tree diseases are 'brooms'. These are prolific, abnormal growths that you would see looking much like a broom in the canopy. What's happening here, is either a fungus or an insect is encouraging the tree to shorten up its nodes. It can be something that stresses the tree for many years. In this case we have a rust fungus causing a broom to form. Again, you get a disfigured tree; and in other conifers if that gets on the main stem of the tree, it can act as a localized energy drain. We get 'brooms' on Rocky mountain junipers, caused by dwarf mistletoe, which is a parasitic plant that gets on certain species of juniper. You can see here's the rust again; this gets all clumped together, shortens up and looks really rough. This is again dwarf mistletoe. You get 'mini' versions of the tree within the tree and these can be thought of as gigantic sinks that pull away nutrients for growth and stunt the tree.

Another symptom of tree disease are 'galls' out there. These come about because you either have some tissue that was stimulated to go crazy and produce an abnormal growth

or some cells begin to start shortening up causing hyperplasia within the wood. So you have hypertrophy and hyperplasia, this can be caused by insects, fungi, or bacteria.

'Galls' cause structural defects and are most important when growing on main stems. For example, when I worked in Canada on lodgepole pine if the lodgepole pine got a big 'gall' in the middle of the main stem that would be the place where breakage and blow down typically occurred. Cedars probably don't get 'galls' of that size on the main stem, but you will see 'galls' often and I would be remiss not to put this out here. Hank was asking me for some snot. Here's some snot. … But if you cleared away the snot you would see some brown, circular globose 'galls', which have been enticed to do this for the purposes of putting out these tendrils in the spring of the year. Now is this a 'sign' or a 'symptom?'

"Symptom." Why do you say symptom?

It's a 50/50, I think, yes. Got fungus, you've got the wood that's been produced in terms of a 'gall' itself. That was kind of a trick question. It's been in the last couple of years I've noticed in my back yard (where this picture was taken), that a lot of my 'suppressed' redcedars are alive and dealing with this problem. As a pathologist it is fun to take your friends out and say, "Hey, Look at this! It's so cool!"

Q. What do you mean by 'suppressed?'
A. These two trees are growing beneath two huge maple trees and they just look stressed and ratty. But they've got all these 'galls' all over them so I keep them going. My wife says, "You should cut those down, they really look bad." by 'suppressed' I mean in the sense that the maples won't let them have any sunshine. So, they look kind of ratty due to being out competed. But we got this disease going on here, I say, "There's no way I'm going to cut those down! That's disease! That's cool stuff

Q. Could you briefly explain the relationship between the cedar and the apple tree as far as passing this fungus back and forth to one another?
A. Yes, I have a whole section devoted to that and I'll be right on that in just a second.

I'm just finishing up with my symptoms here.

'Wilts', this is anything that messes with the water conducting tissues of the tree; it can be caused by abiotic stress, fungi, and in redcedars case, nematodes. This disease problem typically occurs further south of us where we get large populations of these microscopic unsegmented worms building up on the root systems. Trees will become placid, turn brown, and most often when we start talking 'wilts' as a symptom you can expect the doom, the ultimate doom that this will be fatal.

This past spring I was fortunate enough to take a bunch of students around the campus at University of Missouri – Columbia during their forest health class, and we have this lovely specimen here and it's kind of cute to note that the crew that works all the grounds at MU after they saw all of us standing out there talking about this particular diseased

specimen, the next week the tree was all gone. “They can’t be talking about disease on our grounds.” Again a creeping type juniper, what’s happened here, as you can see the steam in the background? This is abiotic desiccation, so that steam has actually told the juniper to start photosynthesizing or making sugar, get going; but the ground is not cooperating because it’s cold and clammy and so the water is not ready to move through the plant. So what you’ll have happening is you’ll get this complete ‘wilt’ looking symptoms at first and then a fairly rapid browning out. We call this winter desiccation. Now in some cases if it was not too severe, I have seen the tree make a comeback, but in most cases when it’s about this bad the best thing is to is prune it out of there and start over.

But if we think about things for a minute and we think about redcedars, we have these microbial agents that can cause disease: fungi, bacteria, nematodes, then there are these things called phytoplasmas, and finally viruses out there. These are our ‘players’ and if I had to rank them, I would put them in this order of importance. Fungi probably caused more problems on redcedar than do bacteria, than do nematodes, phytoplasmas, or viruses. However, if you’re a person that has a virus going on it can have a significant impact. So they all can be considered significant as disease agents. The main point that I want you to get from all this is that ‘signs’ are important for complete diagnosis.

Signs are the actual organism. So why are ‘signs’ important? Well we get to wear some really neat hats and if you see that stuff going on out in your field or on your redcedar, you should be worried. If you remember the movie ‘Signs’, Mel Gibson gets a hint early on basically so he could go through the motions and get the job done when he was called on to respond to some invading aliens. Not that I’ve given the show away or anything, but that’s what people tell me. So ‘signs’ are important because once you’ve got a hold of them you know how you are going to proceed in terms of managing things.

Signs can vary across the board; if you don’t have a hand lens, I highly recommend you get one, because most all of these parasitic diseases causing agents, fungal or nematode require a hand lens to see them. They are very small. In most cases so small, like bacteria which are rod-shaped, maybe in the vicinity of 3 microns in length by one micron.

Or you may see something on a stem that looks like this; All of these ‘signs’ and if you have a hand lens it really helps you pull this in as our case study today we are going to be talking about these black pepper ‘grains’ that keep popping up on the host. All plant parasitic nematodes that cause disease are actually microscopic. So you would have to have some diagnostician look for them to be sure of what you have. So microbes are small this is just showing nematode poking its head in to a plant cell. This is 5 microns over here. ‘Nematodes’ have these piercing sucking parts which go into the cell, as shown here, enabling them to draw nutrition for life.

‘Fungi’ will put in these strands of root-like growth known as ‘hyphae’ into the host cell; and if you want to think about it, consider this a thread-like growth that has a large surface area to absorb nutrition. Hyphae can go from cell-to-cell or they can move through intercellularly through a wound between cells as has been mentioned.

We have ‘bacteria’ that are shown here to be little bit smaller than nematodes or fungal hyphae. We have ‘phytoplasmas’, which really are bacteria without a walls; and we have ‘viruses’ smaller still until we get down to those blasted ‘viroids’; and you don’t want viroids; viroids are very bad. So from this illustration, we get it that microbes are very small. You probably wouldn’t see any of these things with a hand lens. So we have to take it up a level and start looking for ‘signs’ that we can actually put our eyes on.

All of these diseases of redcedar that we are going to talk about today go through a cycle. They have 7 steps. They go along with my 7 P’s. There’s a ‘dissemination’ phase when a fungus is projected out to a susceptible host; then we say the fungus ‘inoculates’ the host and then ‘penetrates’ the host leaves, branches, roots, etc..; ‘Infection’ starts to take place when the fungus begins to draw nutrition from its host. Once that happens the fungus is happy. It starts to ‘invade’ all the host tissue and then after all these steps have gone past we begin to see ‘symptoms’ expressed on the tree. So by the time you’re looking at the symptom, these five steps have already occurred. Finally, like all good organisms, the disease agent will ‘reproduce’ and get ready for the next growing season. I put this lightning bolt here because if we know something about the disease triangle and know something about the disease cycle, we may be able to deduce a ‘break’ in the chain and actually prevent or slow the spread of disease from happening in the first place.

It’s important for us to be integrated when we think about ‘managing’ tree diseases. Most of us get this idea that if we apply a silver bullet approach out there we will solve the problem; and that may be true in certain cases like highly managed operations like nurseries and stuff like that. But for the most part, once a tree gets to a certain age it’s difficult to get complete chemical coverage on bigger trees. Chemicals also get very expensive to apply with increasing volume of spray.

We need to think about the principles behind our management strategies. We might ‘exclude’ something, we might ‘eradicate’ something, we might ‘protect’ our host, or we might incorporate some type of ‘resistant’ on the landscape so we can slow these diseases down by being integrated.

Take for example ‘cultural’ approaches; I want you to think about plant inspections and quarantines. At one time, in theory this was a nice thought, but since we restructured APHIS into homeland security, we have fewer inspectors on our borders actually inspecting plant parts that come into our country, as a result the complete concept of ‘exclusion’ is in my mind a little dicey. ‘Eradication’ is our typical and best approach in that we ‘sanitize’ by removing the source of disease inoculum. If we pick good sites to plant our redcedars, then we are protecting our investment over time. We want to promote healthy trees by watering, by fertilizing, and so forth. In the forest we may want to try to improve spacing out there so that they have room to grow. ‘Sanitation’ in practice makes sense as part of our integrated approach to management.

As I pointed out, ‘chemical’ measures get expensive; but if you’re in the nursery business you know what it means to fumigate a whole nursery bed or fumigate with soil sterilants

down. Over time it's costly to maintain this practice since you'll be applying lots of fungicide and insecticides every year. As an aside, new in the chemical arena they're starting to develop things that actually are systemically absorbed into the tree to give you resistance to disease. But again, as you go down this path it gets more and more costly for us in terms of management, kind of like a catch twenty-two.

Another approach may be to use some pre-emptive fungal competitors to exclude an unwanted pest. As I talk about root rot today, this would be our only example of successful exclusion with a biocontrol agent where we put a fungus on a stump and it actually eats the stump before the bad fungus arrives. That's 'biological'; this too is a lot more costly than chemical. There are things out there that we can put on that actually take advantage of these fungi eating fungi competitions. Further, you may hear about things like bio-stimulants. These are bio-based-products that encourage roots to grow, but slow up the above ground growth of the tree balancing root to shoot ratio. We tend to see this applicable in the urban environment where arborists are trying to overcome some really stressful growing conditions.

Finally, there is genetic host resistance, and there are a lot of redcedars out there that are resistant to many of the diseases that I've talked about today. You should always keep these things in the back of your mind. Again, no one thing is going to solve all of your disease problems; there is no one silver bullet. But if we apply an integrated approach to our thinking maybe we get more tolerable levels of disease out there.

What I've found is Bordeaux mixture has been around for a long time to control plant diseases. Its discovery was just an accident by this guy in Bordeaux, France, who stumbled along putting some lime on sidewalks to de-ice, and low and behold all of the grapes that would normally get powdery mildew, didn't get powdery mildew right next to the limed sidewalks. This has proved one of the best fungicides and still is relevant today for many fungal diseases. You can think of it as a preventative measure. You have to put it on before the spores get there or are disseminated. It does offer some pretty good control. Remember, "*Complexities of tree health and disease should mandate that the practice of disease horticulture never be reduced to mere squirt gun botany*". This gets back to my little message that no one control measure will solve all of your problems by itself.

I'm now going to talk about some chemicals today, but just because I talk about them does not mean I'm endorsing them from the Missouri Department of Conservation's point of view. And if you use them I want you to be careful. We actually have this fine print disclaimer, and I've never actually gone out in one of these suits, as it would certainly be really hot. But there are many chemicals out there and again as I said, if you are integrated you can generally get away from too much dependence on them.

There was a time when we thought that more was better. So, this helicopter is probably applying the appropriate amount back in 1970 to about 1980. But, as this industry has grown more may not be better and in the long run trees may actually get messed up. There may be things you are doing to your lawn that are affecting your trees poorly and

there may be things that you are doing to your trees that are affecting your lawn poorly. Always use caution and again there's nothing like a good old fashioned weed pulling to stay on top of things and keeping your trees in good health. That guy up there is pulling way too much.

Ok enough background: onto the diseases impacting redcedar….

Let us now take a look at a couple representative disease case studies on redcedar. The first, Phomopsis tip blight.

If you're in the nursery business you probably are contending with this problem as we speak. Its 'symptoms' are characterized by this straw-colored dieback on these young seedlings or the younger growth; about the first 4 to 6 inches. Eventually these seedlings will turn a 'sooty' gray color and if you look really close these symptoms will prevail all the way down in these brats, you'll start to see these dark little pepper grains (signs) that distinguish this as a fungal disease. It's the biggest problem, I think, facing the nursery at our own George O. White facility, near Licking, Missouri. Greg and I have spent many years taking samples from here and yep, it's Phomopsis alright, but what can we do about it?

I think Greg has finally turned the corner on some of this; in that he's found a way to get better coverage with different nozzle angles as and a couple of other cultural planting strategies he's been doing that is making the disease situation better. He's still gets tip blight; caused by Phomopsis.

One of the things that we look at on the diagnostic side of are for these two types of 'conidial' spores. They light up, 2 little oil droplets which are called 'alpha' conidia. Then you see these little spindly ones called 'beta' conidia; and if I get both of them, then I'd go, 'Yep, you've got Phomopsis.' These little spores are formed in the base of vase-like fungal structures known as a pycnidium. If you see this grayed symptom on your redcedar, you can go right down to the base of that symptomatic area and you'll start to see these black pycnidia; and when we slice through it, a cross section the spore factory is revealed.

Basically billions and billions of these conidia are housed in here and are actually forcibly discharged from the pycnidia into a mucilaginous, gelatinous matrix. So during wet rainy periods this sticky stuff sticks to insects coming in allowing them to move or disperse the spores to other susceptible hosts. Now this disease can sit dormant for about two years and act as a 'saprophyte' or dead tissue feeder. So, survival is no problem for the pathogen but when some sort of stress occurs on the host, the potential for disease to start up again is quite good. Again, 'Phomopsis' is a big problem in nurseries in low lying areas when redcedar are grown under a lot of overhead irrigation. We've had entire seedling beds turned over because of this disease; and disease levels usually gets back to location of where planting has taken place. So, environment may determine whether chemical control will be used.

What are some other recommendations for control? There are some resistant species out there. Sanitation can be obtained by telling folks to go out there and pick all of the dead ones out. That's not really highly thought of as that practice can be very intensive. You can restrict pruning or sheering that you're going to do to your trees to be done only during dry weather periods when the spores are not flying around or stuck to insects. You could remove and burn all effected seedlings in the nursery operation. Avoid planting your nursery operations close to older redcedar, this just makes intuitive sense. Do not use redcedar or other hosts as wind breaks or as landscape plantings around your nursery. It doesn't mean you can't use them as wind breaks, but especially around nurseries. Avoid wounding when cultivating and they also recommend that you don't use this for mulch. So these are a few practical cultural things you can do to get a handle this disease.

Chemical options available; these fungicides have to be applied through the growing season beginning right at the time the seedlings are emerging. You're supposed to do this about every 7 to 10 days; and if you get a rain somewhere in between, you're going to have to repeat the process. Remember we are trying to 'protect' our seedlings and the water will just wash the fungicide off.

In landscape planting they may repeat 10 to 14 day intervals up until the new growth is matured. The reason this is important is because once the redcedar hardens up and the needles become green and matured, Phomopsis drops considerably. The disease tends to like young, tender, wounded needles, and we want to be sure that you're keeping new growth thoroughly protected by regular sprays to get a hand on it.

Now if you thought that was confusing, the next disease I'm going to be talking about is Kabatina tip blight, it is very similar to Phomopsis.

The only thing I get to use to distinguish this disease by itself is the time of the year samples are brought in for diagnosis. Early in the spring is when I see Kabatina and only on the first one to two inches of the new tips. So, these will be the first samples I diagnose in the growing season; as opposed to now when I'm still diagnosing Phomopsis. In this case both diseases exhibit the same symptoms so you can't really tell as we mentioned.

But you start to see these black pepper grains on here and that's a different structure than that pycnidia we used to diagnose Phomopsis. It's called an 'acervulus' and basically you can think of it as this big disc where from the bottom has all these little cannons positioned where they start firing out all of these infectious conidia.

'Kabatina' is a problem that we often see in windbreaks and older plantations. Again, its disease cycle is completely different than Phomopsis. That's why you've got to know something about how that disease cycle is operating to improve the timing your sprays or your control. So, the cultural practice of sanitation makes good sense to get rid of diseased redcedar infected with Kabatina.

These are some of the fungicides registered: Cleary, Mancozeb, and Protect. They're all registered primarily for Phomopsis not Kabatina. They haven't done a whole lot of studies on Kabatina even though they're recommended for both; and because they have these two different infection periods, spraying should begin early in the spring for Phomopsis through the growing season. Whereas, Kabatina should be treated by applying a fungicide in the fall because that's when they believe infections are taking place.

Again, just knowing something about symptoms doesn't do you any good. But knowing something about the life cycle and actually trying to figure out which one of these things you have will direct whether or not you're going to spray. If you're spraying Kabatina for example in the spring, you've missed it; you've missed your window of opportunity.

Our last blight to consider is Cercospora blight of juniper.

This disease is characterized by its fungal fruiting structures known as sporodochia; meaning a fancy term for a big cottony cluster of spores that look like this. I've not actually diagnosed this in our lab, but it's a big problem south of here in Oklahoma and Texas; again this is common in windbreaks. A key signature symptom about this disease is that is starts from the inside working its way out of host. So, when you see these little tops up here and all of this dead stuff you may think. "Okay something is going on?" and the symptoms keep coming back year after year. The thing looks rough one year progressively getting worse thereafter. Then we start to look of the actual spores. You can find these actual signs usually showing up around July and August. That's when we start seeing them.

Again, suggestions for control include a healthy dose of sanitation; you've got to remove diseased trees because they harbor all of these spores that will be used against you in the next growing season. Nursery situations will benefit from protective fungicide sprays, like Cleary, anything with chlorothalonil or Maneb. Those are active ingredients that are really good to work against fungi; and you're supposed to spray mid-late spring before fresh symptoms appear and then reapply after rain; it's critical that you get complete, thorough coverage within the tree to get the foliage completely covered. Otherwise you could just be throwing money away.

Q. Are you not, when you remove a tree of that size, actually spreading those spores?
A. If you do it during a dormant period, like in the winter spores are not likely to be as abundant. So, that's a good point; and we should mention that the timing of when you get these things out, most of the time, dormant periods are the best time to get sanitation done. But yeah, you have to be careful. Some diseases you have to be careful with pruning. You can take and move a disease that way, so timing is everything.

Our next redcedar problem: Cedar – Apple Rust
To get back to your question in the back. Cedar-Apple Rust. Again the symptom would be a…? GALL! Gall-eee, right?

Now this disease is a host alternating rust which I've studied rust for a long time. I'm fascinated by them. The first thing that told me I was going to be a pathologist was when a lady brought in a gall up at North Dakota State University, basically this lady brought this thing in and she had it in a little ice cream pale. She said, "Can you tell me what this is?"

This marked the first fresh sample of cedar apple rust that I had ever seen. It was all just books and dried samples up to this point. I said, "Awesome, can I keep it and hold on to it forever?" "Sure", she said, "You're really weird and disturbed aren't you? So, I got very interested in rusts and worked on western gall rust on lodgepole pine, and now I get to spend a lot of time in Missouri dealing with this fun-guy. And you are correct it does alternate from redcedar to apples. Depending on who you talk to, if you're an apple grower you don't like cedar apple rust. If you're a cedar grower, you don't like apple growers. So there's a big controversy brewing between the two.

Q. And what are the recommendations for this disease, any ideas?
A. To remove cedar rust; in fact remove all redcedars 3 miles in proximity to your apple orchard! I just started laughing when I got to Missouri. Sure, good luck with that. Just go ahead and try to remove all the redcedar across the state. Maybe, we should just remove all of the apple orchards. Yeah!

Galls form these telial horns as I said to produce spores. I'll demonstrate this to you in a little bit when we talk about the actual life cycle. This by the way is 'Quince' rust and it forms on the alternate host Hawthorn. You may have seen some of this on redcedar as well; to distinguish it on redcedars, if you see it on the stems where orange spores keep popping up, it's Quince rust. If you see galls, then you have cedar-apple rust. Here we have two different rust fungal species that can occur on the same redcedar, I just threw them up here as examples of redcedar diseases.

Telial horns produce basidiospores that are discharged in May. They will disseminate from a fungal structure known as a 'metabasidium' where you get four basidiospores formed that move about the time that the apple leaves are unfurling in the spring, where they start landing on apples and then within a couple of weeks you start to see these little yellow flecks on the top. If you were to turn over the apple leaf, you'd see this cup-like shape, clustered cup, with some orange spores produced there. If you put your hand on these structures, you'd get this orange stuff all over you; it's kind of liberating for the spores.

And basically what they are doing right now is they are coming to your redcedars. And if we get humid and wet period, that's optimum conditions for the rust disease. From here the rust begins to create more galls. It takes two years for these galls to form and depending on moisture conditions we start to see these horns form, thereafter every year. Basically, some years we can get this 'globby' snot stuff and sometimes we don't. The important thing to remember is this disease oscillates back and forth, knowing something about this life cycle then, should guide where we want to step in with our control.

Q. Where could we make an effective effort to control cedar-apple rust?
A. I think a case can be made prior to these basidiospores getting here, I'd want to be treating my apples with protective fungicide; and certainly right about now, if I was worried about it in a redcedar operation, I would want to stop the aeciospores before their arrival. Key point: Knowing those two breaking points can minimize damage on both sides of the disease equation.

So, redcedar that I have typically seen don't appear to be dying, probably because rusts are considered obligate parasites; they cannot exist without a 'living' host; and they tend to prefer really healthy living tissues. They are like that lamprey on the back of the shark, right? Lamprey on your back does not kill the shark, but they may take their toll gradually out a small portion of nutrition from the shark without killing its host. That's pretty much what the 'rust' fungi do. It's not a good for the rust fungus if it's going to kill its hosts. As I said, this process takes about two years to really manifest itself. So, I think maybe moving the apples would be a way to go, if we want to break the disease cycle and protect our redcedar investments.

Q. Does cedar-apple rust have a significant effect on health of the cedar?
A. Ha ha! I think you get the sense, yes. When you see all of those orange globs up there you really think something is going on. But, no as an obligate parasite it's just causing that gall to get bigger and bigger every year. At best, you can think of the galls formed as many drains to the host. It's not going to kill it, unless you get extremely intense case of just the whole tree completely covered in galls. Then perhaps mortality would follow.

Q. What about other fruits? Peaches or blueberries or something. Would they be negatively impacted?
A. Well here there may be a difference depending on the variety or host species infected, as we saw with the Hawthorn. I've seen some serious stuff going on with Hawthorn fruits where they actually whole shoots and repeatedly infected Hawthorns finally turn toasty brown and have died. In fact, we have lost three Hawthorns in front of our MDC building, I think because they were stressed to begin with because of where they were planted and died because of the rust. Peaches, I'm not familiar with that; but apples this can have a tremendous impact. Certainly rusts are clever and because they alternate hosts.

So, what might be some management options; any suggestions? Cultural control methods like sanitation of dead apple trees or that Hawthorn may reduce the number of spores that could potentially arrive on your redcedars. In severe cases you could control with fungicides on the apple and I would say on the cedars; with a fungicide containing chlorothalonil or maneb.

There may be other products if you're commercially growing apples. But again, we get back to resistant varieties of redcedars is probably the best way to keep your plantings healthy. These rust spores will travel many miles so it just doesn't seem very cost effective to take care of your alternate host.

One thing that was not mentioned in the last discussion when we were talking about decay in all the literature that you read is that redcedar boasts decay resistance. Redcedars normally, unless we give fungi an advantage through ice or mechanical damage event, will not be impacted by decay.

Annosus root and butt rot come to mind. As a pathologist you got admit we're not shy on stating the obvious with our cool names for diseases, 'butt rot'…cool! But I have not diagnosed 'butt rot' on redcedar in Missouri, but I have diagnosed it on shortleaf pine down near Potosi, Missouri.

What this fungus does is get into the root systems and is moving around in two ways. You'll see these 'conks' at the base of the tree that produce spores that go and infect fresh cuts or wounds on other shortleaf pine. From there this fungus can be shared via water conducting systems that have grafted allowing the fungus to move right into the adjacent tree. So, it's got two modes of operation, and I think this is a more serious threat to redcedar to the south of us. This is one of the diseases that's been studied extensively in shortleaf pine.

Currently, we are pushing for shortleaf pine restoration in areas where we've lost a lot of oaks due to Armillaria root rot and oak decline. So, my worry is if we come back with shortleaf pine we may actually run into Annosus root rot instead; trading one disease problem for another. So, to support my contention we need to plan our future carefully; anticipate what kind of diseases can we expect if we go with too many of one tree type. Again, I've not seen Annosus root rot on cedars in Missouri, but I have seen it on shortleaf pine.

Q. Is this a 'hard' or 'soft' conk?
A. It's a hard woody conk and again it would be right down near the base of the tree; if you were to scrape the bark back you would see a lot of black zone lines between healthy and diseased tissue. Basically the fungus works around the base to gain a stranglehold then the trees become sparsely foliated, decline, and die.

Okay, Annosus root rot has been identified as a problem in the south so it should be considered if you're going to plant redcedar in these areas of the U.S. I would like to point out some interesting improvements to stump treatment to cut surfaces are available. Mounted right to skidders you can apply a biocontrol agent right to the stump after cut to prevent *Heterobasidion annosum* from becoming established in your stand simply by excluding the bad fungus with a good fungus.

Since I am not the 'official' entomologist or bug guy for the Missouri Department of Conservation, what follow is a very sparse crash course in two insect-related problems that may negatively impact redcedars. This information was graciously provided by Rob Lawrence who is our resident 'bug-guy' and usually represents the other half of the MDC 'doom' and 'gloom' show.

Bag worms: Have you ever seen these? What do you do about them? Ignore them?

It's a fascinating little insect, moth-type thing, or grub. The damage they cause is primarily defoliation to your plants out there; if you get lots of them on a tree, they can become problematic for the tree because you no longer have the evergreen foliage that you need to produce energy. They are difficult to control because you just don't notice them until it's too late. They also, according to legend, know when you are spraying for them. They know when it's time to run.

Things like Orthene or Seven are registered for use, but primarily what I want to say about chemicals is that if you're not a certified pesticide applicator, you should talk to your agents or get certified. They've probably got a program that you can get involve with so that you can actually put stuff on things. Other solutions include the use of biological controls perhaps you've heard of BT or *Bacillus thuringiensis* a Gram-positive, soil-dwelling bacterium that will take care of the grub or the worm if you apply. It's a very specific parasite and application should be made at the end of June after all the eggs have hatched.

Our final insect pest is the Eastern Cedar Bark Beetle.

One of the things that makes this particularly interesting is you see symptoms like the flagging shown here, and then the tree dies soon after, when you peel back the bark you see all these interesting brood galleries which have basically cut off sap flow killing the above portions of the branch. It's not generally a huge problem. Like I said, I really had to dig to find some good insects; occasionally you'll get some scale going on your redcedars but again, nothing to get too excited about.

Wrapping up then, sanitation of unhealthy trees is good practice, a working knowledge of disease cycles, symptoms, and signs will better prepare you for good management. Thinking about the disease triangle before YOU plant will also help to stave off future disaster. Be innovative in your management approach, think of the 7P's to ensure this as a good 'opportunity' to move this tree forward as a commodity. While we can't predict the our next disaster like Dutch Elm Disease or Chestnut Blight as global markets expand; at least with redcedar the 'challenges' from disease and insects to this tree can be better managed if were integrated.

Marketing 101

Craig McKinley, Oklahoma State University

Introduction

Craig McKinley was raised on a cattle ranch near Elmore City, Oklahoma. He received his BS in forestry from Oklahoma State and his graduate degrees were from Texas A&M. Over his career he has worked for Potlatch Corporation, Texas A&M University and North Carolina State. At the present time, he is a professor and extension forestry specialist at Oklahoma State University.

Presentation

The idea today is to talk about just marketing, marketing in general. We're going to talk some about redcedar and I hope to build a little bit on what Richard Newton touched on this morning. He had an excellent presentation.

Certainly, there are college careers made in marketing, so 45 minutes is only going to just scratch the surface. But, I hope it peaks your interest enough that you can follow up on those things that you might be interested in.

Let's start with a definition. First, marketing is an ongoing process. You don't just do it and quit. Marketing is really just moving people closer to making a decision - moving that horse closer to the trough. Of course it may not drink. The customer may not buy but you're moving potential consumer, closer to making a purchase. We're just trying to get people to buy and we're marketing to move us closer to that point of purchase.

In order to have a good marketing plan we need to have a good business plan. So let's think about a business plan for just a minute. Some of you have been in business for 30 years, and some of you are thinking of going into business next week. My apologies to those I missed. This is talk is somewhat in the middle. Let's think first about your want to have a business. You want it because - why? Well, you can manage your own time. How many times have we heard, "Well, I want to be my own boss."? There's nothing like being your own boss 24/7 right? Because if you own your own business, that's what it is. There's no down time.

You want to have financial independence. Wouldn't we all? But one way you can do it, and not be dependent on that paycheck, is to own your own business. You may wish to have creative freedom. There are some wonderfully creative people who have their own business. In fact I think you'd better have some creative freedom or you won't do well in your own business. Richard pointed that out this morning.

And you can use all of the skills you possess in your business.

Let's talk about which business might be right. Again we're discussing a business plan, not a marketing plan. They do go hand in hand. What do you like to do? Very simple,

you want to be in business doing something you like to do. What are your technical skills? As Richard indicated this morning, he has some engineering skills. I have different skills, you have different skills. What are the skills you have? What are the ones you enjoy? How much time is available for this business? Are you going to devote full time? Is it half time? I caution any and all of you about going into business and calling it a hobby. Hobbies are something you do for fun; business is something you do for profit. So if you're going to spend money to buy a sawmill, call it a business and act appropriately. Figure out how much that business is going to cost you.

You should consider family support. Does your wife or husband say, "That's a great idea!" or "That's the dumbest thing I ever heard!"? That support is going to be very necessary as you move into any business.

What about that business niche as Richard spoke about this morning? Well, what kind of enterprise do you want to start? That goes back to the previous slide: What do you enjoy doing? What are your skills?

What product or services will you sell? I think you've all noticed that we are in a service economy. Service – fast food on down - service. It's that simple. Regardless of the actual product service must be a significant part of any business.

Will your business fill a need? It's nice to say 'yes' there should be a need, but is somebody else or are you going to fill it?

What is the competition? Before you start any business, who are you going to compete against? Who can you work with? Can you create a demand? This is not an 'I will build it, they will come' kind of scenario. This is 'I have to build a demand.' That's building a demand is going to come with the marketing.

Now here are some things that you need to check if you go down the line: What skills do you bring to the table? What legal structure do you want to use - sole proprietorship, limited liability? You need to know how to maintain legal records? What are YOU going to get paid?

Not only do you figure what you need to get paid, but what insurance is needed, etc, etc? There are business plans that fail to take into account everything involved in a business. Where's the location of this business? Are traffic patterns important? Do you ever see a McDonald's put in a bad spot? The people who make those decisions don't just walk out there and say, "I'm going to place this restaurant here." They think about it.

And in all aspects of business, timing is everything. If you wish to go apply for a job that is fine, but you might want to look to see if the company is closing. Timing is important in any business and any other endeavor.

Now we moved through that initial business plan. Let's say you now have that business. We're going to imagine that you're in eastern redcedar. What about this thing called

marketing? Marketing is more than advertising. I think that's the first word that comes to all of our minds when the word marketing is used. I'm going to market, so I'm going to advertise. Really, it's more than that and that's why there are careers in marketing. In simplest terms, marketing has two parts. One, make a product the customer wants, picket fences, fast hamburgers, or whatever. Two, make the customers want your product. For a successful business there has to be a supply and demand. The demand needs to be there, you're going to have the supply but make sure that demand wants YOUR product, your supply.

Anybody that's taken a first course in marketing knows the 4 P's: product, price, placement, and promotion. Just remember if you talk to any marketer in the country, you can say "Ah, I'm a marketing expert. I know the 4 P's!" because that is where all marketing starts - product, price, placement, and promotion.

Let's look at each one of these factors:

Product

Before you sell any product, and this applies of course to service, you need to know what that product is. You need to know everything about it. If it's eastern redcedar, you need to know everything about redcedar that you possibly can.

Now, for one of my hang-ups, redcedar is not two words, redcedar is one word. However, to use redcedar as two words is not that bad, and I'm going to tell you why later. Redcedar is not a cedar, and Rod Will talked about it this morning, it's a juniper. There are no cedars native to the United States, simple fact. Western redcedar is not a cedar. Eastern redcedar is not a cedar. Atlantic white-cedar is not a cedar. The only cedars are in the genus *Cedrus*. I'm sure you've seen cedars planted around cemeteries, and used as ornamentals. Many of those are true cedars. Eastern redcedar is more closely related to redwoods than it is to the true cedar. Now there's nothing wrong with that. Redwood is a pretty good tree. It certainly grows large, but it also has very many good characteristics: it's somewhat rot resistant, mildew resistant, and insect resistant. So, being related is not a bad thing. You can capitalize on those similarities as part of your marketing.

Here's some of the information about eastern redcedar that was discussed this morning. I was particularly going to look at point 4. Redcedar has male and female trees, but Rod Will covered that part so I'm just reinforcing. Yes, we agree there are male and female trees. However, there are other species of trees that have both sexes on the same tree, which makes redcedar somewhat unique.

In looking at a range map, eastern redcedar goes all the way from Maine to somewhat west of here. I would like point out the type of sites on which redcedar is found: the Ozark Plateau, the Cumberland Plateau, and then the Piedmont of North Carolina. Redcedar is not generally found on the high part of the Appalachian Mountains. It's not in the Rocky Mountains. It's on those plateaus I mentioned. Redcedar is generally on uplands and not in the bottomlands or at the highest elevations. So, the saying when it

comes with trees, if they don't grow there, naturally, there's a reason. In this case, it's likely the soil type. The plateau soil types are often quite similar. There's also a latitudinal factor. Obviously, redcedar goes into Maine as part of its native or natural range, but there is not a high concentration in Maine and the species does not go further north.

Oklahoma, my home state is in the southwestern part of the redcedar range. In comparing the 1985 and the 1994 redcedar distribution in Oklahoma, you can see the distribution has move significantly west, with a greater concentration in the more eastern regions. The western part of Oklahoma is where the redcedar is that we talked about this morning - that explosion of trees we mentioned. Redcedar is not expanding in the southeast part of the state. It's out west of Interstate 35. The NRCS has estimated that 750 acres per day are being converted in Oklahoma into eastern redcedar. That includes trees 5 feet and taller, and a minimum of 50 trees per acre.

We're talking about marketing, there's the resource! It's there for the taking. Mike Brittain has visited Oklahoma several times and he says we have a gold mine right there. I keep waiting. I've got my bank loan officer ready. It's called opportunity, and I agree. The resource is there!

We have the resource and we can make redcedar products. What are we going to market? You all know the good things about redcedar: nice colors, nice aroma, the durability, the insect deterrent. One website says redcedar even deters snakes. Anybody dispute that? Anybody tried that? I don't know whether it works or not but it's on the website. There are multiple products that can be made and thanks to Richard Newton who covered a lot of them. Here are some of them just to repeat: solid wood products, shavings, fences, mailbox posts, oils for medicinal cosmetics, mulch. Currently there is a great deal of mulch being produced in Oklahoma.

<u>Cedar oil:</u>

What about cedar oil? There are several companies in this region that produce oil from redcedar. One of the current processors told me once that every batch exhibits little bit of a different color. That variability can be used as a marketing point. You know it doesn't all have to be exactly the same. Some people may actually like to have the darker color, and some people would like to have the lighter. Cedar oil is becoming more and more of an interesting product from redcedar.

Q. Is it true that all cedar oil producers used to be whiskey makers?
A. I'm going to say that that's false since you used the word "all." But I'd bet most of them were whiskey drinkers! And if they weren't before they produced the oil they probably were after they got started.

I kind of made light of that term "all." But I think that's real important in a general sense. If you say all or never, you're generally going to be proven wrong. I think the same thing applies to redcedar marketing. You can't say that everyone wants light oil or dark oil, or

everybody wants bur oak wood, or everybody wants clean wood. It's never a 100% scenario.

Particleboard:

Oklahoma State started putting together particleboard. It's made a lot like flake board or what you might hear as oriented strand board. The machine literally chews off the side of the log, puts the material on a belt or screener, and shakes it a little to somewhat orient the wood. It looks like a mess but it does sort of orient those pieces. And then it's put together like plywood so you have one that's oriented this way and another that's oriented another way. And that gives it more strength. Best we can tell from our early results is that it has the same strength as Southern Pine plywood. Now that's almost as big of a piece that we've produced so far. We don't have a plant that's doing that, but it's a possible product.

Lost circulation material:

We talked a little bit about lost circulation material this morning as we ended up the session, and I heard it used yesterday at Mike Brittain's operation. Lost circulation material or LCM is actually used in drilling of oil wells. Most of you are probably familiar with drilling mud. Drilling companies use the mud not only to lubricate the bit but to also bring dirt, grindings and other material to the surface. Mud is also used to fill up fissures and cracks because the earth is not just solid rock. Drilling mud has been used for years, but now it is found that the cedar mulch type material, actually it's finer than mulch, into the mud the process works better. Redcedar helps to fill up those fissures and cracks - helps plug up those area. Drilling mud now goes a little bit more to the bottom of the hole where it's wanted. So, lost circulation materials is one of the key products that is coming onto the market.

Miscellaneous products:

Here are two photos of products. One is a business card holder; the other is just a trinket – miniature truck. We've all seen cedar trinkets. This was one of Mike Gold's slides this morning when he talked about the top selling products in Missouri. I think the beauty of this slide is that just it goes across the whole scale. There are innumerable products, not a single or just a few products to be manufactured.

Most third world countries use wood as fuel - they cook their meals with it, they heat their homes with it. Could we be there? It just might depend on the price we will pay for fuel in the future. I dislike seeing cedar in western Oklahoma just being burned. Why not use it as fuel wood? Let's take advantage of the resource.

Wood is made up of cellulose. Cellulose is made up of glucose molecules. Glucose is nothing more than sugar. That's the sugar that the plant produces in photosynthesis. If you put glucose molecules together in one way, it becomes cellulose. If you put the molecules together in an alternate pattern, glucose becomes starch. Cellulose is harder to

break down than the starch, but it's the same material if you break the chains down. So there's a real opportunity if we think in that way.

Price

Number two of our 4 P's was price. How do you set the price? You'd probably like to like to know what your competition is selling the product fore. But that only gives you a start. You need to know how much you've got in the product in order to set a realistic price.

Should your prices vary by region? Some 25-30 years ago when TV first came out, I'd see ads, "$9.95! Slightly higher, west of the Rockies." Did you ever see those? Do you see those anymore? I think that price differential went away mostly after the interstate highways came, because west of the Rockies was over the mountains, and now you can get trucks over the mountains in a pretty good fashion, or you can put the products on an airplane. But maybe your prices should vary by region? If there is a good reason for regional pricing, it should be considered.

Are there quantity discounts? If the customer buys 5 widgets or whatever you're selling, there is probably one price per unit. What if they buy 5,000? What are the competitors charging? Perhaps a quantity discount is in order.

Timing, often prices change by season. Having worked in the Christmas tree industry, I can assure you that you may wish to discount your trees on December 26th. The market is certainly time-sensitive for Christmas trees. So you have to think, when is the product wanted, when is it not wanted?

Are there price wars? That's a term we haven't heard in a long time, especially with gasoline. But you can have a price war in the cedar business.

And what form of payments do you expect? Will you take credit card? This goes back to that business plan. How are you going to run the business?

Placement:

Placement, better known as distribution is out third P.

You have the options of direct sales, mail order, retail, wholesale, through agents, regional vs. national, seasonal. Any and all of those will work, but before you commit, I challenge you to look at them closely. How does it fit YOUR business? How does it market YOUR product? YOUR service?

Promotion:

The fourth P is promotion. This is where you are going to focus on advertising.

Advertising is nothing more than disseminating information about your product. It's not just trying to make a sale, but getting the information out. This morning I was listening to a group having a conversation about making sales. One of the group said, "Well, I was called because I had a contact." And another said, "I was called because I knew somebody who knew somebody who knew somebody." Let people know what you're doing, even if you're not selling it to them. There are a number of ways to do that, but this meeting, I hope, is one of the best ways. Here, you get to meet people that you didn't know were doing something that you could use or you're doing something they didn't know that they could use.

Advertising also involves public and personal selling, sales promotions, publicities, public relations, and on and on. We've heard of self-promoters. Be a product promoter with a little bit of self-promotion.

There are found basic reasons to advertise: 1) raise consumer/customer awareness, remind customers of our product. A good example used this morning was Coca-cola. We're not raising awareness, but we're sure reminding you we're still out here. 2) to persuade customers to switch products. That's not crooked, that just honest competition business. You don't have to run down the other folks to tell what your good traits are. They have a nice product, but I have a better one and here's why, 3) Promote and persuade the customers, 4) and to improve and maintain the image of the business. Tylenol probably spent more money in advertising in a 6-month period than they had in 5 years. Remember why? When somebody poisoned the Tylenol bottle, they wanted to improve and maintain their image. That's a drastic thought. It's not good the way it occurred, but that's how they had to respond. Tylenol had to improve that image that they had in the market.

I heard this once from a professional marketer. He said, "There's only 2 times when you should advertise: 1) when you can afford to, and 2) when you can't afford to. Other than that you don't have to advertise." He went on to say, "When you can afford to, go after 'em, go get 'em. When you can't afford to, that means you're losing money and you'd better go out there and advertise."

How much to advertise depends your audience, the size of the market, and the size of your budget. Many people start with size of their budget and work their way up. Size of the market: If I was going to sell soybean meal to cattle farmers, I wouldn't go to New York City. No, I'd go right down the road from where I grew up. I would go to THAT market, THAT audience.

How big is the audience, say perhaps for the eastern redcedar market? I think we should think nationally, I really do, and internationally, because I know several people who have exported material around the world. Don't focus on the regional market unless you want to stay within transportation costs or other reason. I firmly believe we need to market redcedar nationally and internationally. I think the opportunities are there.

Now let's look at some of the ways to advertise. I'll talk about each one of these

separately, but this is just a quick list: yellow pages, television, radio, newspapers, magazines, posters, billboards, leaflets, telephone, and websites. If you do all those, you're going to fill up a day! So you'd better pick which one is best for you, your product, your budget, your audience, etc. Let's look at some of these methods individually:

Yellow Pages:

Everybody knows about the yellow pages. Customers may say, "Oh yeah, I'll look it up." However, I doubt that we have too many pages that say redcedar products. They probably say lumber or wood products. The two most common sections advertised in the yellow pages? It's attorneys and doctors. If you want to look up any yellow pages those are the categories with the most pages. How many times do you look at the yellow pages and find what you're looking for? I'd say 80% of the time. 20% you probably can't find what you want. Maybe you're not looking in the right place or maybe there are just too many listings. If you're a doctor and there's 47 pages of doctors, it's pretty hard for the customer to pick your ad out. Likewise, wood products might have a little less competition, and you might be on the same page, but does the term redcedar catch attention.

Often businesses use something that draws attention to their ad or results in the customer seeing their ad first. That's why some businesses use something like "Aardvark Building Materials" because they know that double A's come before anything. So there's a lot of aardvarks out there.

Television:

We all watch television. You can reach large audiences at once by television, but it IS expensive. We've made a culture in this country watching the Super Bowl ads. I forgot what the number was last year but I think it was something like $3 million for a 15-second ad. You probably will not market your redcedar products on the Super Bowl. With television, you can reach large audiences and it's expensive, but one exposure is not enough. Why do we get pounded and pounded and pounded with the same ads at a certain time? Simple, because they know who and where the market is. They know the demographics of who is watching at that time. As a private business, it's truly hard to make the TV dollar reach a large part of the target audience unless you provide coverage a number of times.

Newspapers:

Newspapers are pretty nice. You can reach a targeted audience, at least those who get the paper. A downside is that your ad can get buried among several others, and who reads a paper the next day?

Solicitation:

There may be some usefulness in direct mail solicitation, but likely only if the consumer is in the mood to purchase that particular product. Some 35 to 40 million credit card solicitations are mailed in this country every month! I shred them before I open them. I don't know what you do, but they're pretty easily ignored. Especially when it says addressed to occupant. They're gone.

Websites:

One of the most questions nowadays is "Is this going to be on a website? Websites provide a whole new system of marketing and advertising - highly visual, very interactive. Such messages as "do you want to buy this?"or "Put it in your shopping cart". Push a button and you've bought it. Interactive is important. It allows you to purchase instantly if you wish.

But there's lots of websites so there's lots of competition. Another of the disadvantages of websites is that they get out of date so quickly. Tomorrow you can go home and read about registering for this meeting I'm sure, but it won't do you any good to click online and register tomorrow, because the site's out of date. That's the same thing that can happen with products or prices.

Now let's say a little bit more about website marketing. One of the more recent terms that you will see is search engine optimization (SEO). The idea is to build your website so Yahoo, Google, or whatever search engine, finds you by using keywords or something. To take advantage of this technique, you need to use the hottest key words for your website marketing. Here's where I allow people to use 2-worded red cedar, because if you get on Yahoo and search for one-worded redcedar, the search engine responds back, "Do you mean Red Cedar?" It doesn't recognize redcedar as one word. So somewhere in that document you should spell it both ways, get the folks that know it's one word and get the ones who are ignorant enough to think that it's two words. Whatever their choice is, but at least they find you.

Put keywords in the right place, like in titles, headlines. Relate the key words directly to the content. Don't try to brag on something you aren't selling. Put in the right key words, those that make sense and use keywords that you want that search engine to grab a hold of. You don't just use key words at random- only about 5-6% of the text should contain keywords. And you place them in there where it makes the most impact.

The key to sales success is: trust, truth, reliability, understanding, service and time. Don't just be there. See the world through the customer's eye. What are they looking for? Provide personalized service and you have to work at it. It doesn't just happen overnight.

So, a quick summary:

First, form a business plan, you need that. Utilize the 4 P's of marketing: product, price, placement and promotion. The key to marketing success is building a personal relationship. And you will see that that is probably the most important. Work with your

customers on a personal basis. This being personal is probably the one thing that marketers are going to hit hardest in the next 5 years. We have become an electronically oriented society and it is becoming hard to get that personalized service.

Questions and Comments

Q. You mentioned that eastern redcedar is actually a juniper. You also mentioned that Western redcedar and Atlantic white-cedar are not cedars as well. What are they specifically?

A. Western redcedar is a *Thuja*. It is related to the Sequoias. If you look at a western redcedar leaf, it looks like an eastern arborvitae, which is also a *Thuja*. Atlantic white-cedar is a *Chamaecyparis*. It sort of stands out there by itself, but it is in the cypress family.

Q. You mentioned the snake deterrent for redcedar, that's the first time I'd ever heard of that.

A. When I saw it on the website, that's the first time I'd heard about it too. I cannot validate that to any degree. I just saw it advertised on one of the websites.

Q. Break a limb off of it and whack a snake with it!

A. A 20-gauge does a better job than that! That was an advertising comment made on a website, so no endorsements implied.

Product Specifications

Mike Brittain, Green Forest Products

Introduction

This next presentation is going to be by Mike Brittain on product specifications. Mike began in the forest products industry as a boy cutting cedar posts. He grew up in the family logging business, which was called Mountain Timber Company. Mike purchased the company and renamed it Americo Timber and Trading Company. He retired from that in 1997. In 2000 he began working as a consultant in contract sales for Green Forest Products with Waste Bio-Products Company, which sounds pretty hot nowadays. Mike spent numerous years working with cedar log exports and I think we are going to find this a very interesting 45 minutes, so come on up.

Presentation

It might be a little bit interesting but I'll bet it's not going to last 45 minutes. I'm not a very good speaker, but I can talk a lot, so anytime you have a question, it'll be a relief to me.

Q. Are we over yet!?

A. We've got two minutes left. I can't pass up a chance to share something I heard this morning when I came in. A fella asked me, "Do you know the last thing that goes through a bug's mind before he hits the windshield? His butt!" I just think that's great.

There's nothing about the logging industry that common sense won't fix. And I'd like to see how many in here are actually landowners. So, that's probably the direction that we want to take for this approach. If you've got marketable timber on your property and you want to sell it, there's a certain amount of specifications that you have to know about and understand in order to get your product to market and get the best value that you can get from it.

There are two standard sizes of length in the cedar industry. As you learned yesterday, one standard of size is 51 inches, that's 4 feet and 3 inches long. And if you want to add an inch to that your sawmill people will appreciate it when you get there with it. Those logs mostly go into camp material and end up in various other products. The other length for cedar logs is 8 foot 4 inches. Those two are the standards you can always feel safe with getting in the market and getting money out of. The bigger the diameter of the log the more redemption value it has once the mill buys it, so consequently you get better money for the bigger stuff than the small stuff. If you're in this area, the ideal log is an 8-inch log because most of the logs go into cants for re-saw and with an 8-inch log you can haul more and produce more and you can get better yield out of that log. And hopefully you get more money. The 8-foot logs go into log homes or decking or something of that nature and the bigger the log the better because when you're sawing lumber instead of cants, the more body, the more yield, the more gain, and again the more money.

I'd like to start out by talking about deck boards specifically because that's one of the new up and coming products that a lot of people aren't utilizing their cedar for. And a lot of what I'm going to be talking about, it's already been talked about today so if I repeat anything what you heard earlier, I'm sorry. But, because the nature of CCA and peoples' awareness and fears of CCA, cedar decking has become very popular. Do any of you land owners own your own mills? It's an ideal product that you can produce on the farm and get to town with a local builder and get your maximum yield out of. Cedar decking has to be 6 inch by an inch and a ¼. It has to be 5-quarter material because cedar is not as structurally strong as some other products like pine or oak. It needs to be just a little bit thicker when you take it to market.

Another product that's made out of your longer logs are the house logs. I've got a couple of pieces here. Here's the typical house log for a cedar house. This is delivered to the mill in a 6-½ inch block and it's milled down to 5 5/8 you can pass these around. One of these is a "do" and the other is a "don't." I bet you can figure the difference pretty easy.

And the side lumber of that product is your indoor paneling that comes in a tongue and groove. But if you want to maximize your lumber market, and if you're going to saw these, saw this in a 6 ½, 6 ½, take it to your log manufacturer. They're glad to get it and they mill it down into this product. And the side lumber off that, they mill into this product.

The specifications on your 51, 52 inch logs are such that they will produce a 17 quarter, in the industry it's called a 4 by wide, but in actuality it's a 17 quarter by as wide as that cant will make. Here's a 4 and ¼ or a 17-quarter block. They've sawed the side number off of it and then they cut that as wide as it will square and still slab. And then that goes to market. They cut that into slats for closet lining. But this piece here is also a 4-by-wide. This piece here is cut out of a 5-inch log. It's cut to its maximum value; they've merchandised it to its maximum. And it goes right in the same load with this product right here. But if you own your own mill the specifications are 17-quarter by as wide as the log will square and leave good clean corners. The end product of these cants is closet lining. And I think everybody here knows what closet lining is. You saw a bunch of this on the tour yesterday. And it becomes ever more popular because we know that cedar kills mold, mildew, fungus, and repels insects. It's an ideal for your closets, pantries, and cupboards.

Questions and Comments

Q. How does cedar as deck wood compare to other woods as it wears?
A. It wears faster than other wood, but it deteriorates slower than other wood. For example, if you put your cedar decking down with nails in a high traffic area, your wood will ward down around your nail heads if you don't put something on it. Because the nature of cedar itself, it's softer than other woods. But the longevity of that, it will outlast any other wood that you put down there with the exception of

cypress and possibly redwood, well redwood and cedar have about the same longevity.

Q. Now you mentioned using those for log homes. Is there any kind of a code or anything you have to be up to?
A. Anytime you use wood you need to code it for something just to keep it…

Q. No, no. Building codes or being up with state regulations?
A. As far as I know there's no specification for cedar different from any other wood. But every community has its own set of building codes. I can't tell you, you can build a log house downtown if the city ordinance says you can't. Is that what you mean? Or do you mean structurally?

Q. Structurally, compared to other building materials.
A. Well on a log home it'd all be the same, because it's an in-place structure. There wouldn't be any building codes different from any other log home.

Q. What about your decking?
A. Well, to the best of my knowledge there's no city, county, or state ordinance on decking, especially in regards to cedar. Now, you might have a community ordinance that you've all agreed that you won't have anything but a CCA, or a cedar deck. But I don't know of any ordinance specifications for a cedar deck. This is ideal for me, if you have questions. It's a lot easier for me than to invent something to say.

Q. You said what the requirements were. Did you say an inch and a quarter by 5?
A. The standard for the industry is an inch and a quarter by 6. And that's a market that hasn't been utilized near enough. Cedar decking is becoming ever more popular. It's very durable, attractive, and it's very satisfactory for the homeowner because it lasts so long. I'll out last a CCA deck big time.

Q. Doesn't is split awful bad when you try to nail it down? Do you have to drill it down or what?
A. If you screw it, it doesn't split too bad but if you get mean with it, it'll split.

Q. You're saying it lasts longer than a CCA. Where did you get that information from? Is that something that you could advertise as fact?
A. I'm sure you could. I think that's a known fact that that cedar will outlast it by far. I don't know that you can find it in a written form anywhere unless you'd want me to send you a note, copy it and give it to your building inspector.

This is another 8-inch specification. Now this is getting popular quick. This is house siding. I don't know if you've seen any of this or not. There's a lot of people using this. It's extremely attractive and it has good cash value for the producer. It takes a small machine to produce this.

Q. Now that's out of an 8-foot log?

A. Yes, out of an 8-foot log, and out of an 8-inch material. That's 5 quarter by 8-inch to produce that. And this is another byproduct of the log home industry. That's a side cut.

The specifications of cedar are determined by your local area. There's no generic specifications that I know of besides than the ones that are mentioned, other than wood fiber. That's a very new and highly demanded product that everyone should be thinking about. We're using wood fiber in everything. On your tour you saw us sifting sawdust. And that sawdust goes into several different materials but the one that's newest and the most active right now is concrete shingle. Why every one of us in here didn't invent a concrete shingle with wood fiber is beyond me. It's the simplest fact that you can think of, 'If you put wood fibers in this concrete instead of sand and it's lighter and stronger.' Who'd a thought it? But wood fiber is so new and so active that there are no set specifications. Different people use wood fiber for different things. I would speculate that most home owners or land owners if they have a saw mill, they have a band saw and that fiber would be attractive for anyone in the pet industry or anyone locally that has livestock. There wouldn't be any set specifications for that.

Q. That should work for the concrete siding?
A. Well as far as I know, it hasn't been used in siding. They use a long fiber in siding. They use fiberglass in your cement in your concrete floorboard, the web board. But that has strands of fiberglass in it, which if my understanding is correct that's how it was used there. But what they've done here is they really wanted to lighten that shingle up. Because when you put an artificial slate shingle, or a concrete shake, or a Spanish-style shingle on your house it needs no compound strength. There's no compression strength demand there. So that wood fiber is half the weight of sand. It lightens up your shingle and it's encapsulated in cement therefore it's weatherproof at this point.

But I've said about all I have to say about specifications. There's plenty that was covered this morning.

Q. The shingles. Is the fiber the only wood being utilized for that purpose?
A. We actually started trying to make LCM and get it to the oil fields. And because of that, the samples we sent were 60/40, cedar over oak. They liked the cedar. I think because the cedar has just a little bit longer fibers in the kerf dust. When we run the cedar logs over a ¼ inch saw, and the kerfs break on that, the length of the cedar fiber is just a touch longer than the oak fiber. It adds just a little bit of strength to it. But the oak fiber is just a little bit fuzzy and the consequent there is that it adds a little bit of strength to it and is a little better filler. So it makes a good blend for what we're trying to do. And on the LCM, Dr. McKinley touched earlier about lost circulation material, cedar is very attractive for all circulation material because it has oil and it floats faster. Cedar is used because of its longer fiber and its ability to bridge a lot faster. For example, you can put sawdust through a funnel. It bridges, it domes over and it won't go anywhere. They capitalize on that, on the nature of the

wood in the oil industry, petroleum industry, because when they drill and hit a fissure that cedar floats quick, goes to the top of that fissure, starts to bridge and as it bridges with itself then it starts filtering out the mud that comes from the cuttings. It seals that cavity off until that drill bit can get beyond that cavity. If that water escapes that drill bit and they can't keep those cuttings away from that bit, you've burned up a $160,000 bit in about 12 minutes. So, LCM is very important for that. And Oklahoma and Kansas and Texas are big users of LCM. But because they produce so much oil in Texas, the cedar oil is made from fiber that they have a lot of excess fiber and they can get their fiber into the oil fields cheaper than we could get ours into the fields. The logistics makes their fiber much more practical than ours. Although that fiber can be produced in the oil areas but it costs so much more to beat it into fiber than they can haul it out of Texas for almost nothing so it's not very attractive.

Q. Considering what you've talked about in cooperation of this wood into a concrete structure, can you foresee other uses that haven't been touched yet?

A. Well first of all I'll address new uses that we're all aware of; you know that we are now producing wood pellet fuel. We now produce composite decking. These things don't necessarily include cedar but the same thoughts will apply. And I'll speak about things that I know about because we supply the fiber that goes into composite decking. If you go into Lowe's and buy a board of choice deck, I supply the fiber for that. If you go into Home Depot and you buy composite decking called Evergreen, we supply the wood fiber for that. If you open a pop bottle or oil bottle, or whatever bottle, that little cap that comes off, that band snaps at the bottom. That's because it has our wood talc in it. With those thoughts in mind the exploitation of new ideas with wood fiber is just now coming to the forefront. There's all kinds of ideas that we can use wood fibers for. You're going to see wood fiber used in polish. Right now every new car in America, I'm told, has approximately 30 pounds of wood in it because they're using wood fiber in all of your composites to go into the interior and lower parts of your car where it needs added strength and durability. So all that is going to be included.

Now cedar can be used for that. For example, they use the oil cedar fiber from Texas into an evergreen composite board that goes to the west coast. Just because a cedar fiber is there, it's cheap and they can get it in that board easier than they can haul it up here.

Q. Do you think we have a supply as of right now? You should go to some of these old lumberyards or logging operations and see many feet deep piles of sawdust.

A. You haven't been there lately. The only piles of sawdust that you see are those on the borderline of compost. If there's any sawmill that still has any please call me. We're looking for it desperately. We can't find anywhere close to enough raw materials to supply our demand. A little plant where we sift sawdust, I'm sure one semi-load of oak sawdust per week. And my neighbor just up the road, close to the sawmill, put in a truck ramp. I saw that one evening after I went by there after they closed. And 2 days later I went back to see if I could buy his sawdust now that he could get his

sawdust over in one of our big trucks. And his answer was, "Well I just contracted on a one year contract to a wood pellet." So it's in high demand. If there's any good sawdust lying around there's a reason for it. There's something wrong. There is no waste in the wood industry today that I'm aware of. We take even the crushed, broken, ground pallets and sell that to future fuel chemical companies to make diesel fuel.

Q. How far can you haul the sawdust?
A. Well, not far. That's the whole problem. And I don't care a bit to tell you. I'll talk about my business and I won't talk about pricing to other peoples businesses. But at our plant and at Bradleyville and our sawdust plant, we pay $300 a load for 100 yards of oak sawdust. So we pay $3 a yard for that. Used to, they'd pay us $50 to haul it away. And we pay $425 for the same volume of cedar sawdust. So you can't haul it at $2 a mile on cost, you can't haul it a long way and make it work. In your case, it'd be good for you to work up your own. Mike from up south St. Louis is here and we talked earlier. I can't see why anybody wouldn't be making some concrete papers for the landscaping industry or flower bed stackers or parameter borders, anything to do with sawdust instead of sand or dirt or plastic or oil. Wood fiber would displace a lot of those products that cost so much money.

Q. It seems like using the sawdust in the concrete to make it lightweight like you do around fireplaces, furnaces… does it have an insulation factor?
A. Yeah, not that I know of. But that ought to be done.

Q. In any furnace they'll back it up with a lightweight and usually they'll mix it with vermiculite.
A. Vermiculite is attractive for the same reason that sawdust is because it's porous and has a better R-value and it's cheap to get a hold of. And I would argue strongly that wood fiber would replace vermiculite with being stronger with a better R-value and a cheaper price. I think it would be very attractive. I think it's just one of those things. It's kind of like concrete shingles. Nobody ever thought of it. And to answer his question, the future of wood fiber is so positive I just get excited! I mean there's so much going on and so much available with new technology and things that you can do. Very shortly we'll be beating trees into fiber.

Q. And fuel?
A. Future Fuel Chemical Company is producing biofuel this very day out of our wood fiber. I'll give you a quick break down. How many hillbillies in the room? I asked this question yesterday at the fiber plant, so those of you who were there, forgive me. But I'm gonna tell you that a hillbilly knows that if this was a kernel of corn, we can put this in a tank of water with a little bit of sugar and yeast. That yeast will eat the husk off of the corn; it will release the starch in the corn. We add bacteria to that and it eats the sugar and the bi-product of bacteria eating sugar is alcohol, right? Every hillbilly kid grows up knowing that. Now instead of this being a kernel of corn, let's propose that this is a single cell of plant cellulose. They have hybridized 4 enzymes that would eat the cell wall away from the cell, which releases that starch, which is a

simple sugar. You apply bacteria and the byproduct of that bacteria eating that simple sugar is a very simple alcohol. And that alcohol is added to the pork fat, the poultry fat in McDonald's cooking oil to produce bio-fuel. They produce 180 tanker loads of biofuel a week. And the bi-product of the wood in their bio-fuel is wood pellets.

Q. How's the construction with redcedar being used for a foundation?
A. You can use cedar anywhere you use redwood. Cedar and redwood have all the same properties with the exception of that you can't add the sapwood to the cedar. So as long as it's red, it has all the same properties of redwood. And you can use it in the same place you can use a redwood. One of the things we didn't talk about is mulch. The reason that cedar, redwood, and Cypress are so attractive for mulch and flowering plants is because they have a neutral pH factor. If you add hardwood mulch to your flowering plants, you've fixed the nitrogen in your soil and you'll starve your flowering plants. They'll live but they won't proper. So cedar, Cypress, and redwood are very attractive. Although, unlike redwood and Cypress, cedar has this natural oil called central, and we're back to where we started. It kills mold, mildew, and fungus and repels insects. It's a Godsend for the horticulture industry. If you've got roses with black spots on them, spider mites, you need cedar mulch. That takes care of that. But yeah, anywhere you use redwood; you can use cedar wood with the exception of the sapwood. The sapwood won't hold up.

Q. Do you have to over-size it any to any degree?
A. If it's dry you won't have a shrinkage factor other than if you damage it. I mean, I wouldn't set a concrete plant on a cedar board. But I wouldn't be afraid to put a stud wall to frame a house. But yeah, your sapwood is vulnerable to rot and cedar is not. There's very little oil in the sapwood; the oil is in the red heartwood.

Q. The treated wood we're getting today is so crooked and warped. I see that as an alternative.
A. I think It would be an excellent alternative, although be careful. Your cedar may be worth more as decking than it would be under your house.

Q. Have you got more than that one fiber plant?
A. Well this is kind of hard to understand: That fiber plant that you saw in Bradleyville is one that I own and my son runs. And we produce 4 semi loads of fiber a week. That is a separate entity than where I work. I'm a contact and sales rep to a company called Green Forest Products and we sell of 175-200 semi loads of wood fiber a week. So I kind of run two halves here. I'm sorry that's not easier to understand. I should've explained that before. But in the wood fiber plant, Green Forest Products, where I actually work, we use very little cedar. All of our cedar goes into horticultural mulch and we bag it. I wish Dr. McKinley had a picture of my mulch up there instead of Green Country today. But I forgive him - he's from Oklahoma and they are too.

Q. You know your decking and your house loading, as long as you have the right UV stuff on them would that hold the color like it is?
A. You just opened a big can of stuff here. There's an ongoing argument about cedar turning dark or cedar turning light and the value of a UV protector. Now I'm going to tell you from personal experience and this is opinion, not fact: The only thing that I've personally found where your cedar will maintain its color is Red Devil Sealer.

Q. Is that a urethane?
A. It's a urethane blend. It's a real thin urethane and I don't know what it has in it, but it's different from regular urethanes. And it's the only one I know of that's ever been…

Q. I've got a cedar fence in my back yard and it's been there 10 years. It looks just as fresh as the day I put it up.
A. What did you put on it?

Q. Every spring we put on CWF, Clear Wood Finish. You get it from any hardwood store, but you have to get the clear. They have different colors but get the clear.
A. Okay there's your man, because I've heard this argument 6 ways from Sunday. As a matter of fact the gentleman that I got these house log blocks from, his name is Dwight Hostetler and he's down between Green Forest and Bradleyville. He built a whole store out of hid cedar logs. His cedar is just about the color of this curtain. And it's just so dark that, it's just not as attractive as I think this pretty pink cedar is. I said, "Boy, Dwight. What'd you seal that with?" He said, "Isn't that pretty) He said I'd like to never find the sealer that suited me, that holds that color like this does.

Q. If you put anything below the finish, it gets that yellow, nasty look under it doesn't it?
A. Not as bad as pine. You can get a heavy poly that will blister from the inside out and it will turn yellow. I'm the last guy you need to talk to about finishing. You ask me about a sawmill and I'm fine.

Q. What about the sapwood on the decking? What percentage is sapwood? About half?
A. I would make sure that on my sapwood that I had a flush finish of redwood on the bottom and a complete finish of redwood on the top. I wouldn't turn a decking board with all the sapwood up and expect it to last forever. The sapwood just won't take the weather exposure that the redwood can.

Q. You can get to selling this stuff, what do they call…?
A. First of all whoever's buying it will tell you. They guy that applies that deck wood will know real quick, but to help you the less sapwood in it the better if you're going to make decking.

Q. What I've found for hardwood is that there's kind of a grading system for whether or not a knot is considered a defect in cedar.
A. A hollow knot is considered a defect but a sound knot is not.

Q. We always said there's two grades: good and bad.
A. That's a fair statement.

Q. Who says it's bad or who says it's good?
A. The end user. They'll tell you right quick. If you come deck my house I don't care if there are knots as big as a half dollar. To me that's character. But my wife will tell you that you'd better get that holey board, we don't want that.

Q. There's no industry standards?
A. There's no industry standards. And what I tried to say at the very first, everything that we're talking about is almost all new because cedar has never been in the forefront of the industry as it is today. Mr. Todd and I'd be glad to tell you that when we had our first cedar meetings, how many people did we have? Not very many, maybe 15? And look what we've done today. And more interest, awareness has become available for the population as a whole and cedar is becoming very, very popular.

Where this gentleman is from, I'm just going to share this in passing. I saw the most productive logging operation that I've ever seen. It was at Melavich, Kentucky. And I'll tell you the guys name here; it was two guys. My age is showing. They had a Hon delimber and a skidder. One guy would run out, he had a basket on the side of his skidder, with his skidder and his chainsaw and he'd limb up a cedar just as high as he could limb it. He'd cut them off; he'd cut 5 trees and lace them up on that ol' skidder out of the canyon he'd come just a bucking and a snorting. He'd unhook them at the delimber. If any of you know what a Hon delimber is, you stick the end of the log in the delimber and as it pulls it in. As it does, it's got 3 knives that blade and get all the limbs off as it comes in. It reaches the 8 foot 6 bump stop and a saw blade comes out and it gets cut off. That log falls off into a crate. When each crate gets full he takes his knuckle boom on the Hon and set that load over on the trailer. These two guys cut a semi-load of logs and took them into the mill for lunch. They came back after lunch and cut another semi-load for that afternoon.

Q. But they didn't last long.
A. Well that's not because they were willing to work, that's because the sheriff was looking. They forgot where they got their skidder. They probably forgot to take it back. I don't know that for a fact. I don't want to talk bad about anybody, but let me tell you they put the logs on the ground. And they got all their wood for free from the landowner because they pulled those trees out of there, top and all. They swept all the leaves and the rock clean. As soon as they got it cut the landowner went in there and sewed it with grass seed and it was done. All the brush was out on the top. When they left the job that landowner went out there, threw in a match in that giant brush pile, and burned it all up. If that was today, you could've called in a tub grinder and took all that slash, that free waste and ground it into mulch.

Q. Do you see very many people cutting 6 foot 6 inch logs?

A. No, we have one guy in our community that built privacy fence. He cut 6 foot 6 inch logs. He sawed them into ¾ by 6 and dog-eared them. And he made a pre-fab panel. He had a jig set up, two stringers; he just nailed his palens to his panels in place. He left extensions on each end of the stringers. You set up a panel of posts. He worked pretty good and he had a contract with Southern in Lumber Company. To be quite honest, I think they just worked him to death. He did it as long as he could handle it. The demand was greater and he just got sick of fighting it.

Q. I think that's a lot of fence makers. That's the only aggravating thing to me is that dog-earing them.
A. Well, you can buy a jig for that now. It's only so big. Ding, ding and it's done. It's laser activated. You just grab that board and slide it up there. You can buy it two ways. You can buy it with a two little saw cuts or you can buy it with an end cut. It will cut it flush, your end, cut it square, and then dog-ear. Those are available and they work very well; that's what the state factories use. But you know what? That's a business that needs to be looked at. Some of you home producers that like to just work on the farm. And you're looking for a market; you could make fence palens and get with a contractor. They're very attractive for you.

Q. That one thing that got me the job that I've got now is, he had been using western cedar. It's so thin you could read a newspaper through it.
A. And now you're talking about break. That western cedar will break if you get mean with it.

Q. But, I cut 15/16ths.
A. Isn't that a bit heavy to handle?

Q. He was happy with it.
A. I don't know what your stringers are made of. Do they hold them up?

Q. 2 x 4s. They're heavy. He said, "My boys don't like you!"
A. The fact of the matter is you're building a visual impairment. There's no reason why 3/4" or actually 5/8" won't do everything 15/16" wouldn't do.

Q. I think he's going to change, especially the 2x4 part of it because they use guns. And a 16-penny nail out of a gun and a 16-penny nail out of a box are two different things. The ones out of the gun will hardly get through the board
A. This is a classic example: there's no set guidelines in the industry, therefore the buyer and the seller need to agree on specifications. In the end, the user is going to determine how he's going to spend his money and what he's going to get.

Q. The problem I see with that is: how do you get everybody to switch over? Where we're from, 8 foot is standard. How do you get everybody to switch?
A. Well, were you here the last session? That's called marketing. You need to promote that particular product at the right place. Placement and promotion is what it takes to get it there. You have a good product, they just don't know it.

Q. It's not the placement and the product, it's all the slabs and byproduct that comes from it. Everybody wants to buy out the industry.
A. I'm not sure I understand.

Q. Where we're from we sell a lot of our slabs to American Woodcut. They want to buy all 8-foot material. They don't want to buy…
A. Yeah, that grinder needs that 8-foot because I'm sure it's going to make a difference on how it comes out in the end. American Wood grinds those slabs or shaves them. Well,
all it does is makes sure they get their money's worth since there's 8-foot there because that's the maximum length they can fit in that shaver box. If you put a 6-foot in there he's not getting maximum use out of his shaving box and therefore loses a little bit. It wouldn't be the end of the world if they throw some 6-footers in there. But, here again that's the end user, that's what he wants, that's where he spends his money, and that's what he expects to get. And you've got the alternative to either supply or think of something else. But to answer your question, if I understand it right, how do you market is like you market everything. You go to another end user that's building privacy fence, and I'm sure in Maysville, Kentucky there's a fencing company or two. Well then, there is, trust me, on the other side of the river in Cincinnati. You're what 40 miles from Cincinnati? So you go over there, there are plenty of fencing companies you can talk to and if you've got a product they can use, am I safe to say? They'd be glad to have it wouldn't they? It's not hard to compete, especially where you are, with western redcedar. Because by the time they get that cedar over there to make fencing, they have so much money to make your stuff really look good.

Q. So far nobody has said anything about how much some of this equipment is going to cost. Some of us smaller guys that don't have a million bucks in a bag, which is one of the big things.
A. His question is: How does the little guy like him come up with a million dollars worth of equipment? Is that fair?

Q. Yeah, a million, $500,000, whatever it takes to get started.
A. There's a demonstration today at 4:15. You're going to go out here; there's a young man. Are you here? Where's the sawmill guy? He makes a little band saw out here that I think is reasonably priced. And, I've had one that, if you're a homeowner or a landowner and you want something to do to make a little money, it would not be out of line to buy a small band saw mill to produce. We're talking, you could produce decking or fence palens; you're not going to set the world on fire. But you could produce some and it'd pay for itself. And you could make wages doing it. I couldn't do that; I don't have the patience. I want to pull that stick and if I had a shotgun retrieve I'd be happy, but I don't. But you don't have to have the biggest piece of equipment to saw cedar. Cedar is small and easily handled. And most guys in the cedar business especially in the woods, do it all by hand. Very few people in the cedar industry are cutting logs with big equipment. They use a farm tractor, a chainsaw, and an ole' pickup.

Q. What you were saying about fiber. The sack we had this morning had long grain as long as my finger. How do you get that? I'm familiar with a chipper, but it just produces small stuff. Is there a big difference in the price or what people will want for that?

A. Yes, all of the above. The question is what's the difference in chips and long fiber like you saw this morning? What you saw this morning goes through a modified hammer mill. You know what a hammer mill is? Okay a tub grinder is a modified hammer mill that can increase the volume 1,000 times. That tub grinder has a set of teeth, rippers, in the bottom of it that goes like this. And instead of chipping that wood, they shred it. I didn't see the mulch this morning that they had but most generally it's through an inch and a half or two inch screen that that wood fiber has to go through to escape and get out on the line. There's a distinct difference in the properties of the chip and the properties of the mulch and a distinct difference in the price. There's higher demand and higher price on mulch than there is in cedar chips. Everybody wants cedar mulch. It's extremely popular now and demand creates price, therefore you can get better money out of your mulch than you can out of chips. And chips aren't that attractive, especially in cedar. And what chips are made are usually used in playgrounds for safety chips under children swings and slides…

Q. That's not what's used in the horse barns and that kind of stuff?

A. It can be used in horse barns and that kind of stuff but they usually use pine because it's more available and more absorbent. I'll tell you one thing that your cedar will do in a horse barn, I'll cut down on your flies in your stables because the pheromone quality of the cedar in the barn, the flies can't smell each other well enough to reproduce. That's true. That's why cedar works in your closet. Moths cannot reproduce in your closet because they can't find each other to mate. That's pretty simple.

Q. Learn something new everyday!

A. Who'd a thunk it? Everybody ready for a break? I'll be here all day if you have questions.

Export Marketing

Kevin Combs, USDA APHIS

Introduction

Kevin Combs, plant health safeguarding specialist. Kevin is a graduate of Arkansas Tech University at Russellville, AR. He has worked with USDA, APHIS for 6 ½ years on invasive species issues, export certification, containment facilities and pest detection. And he's going to talk with us today about export marketing.

Presentation

Good afternoon. I'm going to talk mostly about export certification. I hope I didn't throw anybody off with my title of export marketing. I want to go into the certification portion of this and how it relates to redcedar.

For export certification, APHIS (Animal Plant Health Inspection Service) certifies that specific plants or plant products meet the import requirements of a certain country. Our main function with exports is help you get your commodity into the country you want to get in to. We go out and inspect your commodity and help you meet the requirements. Whether it's fumigation, verifying moisture content, or whatever the country needs from you to say that it's a clean product that meets their standards and can come in.

Export certification is also commonly referred to as Phytosanitary Certification. That's probably the most common term you're going to hear, 'I need a Phyto, not Fido.' Fido won't help you out too much. Phytosanitary simply means a clean plant; freedom from pests, soil, nematodes, and other plant pests. Missouri Department of Agriculture or your state agriculture agency or plant board can also issue these federal certificates. This is a sample copy. It's going to change just a little bit as we go to an online system.

If you are looking at exporting goods and you find you need a phytosanitary certificate, you'll need to complete what's known as a PPQ Form 572 – Application for Phytosanitary Certification. It lists information that we need to complete the certificate: your name, address information, who's importing it, the foreign country where it's going, what you're exporting, how much, distinguishing marks (that way we can help foreign customs identify it). We can't certify every single commodity. There's a list. The more processed it is the less likely it is we can issue a certificate. Logs, lumber, wood chips, that sort of thing, are all eligible for certification. Most hand-made goods, crafts, furniture, we can't issue certificates for. We have to go out and visually inspect it, verify the contents of your shipping container, the quantity of pallets that you're planning on sending out, etc.

Okay, so we need ample time, which we usually have, to get things ready unless it's a special treatment or a requirement has to be done. Each shipment must be reasonably free of pests or soil, it's kind of a loose interpretation but it's generally a 2% threshold for

non-injurious pests and soil. A shipment can't be certified if quarantine on significant pests is found on the commodity. Each country may provide a list of prohibited or quarantine significant pests.

If treatments have to go on the certificate, we have to be there to supervise the fumigation or dip or whatever need be.

We get all of our regulations for foreign countries from a database called EXCERPT, and it's just whatever the countries have given to us. You may find that the country is requiring something that we don't know about and that's because the country hasn't provided it to us. We don't run into that very often but it does happen. Therefore, we have to go through official channels and the foreign country provides written documentation so we can take whatever corrections need to be done. So, everything in EXCERPT is considered current and correct but it's not legally authoritative.

A lot of times you may be asked to present an import permit, and that's issued by a foreign country. They may require certain things of your shipment which supersedes any information that we have in EXCERPT. It's issued from the plant protection agency of the foreign country. A lot of times they'll ask for one, but you don't necessarily have to have one. It can be confusing. Usually explicitly stated in EXCERPT that you must absolutely have an IP (Import Permit) or we can't certify. More often than not you don't have to have one.

There are also time limits to be aware of during the certification process. Phytosanitary certificates must be issued within 30 days of certification. Other countries often have time requirements which must be met in addition to the U.S. policy.

And here's just a brief blurb on the International Standards for Phytosanitary Measures No. 15 (ISPN 15), which deals with the solid wood packing, pallets, crating. A list of countries that require it, and if a non-ISPN 15 country is requiring it we can maybe help you out and go through our phytosanitary issues management unit. But that's generally the list of countries right now that have signed on to it. We don't issue certificates for those. You get your stamp saying that it's been treated.

ISPN 15 Country List:
Argentina, Australia, Bolivia, Brazil, Canada, Chile, China Colombia, Costa Rica, Ecuador, Egypt, European Union, Guatemala, India, Korea, Mexico, New Zealand, Nigeria, Panama, Peru, Philippines, South Africa, Switzerland, Trinidad and Tobago, Turkey, United States, and Venezuela

I'm just going to go into a few countries, some of the regulations. Each is going to be different. Some don't require anything whatsoever for bringing in cedar. Some are pretty extensive. I've tried to get a sample from the largest importing nations. I don't want to overwhelm anyone, but some of them are complicated. It's just to give you a general feeling. If you have any questions about a specific country, just let me know and I can hash it out a little better. All requirements are subject to change at any time. There's no

fixed time period. I have run into cases where I've told somebody one thing and a week later the country has changed slightly how they want to do it. It's not set in stone for all time.

Country Requirements as of 06/23/2009

Australia:

If you're going to be sending logs, they say an import permit is required. It's suggested you get one but you can probably import without one unless they say you absolutely have to have one. They are kind of a hassle to get. And they always have to be imported through certain ports, which is a pretty common requirement for countries. Certain ports will handle certain materials. Free of plant materials, animal residue, seeds, soil and bark. But if you see no fumigating action is required, no sampling. It's just a pretty general requirement. On this I would go out and look at logs. If I didn't find a major infestation it would be good to ship, no treatments would be needed, provided there's no bark. It can go as just logs.

Lumber must also be imported through designated ports. If the wood product exceeds 200mm or 7.8 inches or in all dimensions, an import permit is required and you must absolutely have that import permit. If it's less, then an import permit is not needed. The lumber must also be free of bark and if the lumber is not treated before exportation it is subject to treatment or full inspection on arrival. That's, I assume, if they find pests or a problem with it they will look at it or fumigate it.

Sawdust: this includes but is not limited to: briquettes, pellets made from compressed wood, charcoal, chunks, chips or bits, sawdust, sawdust powder or wood shavings and any other timber byproducts that are not used for packing or for further process. These conditions do not include materials used as packing and boxes and materials used in the catering industry. Excluded are sawdust, or oak balls, chips and cubes, used in wine-making. You've got to have an importing permit for this as well. It's mandatory.

Round wood: they define this as a length of cut tree generally having a round cross-section such as log or bolt. This is also subject to the length, width, depth requirement as well.

European Union:

For all wood: any logs, sawed wood or chips, sawdust, wood waste or scrap, pellet container or other packing material… which contains all or part of its natural, round surface with or without bark. It has to be free from this list of pests: nematode, pine-spruce beetle, some of the other wood boring bark beetles are listed. It's a pretty large range of pests there.

Logs: a phytosanitary certificate is required. Logs may be fumigated with methyl bromide and that's something we've been asked to witness. We do methyl bromide

fumigations in Kansas City and St. Louis. Heat treatment is not an option for logs so we do a fair amount of log fumigations for all species.

Sawed wood and lumber: this includes sawed wood and lumber that has not kept its natural round shape with or without bark. Either an industry issued mill certificate indicating heat treatment or a phytosanitary certificate with the moisture content of the wood verified as below 20%.

Chips, wood waste, scrap, etc: a phytosanitary certificate is required. I've got to certify that the product is free of Formosan termites. They are usually found in Louisiana, and Mississippi, but mostly Louisiana, New Orleans, so this area should be free of it. The wood must also be heat treated for 30 minutes at 56 degrees C.

Mexico:

Logs: a phytosanitary certificate is required. I've got to verify that logs are free of Formosan termites, and just any wood bark beetle. And specifically, it's got to be free from pinewood nematode and inspector, which is any sawyer beetle.

Conifer logs are enterable in Mexico but only if they can be certified as being free from pinewood nematode and inspector. So we can't determine the distribution of the pests in the U.S. We have a pretty good idea, but we don't know for sure.

We don't certify unless there's an import permit. We have to have an import permit before we certify because we can't attest to the presence or absence of pinewood nematode or sawyer beetle, which exist pretty much everywhere.

This is for new sawn wood, which includes lumber: the lumber has to be free of certain quarantined pests - Formosan termite and a few other pests.

Dried wood: at 20% or less humidity, you can't have bark on it, fumigation certificate is required, specifying the product received treatment at origin or it can be done at the point of entry at the importer's expense. Sawn wood with more than 20% humidity, which also can't have bark, phytosanitary certificate is required, fumigation is required and the treatment must be recorded on the certificate, which means we have to be there to witness it. And also if you don't want it done here you can have it done at the point of entry at your expense as well.

Kiln dried wood: if you have a certificate for kiln drying then a phytosanitary certificate is not required.

Wood chips to Mexico: a phytosanitary certificate and an import permit are required. The chips must be dried from wood with a moisture content of 20% or less and free from bark and Formosan termite. Also a certificate of origin is required and the wood will be fumigated upon arrival to Mexico.

China:

All products must be free from pinewood nematode and other harmful organisms, there's a pretty long list that I have to look for when I go out and inspect. I usually don't find anything, a lot of it is things that we don't have in the area.

Logs: this also includes cants: an import permit or a contract to sale is required. Most people have a contract of sale, at least in my experience. Logs must be sampled for pinewood nematode. And logs require treatment with methyl bromide for wood bores. Without bark, phytosanitary certificate and import permit are required. Logs without bark do not require treatment, but bark left on the surface area of the logs must be less than 5% of the surface area. It has to be certified on the form that logs in the shipment that are without bark are less than the 5%.

Sawed wood and lumber: this includes anything that has not kept its natural round surface, with or without bark. Phytosanitary certificate and import permit required. Wood must have undergone appropriate heat treatment to achieve minimum wood core temperature of 56 degrees for 30 minutes. Phytosanitary certification can be divided for consignments destined to China based upon a mill certificate of the type described in the summary for European Union countries or other sufficient proof of heat treatment. Cants may be considered for this treatment if dimensions allow for effective treatment as specified above. Of course the treatment must be monitored by us or a state agricultural agency.

Wood in the form of chips or particles: wood waste, scraps, apart from conifers, phytosanitary certificate and import permit required. The chips must be treated with either phosphine or methyl bromide.

Taiwan:

Logs and lumber: a phyto is required and it must be free from harmful organisms, especially pinewood nematode and long-horned beetle. No pinewood nematode testing is required.

Questions and Comments

Q. Say we call you on Monday, how long until you come out to inspect?
A. It depends on where you are. A lot of my places, I can only hit once a week. I have so many places.

Q. What about if you loaded the container and sent it to the rail yard or something?
A. Usually not. We like to look at it before it goes into the container. If you're doing lumber and you absolutely have to stick it into a container, that's something we can look at. It's preferred that it's on site.

Q. Since we're talking about cedar and nothing else, has there ever been a country or a company requiring a phytosanitary certificate on all cedar?

From Audience: Oh yeah, I do it all the time. I do a phyto on just about every load that goes to China.

Q. You said you can't give a certificate on crafts or processed products like furniture. Does that mean they aren't required or you can't issue it?
A. We can't issue it. It's an international agreement that things like that don't go on the certificate. And really they don't need certification they're so highly processed. The pest risk would be low. Cedar is low to begin with.

Q. How do you determine if there are no bugs in it?
A. I've got to go out and look. I walk around and look. And 99 times out of 100, I don't find anything, especially in cedar.

Q. Have you ever found anything?
From Audience: No, I've not found anybody that's found any nematodes, not for cedar?
A. That's something we'll get to. They finally removed the nematode sampling for China.

Q. I thought they stopped it all. I guess this China deal is new.
A. Well they relaxed it somewhat. I don't think we have to have sampling.

Q. How's this different then palleting and crating.
A. We don't issue certificates for pallets and crates, but you have to have those heat-treated and an accredited stamp on them.

Q. For bugs right? It's the same deal?
A. Essentially. We can't run out and inspect every single packing shipment, that's the only difference.

Q. So the nematode is not a big factor?
A. It never really was, but the requirement was always there.

Q. Do we make them do the same thing on their end when they send us something?
From Audience: Our phyto requirements in the U.S. are tougher than on what goes out. If we import a load of logs from China we require a lot more inspection than what they require from us.

Q. Isn't that where our beetle and stuff has come from, that started in Chicago because China sent something that wasn't inspected?
From Audience: That's how we get all our pests. It's not because we didn't require them to inspect, they just didn't do it.
From Audience: Well an inspection isn't going to solve the bug problem.

Q. How about the one time we export any cedar and we had to be totally bark free? Is it still that way?
A. It depends on where you're going. Every country is going to be different.

Q. What about China?
A. I can't remember what the requirements are for bark. It may be 5%.

Q. So did I understand it right, it has to be fumigated?
A. No, that's coming in. That's imported to the U.S. And I don't even know if that's a requirement. I don't deal with imports anymore.
From Audience: If it gets to China and they even find one ant in a container they will fumigate it and charge you with it. I know because I had 6 of them, last month.

Q. Really to get rid of the bugs, put it at a set temperature for a certain period of time to guarantee there are no bugs.
A: There are a lot of countries that require that, drying certification.

Q. That's what it has really come to with pallets; I hope it doesn't come to that with cedar products.
A. With pallets it depends on what country you're sending it to. It kind of varies from country to country.

Q. Well now hardwoods are included to, right? For pallets or crating or anything?
A. Right.

Q. What does it usually cost to get them inspected?
A. I'm not sure what the state's doing. Ours is $50. There's a proposal to bring it up to $99 starting in September or October. I don't know if that will go through or not, but it could be more expensive.

That's a lot of requirements that I just kind of rambled through. If you have any specific questions I'll take them. Or you can call me if you think of them later, maybe another country, something that wasn't covered, a commodity that wasn't covered.

Q. If you pay to have it inspected and then once it gets there they say it has something in it… then what?
From Audience: No, the government won't cover it. You're in trouble.
A. That's right. If you pick up a pile of dirt with a fork lift after I left, you're liable.
From Audience: That's really no joke. Dirt gets on it. One time I had that happen. Dirt got in on the forklift and I think they found an ant in it and it cost me $200 to get in inspected and fumigated. I had 6 last month, they found one ant in one of the containers and they went back and inspected periodically throughout the month.
A. Yep, I've heard of that happening.

Chain Saw Safety

Greg Hanks, Stihl Corporation

Presentation

We've got chain saw features, chain saw maintenance, chain sharpening, apparel and operating your saw. Let's first look at operating. We can then come back and look at some others.

Do you know about the gun sights on chain saws? When you stand behind the saw, let's say you lost the line, and it goes all the way around like this. Most lines are at right angles to the bark. You're standing behind the saw and you figured out which way you want the tree to go at this point. The tree is here. Stand behind the saw, you start your cut, actually line up your cut, the sight with the target. It will help you line up, a little bit right, left. You've got to make that cut and keep that line on the target. I learned that and it's amazing how that has improved my accuracy. I'm still not perfect but lots of folks don't know about that line.

While we're waiting, do you know about the reactive forces of sawing? Okay. You know when you cut from the bottom here; it pulls you into whatever you are cutting. If you cut on top, it pushes you out. If you cut up on this corner you get the kick-back. Push, pull, kick. If you get to where you want to start a plunge cut, or a board cut, that's on this corner here. I'm not ready to try that. Push, pull, kick are the reactive forces. So if you're ever sawing a boat, it really becomes hard because when you're in a boat and you saw with this side, the pull side, it will pull you to the tree and keep you there. If you decide to flip the saw over, you've made a major notch. Then you want to go to the back of the tree and do a back pedal. It pushes you out of the cut so the guy running the motor has to be fired up in keeping you there or else you have to drive around the tree on the other side and you can continue cutting.

Keeping track of that is good because it always involves proper stance when you're trying to saw. The power in the saw can throw you off balance and that leads to the possibility of bad things happening to people.

They will probably go over this during the safety features of the saw. The interlocking, trigger. I can't pull the trigger unless that thing is down. It will saw that for you. An example would be, I'm walking across a landing on ice and I slip. It's not good. The chain blade which could always be the arm, but if you hit something with the kick back corner and it comes back to visit you, the inertia break or this hand operated deal can kick in and stop the chain very, very quickly. That's a nice feature, and then you only get hit in the head with the bar and no chain moving. That's better than the alternative. I'm sure that can happen.

There's a little aluminum thing down here, a hook-looking thing. Should you ever not keep your chain tight enough or you hit a cedar limb and it throws the chain off, this thing helps wad the chain up. Notice how the chain comes off and it spins. It comes back

here and can come back to your hands. That keeps it wadded up here. It's wider in the stirrup. Notice how the handle is wider where your hand goes and on the other side, it also kind of helps protect your hands should the chain flip back.

Then, they are harder to see but there are these cool little handle vibration things here. I don't know how many there are; seems like about 5. Here's one, here's one. There's probably some up inside somewhere. It insulates the motor vibrations from us so we don't end up with that sore hand thing anymore.

I can say the low profile bar is not as wide as a solid bar, but the time you get the chain on it, it's only what, 4-inch wide or something like that. With the low profile bar, it helps keep that kickback corner a lot smaller. It's a smaller target.

These small projections on the saw - people call them rags, rakers; they are depth gages. They determine how much wood this tooth can bite off. So if someone's in a big hurry the file will become low and it will become a lot faster. It also throws a lot more vibration. And it will get them into a kick back situation quicker.

The concept is what will naturally cause kick back, is that the depth gage buries itself in the wood. If you hit a branch, you hit a log, you hit whatever and the depth gage buries into the wood. It says, "Oh wow, I can take a great big bite of wood." Only the motor doesn't have enough power to take that cut and it stops.

But anyway that ramp on there tends to not let the depth gage bury itself into wood as much. It doesn't get you away from it; it just kind of minimizes.

So when I go to the forest, woods, whenever I'm working with one of these things, I always have a little visit with myself and remind myself that this is one of the most dangerous pieces of consumer equipment on the market. I can get hurt real quick so be careful. And the bar is much like a loaded weapon and I think in rifle or shotgun, pistol training, never point a weapon at anything you don't want to shoot, or to get shot. And that's kind of the way I look at the chain saw bar. Don't put it against anything you don't want cut. It's all on me making decisions and paying attention. I'm the first line of defense going home safely at the end of the day.

Did I leave anything out on the safety features?

Questions and Comments

Q. I've seen the line before…
A. I've got an old McCullough, 1980 version, and sure enough it's got sight lines on it. So they've been on saws for a long period of time.

Q. You're not cutting cypress are you?

A. No. Let's not go there. It was real hot, let's put it that way. The water was about yay deep.

When you're sharpening you get the wire edge up on top or the side? Do the same thing. It's usually from doing the same thing, probably pushing down or holding up too high on the tooth. It's trying to get down into the gullet side of the tooth. Are you using the electric one? One that you bring your arm in like this?

Q. What about using a grinder?
Q. That's what I'm saying. I spent $400 bucks on one of those grinder things. The only time I ever put them on a saw is due to the simple fact that if I need to touch that saw up. Like if I got to a rock or I got into a piece of metal or something. Then I will take it off and will grind it. You have to worry about your angle on each individual tooth. And that could be a problem when you put that grinder on there.

The book is kind of void of a lot of pictures; they always help. I'm not sure it goes into; no it doesn't show any pictures of filing. If you get a hold of a chain book it will have some pictures in it that will help. I mean, walking around here trying to talk about angles on something this small, I'm not sure we can adequately demonstrate what we're talking about. There's what, three different angles to worry about when you're filing a chain. You can talk about them and as you look down on top of the chain you notice that the top of the tooth runs off at an angle. Then there's the angle that's actually under the top of the tube that you have to think about. Then there's the side of the tooth and that has an angle also. You've got the top plate, the hook, and then the side plate angle in it. And obviously the depth gage.

Q. Are those marked on those teeth right there?
A. There is an embossment on the back of the tooth that would kind of help you line up. It's best to have a file gage. It helps a lot.

Q. What file angle do you use?

A. 30 degrees is the angle on the top plate. The other angles are kind of set by the angle you hold the file and the diameter of the file. And I don't recall right off the top of my head, but it seems like .10 of an inch is about the right depth. The depth gage should be filed below the top of the tube. I think that's right.

Q. It just varies if you're cutting softwood, cedar, or hardwood. Take a smaller bite with hardwood.
A. When you order the appropriate bar and chain and so forth. There is piece of information on the bar itself. And it's probably different on each. Usually there's a little piece of information, it may be buried somewhere else. It tells you the pitch of the chain and you can measure that by measuring between three of the rivets. That would give you 5 by 2 and that gives you pitch. It will tell you the length of the bar. This is 20 inches. It will tell you the gap, the rail, how wide the rail is. In this case it's .63 and it will tell you the number of drivers on the chain. In this case it is, it

looks like 81, which seems like a large number but it's a small chain. I guess I'm just thinking about a bigger chain that's got 50 something. That information is there but when you have to replace the bar and the chain you have to know that stuff. Then obviously if you have a sprocket nose up here, that's what these 4 rivets are about up here; it helps put the chain around the bar. It cuts down on wear and it cuts down on heat.

Q. Can you go through your starting procedures?
A. If I'm going to start it, I'm not dressed appropriately first of all. I want chaps, hard had, with a face, eye, ear protection. I want gloves, boots, and long pants. Starting procedures: you get the gorillas out here in the forest and know how to do this number. I ain't near horse enough to do that. In fact one of our mechanics, I thought, raised a very good point. As soon as you do this, the motor always goes to the end of the rope and it's really, really hard on starters.

Q. That will put 6 inches extra rope on the end of it the first time you break it. Then it kicks it on down to your foot and you've got your finger on that trigger.
A. Yeah, there you go. We got this puppy started this way and it's running wide open at that point and once I set the chain break and it's flying around out here and I have no control. I like having control as much as possible.

Anyway, put one foot in the stirrup; make sure that you aren't running the chain. It will probably tell you to set the chain break, do the choke and all that good stuff, make sure the on switch is on, and start. But I've got three points of contact: the ground, my foot, and my hand. Basically I'm not really going to go anywhere.

The other technique is hooking it behind my knee. I've eliminated one point of contact but it's an acceptable way to start. I've got the chain break set; I'm good to go that way. It's quick; it's really fast. So probably in the morning I start by putting it on the ground first.

Q. How much does the electric start run?
A. I don't know.

So, the other part is you're working. You cut a tree down, you're limbing it out and you want to keep the log between you and the bar. It is acceptable to cut on both sides but you want to be careful if you're walking out you don't want to kick a moving chain. When you get done with the tree and it's time to go to the next one or just if you have to clear brush for a path, just set the break. And then there's no chance that something can get away from you. You learn pretty quickly. A coasting chain can do a lot of damage. It's got no power because it's coasting but it's sharp as all get out. If you've done your sharpening job right it will cut through lots of stuff.

Safety apparel, we haven't talked about that and we ought to. They make great Christmas presents if nothing else. But they're good. And consumer product safety commission several years ago came up with a diagram, which I didn't bring. Hindsight is always

20/20. But what it did is show occurrences of chain saw related accidents. You can imagine that there is a lot on the left leg, it's the one usually closest to the chain. There's some on this leg and a lot on the left hand. There were some right up in here and some on either side. Now you've got an artery on either side here. And there's some on the feet. When you think about the way the safety apparel is designed, they want us to wear leather gloves but you can also get some of those that have some of that Kevlar material in the backs. They'll make boots with Kevlar, or steel-toes. The chaps themselves are set up to want them to come down pretty low on your leg, not way up here. But they're designed to stop a chain, or at least slow it down. They will stop it but it may take a bit, but they will slow it down maybe that fraction for instant reaction time. We've attached chaps on logs and sawed them. The way they work is all the fibers in the chaps, the chain cuts through them and they pull fibers and it goes down here and wads up on the sprocket and up on this it stops the chain. It's kind of a slow process. This thing is moving at however fast it moves, 40 mph or whatever, it's a pretty slow process really, but it will stop a chain and it will take you an hour to dig it all out of the sprockets. We've stopped chains from going all the way into the log on demonstration. So chaps have that function. They are terribly hot. Again cut early in the morning or whatever, it's better than going to the emergency room. You can get pants with the Kevlar fabric or the polyester fabric that's also cut resistant. They're handy; they typically don't have anything way up in here but there doesn't seem to be much of a probability of getting cut in the waist area.

Hard hats are for protecting the computer (head). You want to think about what you're doing when you're out there so you need a hard hat.

Obviously the ear protection is for cutting down on the screaming of the saw.

And the eye protection keeps you from getting all of that grit and crap in your face when you cut. If you go at it you're going to get dust and grit in your face. A screen can be attached to the hard hat and comes down but really it's not enough. You really need some safety glasses or something behind that.

Q. I'll add this part right here I read something in one of my logging safety courses that approximately 60-70% of all chain saw injuries actually come from after the tree is cut and you're walking away. As that tree falls it's going to have dead branches up there and that's why you want that helmet. And that's why if you want to forgo something, forgo the steel-toed boots, and wear the helmet. If you don't, like he said, you're going to be knocking out the computer. It's not going to do you any good to run then.

A. We don't have a tree to size up but we can talk through it.

Q. There's another thing on those Kevlar chaps; you don't ever want to sew them if they get ripped. If you sew them, that fabric won't stop a saw.

A. That's right. The other thing is look at the laundry instructions, because they get all full of oil and cedar resin or pine resin or whatever. Once they get that filtered, they cease to work real well. So they can be laundered and washing machines work fine but read the label to make sure that it is washing machine and not dry-clean. I think

most of them are set up for washing machines. And I've washed mine a time or two. But that oil renders that fabric worthless. You know how oily you get after a day of running the saw. So that's the second point, yeah if they get cut throw them away and start over. They've been compromised.

With the crown and the tree, what you're looking for is it heavy over here or is it heavy to the left? Remember that. You go to 90 degrees of where you want the tree to fall. I'm going to go over there and do the same thing. It's a little bit like by the numbers like how they teach you to shoot a rifle in the military. This time you're looking does it lean toward where you want to fall it or away from it. Take more information. You do the same thing with the little circle-y thing when you look for an imbalance in the crown.

It's a good idea to look down if you're dealing with lean, say side lean. What that's telling you is which side of the tree you actually want to stand on when you're actually doing the back cut and it's tipping over. You want to be on the safe side so if everything fails the tree is likely to fall away from you. So you want to pick the safe side.

Back lean, if you've got that, we want to know how much. How many feet? Where do you think the line will drop from the crown? Look at it and measure it. Is it 2 feet, 4 feet, 6 feet, what is it? It will help you determine how many 1-inch wedges you need typically in the direction you want it to go. There's a limit to the amount a wedge will lift. I don't have that chart with me, but a one-inch wedge can overcome 3-4 feet of lean. It will lift a little bit. Double the wedges if you need to and it will lift some more. At that point, depending on your skill level, you might want to call a professional tree cutter to do that. Hopefully they know all about this stuff. Also it will also determine, when you put the notch and the back cut in, use a wedge to support the notch. But this leaning, say one way and you're on the other side; you still want to support that so it doesn't crush the wedge.

Also while you're doing this, you're looking for vines that are tangled up in the top and going over this other dead tree. You're looking for loose branches that are already there. If you're down in Springfield there are lots of loose branches. I've noticed that since that ice storm. There are loose branches just about everywhere. You're looking for dead branches that might break off unexpectedly. Rotten places in the stem of the tree that may cause a weak point, it all goes into the computer. You're looking for where the tree is going to fall, is there something out there, another dead tree out there or something out there that you might hit and it in turn flips something back at you, or something that will hit that tree over here. It's a lot to keep track of.

Q. That's why they call it fun.
A. That's right. It's a lot to keep track of. It's not boring.

You can pick out an escape path too, about 45 degrees away from where you think the tree is going to fall. Make sure it's cleared out, or at least that there's nothing there that you're going to trip on. What you don't want to have happen, say it's got big branches and they stick out from the side, they hit and they've got enough diameter that they can actually lift the butt of the tree up and throw it backwards. That can happen. Or miss

something in the tree you cut, it falls and hits a tree and that in turn causes it to spring back. That's why with the 45 degree angle thing, you want to be going away. Once you see the tree going, you get away from it.

Q. You should never see it hit the ground.
A. Nope, you're already picking out your next tree. If you've done everything right you really don't need to see it hit the ground, if you've been paying attention. The branches can come flying from any direction, so you definitely need to be paying attention.

Notches: the thing to remember about notches, and you can use an open-faced notch or more traditional. Open-face is more like a 90-degree angle and traditional is more closed. The thing to remember about the notch is that if you've made the top cut and the undercut you want the corners to touch. You don't have that thing called bypass where you've made your top cut and coming in on the undercut of the notch and you saw past where that top cut stops. It's called bypass and what it does is sets up a weak point. It makes that side of the notch weak. If you get the corners to touch and you don't worry about if that corner's weak, that tree can lean in that direction. It may not go where you want it to go. It goes and hangs up somewhere; or it hits the truck. Hopefully you move the truck. It goes where you want it to go, that's the important part. The way we learn about the open face notch, it's kind of interesting to think about that 90-degree angle on the notch and demonstrate that. On the back cut that tree begins to fall, let the hinge wood in there. It controls all the way to the top of the trees on the ground. I've actually had to walk up and actually cut the hinge off and release the tree from the stump. You've got control all the way or most of the way down. That little notch that we all originally learned about is at an acute angle. I don't know if I can demonstrate, It's like this. When the tree starts to fall it closes and the tree is at this angle. It's going to go somewhere; you don't necessarily have control of it all the way down. Control of it all the way down is important.

Q. I know one of the safety things the guys get into back home is they hang up a tree and they decide to cut the tree that it's hung up in. Well essentially you've got one tree hanging in another and you're cutting the one underneath it and it ends up falling on them, the one that's hung up.

Okay, the trick that we learned on the open face notch, and it will work on any of them, if you do that top part first and what it is, that curve where the wood used to be, you can look down in it. When you start that bottom part of that notch you can look in there in that curve cut and that chain emerges and okay, don't cut anymore over there. You've cut through on this side and you know that the corners are going to touch on your notch. And look down that curve. It's harder to talk about it; it's easier to demonstrate so hopefully that makes sense. And usually I've always learned to go do the bottom part first and then top part, a big chance for bypass. It takes a little self plan to get used to the top part of the notch first. You get used to that.

Q. Just be advised, those big open-faced notches, when you measure it for logs that I'm going to be buying, start measuring from where you start that big notch out because I'm not paying for that big notch.

A. That's the downside. That's a good point. A lot of times at a sawmill a guy can use a not a 90, but a 70 works pretty good too, which is a way to put it on the stump, that's harder to do basically.

Q. I teach my people to do an inversion where they come in and make the angle off of the bottom side and then come across on it like that so they can actually see where they are cutting into the angle, that way when we get the log down we still have some of the control going across. You're going to lose some down at the stump but most of what I'm cutting anyway is cedar so I'm going to lose that anyway. I want to cut up and then across that way when that tree falls you're still getting that hinge that's on the backside. So you're going to have your control and when that log is down you're not losing 6 inches on there that I'm going to dock you for. Because when I catch you doing it on my job site on my payroll, that just cost me 15 minutes because if you're going to end up taking my time and have to re-cut it off. So if you can you're going to lose a little bit on the bottom but you can also cut it from the bottom and keep the same hinges.

A. Yes, good point. If you're cutting stages you'll have the same problem and he won't buy. He won't pay you for all the sage during that because he's going to lose some. A lot of times in the sawmill they will cut that off. Now cedar is small-diameter trees, your chances of getting a big notch is quite possible. How much do you come in on the notch? Go to breast height, forestry always talks about breast height, 4 ½ feet above the ground. See these places that you're measuring. Measure it and estimate its diameter. You want to go the length of the notch, not how far it goes into the tree but the length of the notch across the stem is 80% of that breast height diameter. I think the old books always talked about, oh you go in and you stand about 1/3. Only using it as a method you don't go in there do you? It lets you still have control.

The hinge, we've talked about that. The notch determines which direction the tree is going to go. The hinge is actually giving you control, it's like a door hinge. It's a strip of wood across the stem right behind the notch.

How do you determine the width of the hinge? Again go to breast height diameter and take 10% as a starting point. And because every tree is just a little bit different, species to species, oaks are different from cedars are different from pines are different from hickories. So the 10% is a starting point. You begin with frozen wood and wood that's been out there. The 10% is a starting point, all be different. But you want to allow that hinge you want something so you may start at the 10%, which for a 12-inch tree it's about an inch, you may end up with about ¾ of an inch. As you work through the day you will develop a feel for it. They've got a picture here, this one with the black thing with angles. The 80% of the diameter and that's the length of the notch, you're going to have to go to the wood that isn't to the sides and just make some cuts, so at least when it's in and it doesn't pull splinters. That's another thing that will make you mad, if I pull splinters on you're good wood.

Another thing that you've gotten me for, if you bought the timber and I'm out there with a saw, you notice that there's not a whole lot of distance between here and here. That thing is designed to run almost on the ground. We always say to allow a foot for stump height. Well I got chewed up for doing that because it was costing the boss about a foot. That saw is designed to run nearly on the ground. Get used to it. So there's that.

Page 20 shows the hinge. We haven't talked about a fat cut, which is going to release the tree. I think they do show, on page 21, the use of a wedge. They do that. And I'm not going to attempt to do a plunge cut here. It's probably better demonstrated then once you've demonstrated you allow people to try it and get a feel on it. Get people started. Go find a 6, 8-inch diameter tree and cut it off, about yay high. Then take your saw, slab off 3 sides, or you could stab off 4, slab off 3. Get folks used to using the attack corner and starting the cut. Now, reactive forces act up again: push, pull, kick. It should go into that plunge cut. The tricky thing about using one that small is that you don't want the bar to emerge on any of the cut faces; it's a little bit of a decision thing.

Thanks for paying attention and asking questions.

Redcedar Furniture Making

Mike Parvi, Cedar Mike

Introduction

Mike Parvi began 8 years ago when he was assisting another local furniture maker in the Butterfield area. He eventually branched off on his own making picture frames and scrap lumber; he learned by doing. His next projects were cedar benches, custom beds and unique, one-of-a-kind pieces. Mike said he is not interested in duplication but prefers customized pieces to fit each unique owner. Mike, take it away.

Presentation

Hi, I've never given a speech before in my life. I've got chills right now. I'll talk about that and benches and I just got into this. I wish I would've gotten into this years ago because I'm a disabled vet and I've been on disabled service for 30 years. I started working with a friend of mine just for something to do and I started helping him with wood and learned from him. He said, "You know what; you need to get your own deal." He's an older person and he has enough work of his own.

So I just started working doing different things and I learned that what I like about cedar is that there are never two pieces alike, unless you're taking a slab and cutting it in half, then you have two pieces close to it. I'll show you some of the pictures in there, you'll see some of my benches I do and I take the two matching pieces and put them together. But you can do lot with a disc and I'll show you a bracket a friend of mine made, but I can turn any kind of product on a table saw, any size piece you want. And this bracket, I will show you in a few minutes.

I let my wood dry for way over 9 months; I let the bugs do their own work and that's what makes it natural. A lot of times I have the wormholes and worm marks and that's what makes it unique.

I just like doing different things and people say, "You ought to see what this guy built." And I say, "I don't care what that person built. I want to do what I want to do. I want to do my own." And I'm getting a pretty good name around different places and the way I got my name around was I set up over by Bella Vista on the state line. A lot of truckers were coming by a couple years ago and I was there for about a year and everybody kept calling me Cedar Mike. That's how I got my name.

I like doing things that are different if you notice the beds. I got into building regular log beds, just straight type log beds. They sell but that's a plain bed. I like building them like this here, one-of-a-kind type. And that's what people are interested in; things that are different, something that no one else has. And I build them small, beefy, whatever size that they want. And some people like slab beds and what I do with those is I cut it off flat then I put dowel pins in them on both ends and when I lay the log down on the big table I make, I lay the slabs right even with it. If it's a king-sized bed, it's 60 inches and then I

take it and I line it up like this and put it up on top of the log, I mark each piece so I know where my dowels are going to go and it lines up perfectly.

Q. Can we hold one of these up here and you can show how you do that?
A. What I do is I flatten one edge; I lay this part on the bottom then I take this board here and turn it so it's flat against this and I line it up where I want it. Then I mark right here. First of all I take the tape measure roughly and go from this side to this side and mark the middle. I make a temporary line going down and then I lay it sideways so it's flat against it. So this piece here would be turned around. I mark both of them and no problem. And then when you drill your paddle bit hold, hold them out just a little bit when you just start because the dowel slips in a lot better.

Q. What do you call that? A "paddle bit hold?"
A. A paddle bit, I'll show you in a minute with my saw. These pieces here; this is just the footboard, the headboard is out in the truck and this isn't finished here.

Q. You might want to introduce the friend that you brought too. Come on up here.
A. He does all of my saw work.

Q. Any particular glue or anything that you use?
A. I usually use yellow pipe glue. It works the best and sometimes if I have a good-sized hole that I have to fill, I use Gorilla Glue. But you have to let it set for about 30 minutes and you have to scrape it right away, the excess off or else it hardens up.

And my partner does scroll work. Dave (Windberry) does all kinds of scroll work out of cedar. He does my inlays. So if anyone is interested in benches, we inlay all kinds of pictures into the backs of benches and we sink the wood into it. We use whole pine; we get a lot of that scrap wood for free. So we take that and set it there; we do it pretty good. I've sold quite a few of them.

Q. Your slabs and whatnot, how are you cutting them?
A. An inch and a half. A friend of mine has a band saw. I sand them down. To be honest with you, I need to get into sanding them a little better than I do. A lot of times they're pretty rough, if you use a pretty good grit like a 50 or 60 grit sand paper, it knocks it off pretty quick. But then you should go over it with a smaller grit paper to get the scratch marks out of it. But 50-grit is pretty good for grinding the knots off with the belt.

Q. How do you get your bark off?
A. A lot of times I let it dry for way over 9 months so it just about falls off. What I like to do is take an ole' hickory knife. You can find them usually for about $5 at an antique place. They have a really stiff blade on them and they're really easy to use. They don't break on you; they're durable. Also on your trees, if you let them dry, one guy was asking me if he can get some cedar trees where he can let them sit for 3 months, cut them off at the base and just let them lay over. The branches suck the moisture right out of them, any kind of tree. And it dries in half the time.

Q. Don't even take any of the branches off?
A. Just leave them on there and the branches suck the moisture right out of the tree and they will dry within 3 months where actually cedar takes at least 9 months to dry naturally. I leave a lot of mine for over a year. I have about 4 stacks of branches about like this. You'd be surprised with how many branches you can go through if you're building chairs or any of these tables. These here you can do any size you want. I've done chairs about this big around. I've put backs on them. And those pictures with those rockers on them, I started building these here like this selling them for $45 because they're quick to make. I figured, you know I'll make a chair out of those, and I just turned it into a rocker. They look nice.

Q. This a tapered cut?
A. Yes, make that cut right there and you can use it, a lot of times I like to use this piece here because I can keep my bracket on at the same time. If you use a really tall piece, you can put this on the floor and do it where you can turn your posts better. But this thing here, if you're going to use an inch and a half bit, dowel, you take this ¾ of an inch away. A lot of times I will treat it and do a paddle bit hold first so when I turn one of these, then I will try and make sure it's in the hole snug. You set it right here in the center and as you turn it further into it shapes it just like those over there. And you can do any size that you want. (Huh! Isn't that amazing, no kick-back.) No kickback at all. The only thing that's going to kick back, is you have to be careful when you first put it on. And then when you go into it, I just put it at an angle like this and I eyeball it. You can eyeball it and then start turning it in, and as you turn it in, it starts cutting but it has to be a carbide blade. You can do any size you want. If you want to do a bigger size you can go further apart.

Q. Do you pre-drill a pilot hole?
A. I first started that, but I don't want them all alike. I sometimes want them a bit little off. After you get going on it, well first of all use a punch in the middle, you could do that too. But I've gotten to where I can eyeball it pretty good. And like I said that way they aren't all exactly the same, unless you want them all the same.

Q. How do you make the part that goes into the hole?
A. With a paddle bit. You put this on here just like this, you eyeball it. And as you turn this into the blade, little by little, you keep turning it into it, then that shapes that. But it depends on how far away the blade is from this point. If you want an inch and a half, then go ¾ of an inch. But what I do is usually you have a block of wood with a hole already drilled into it the right size. Every once in a while you want to double-check it because in case this moves you never know, you know what I'm saying? But maybe every 5 or 6 pieces check it and you can't get them tighter whatever size you want.

Q. So you don't have any kickback problem?
A. No. A friend of mine has one of these, and he was turning a piece but he was turning a small piece, he cut his hand really bad. So what I'm in the habit of doing, is if I'm at a table like this, I rest my hand like this. That way it keeps me from falling into it.

And once I get it like this here, I keep my arm like this and it keeps me from falling. I'm a little safer.

Q. It probably doesn't feed that fast, which probably helps?
A. It depends on how sharp the saw is. After it's been going awhile it seems like it takes forever to cut. You'll know when a saw gets dull. But then when you re-sharpen it you can't use it again because you're using the blades on the side. So you've got to get rid of the blade or just use it for straight cutting.

Q. Is that welded to that or how do you keep it on there?
A. This piece here is welded. This one with brackets, I made. The only reason I have this piece of wood in here right now because when a friend of mine made it up he didn't quite understand what I was talking about. But he left an edge on here and I need to grind that off. So when it's flat up against here, this is a cheaper saw, my son put a hole in it so that's why I use a block of wood. But you can use a regular clamp and clamp it. If that lip wasn't on there, that's why I have the wood there.

But like I said, at any size you want. You can just line that wood up right here and do any size you want. If you want to do a bigger taller piece, put this on the floor. You can buy these used for $50. And if you do something like this and it has a really big curve in it like that bed right there has a couple of big curves. See how the dowels are straight even with each other? So if it's crooked, after you get this one here turned, hold the top of this even with this and turn it. And when you do this one here don't hold it down here because it will be going every which way. So this won't line up with this one, so you hold it on the end and turn it. That way both dowels will be going the same direction instead of going like this and like this.

Q. How did you figure this out?
A. An old friend of mine that I got building with for years and helping him do his work. He just got tired of it and I said, "Well, do you mind if I go ahead and use the bracket, patent it, sell it or whatever?" He said, "Go ahead, I don't care." As far as I know he's the only one that ever had it. I've turned a few people on to it because it's interesting and it's cheap. It saves you a lot of money.

Q. Does it work better, well, have you seen those big ole' things that you put on a drill?
A. I've never used them because this here will cut any size that you want. You can cut up to 2, 2 ½ inches… for bed posts. I found out about bed posts too, the bigger the dowel, the stronger the post. If you use a smaller dowel then they are weaker, so the bigger the dowel the better.

Q. So that just means you have to position it further from the blade, the bigger the dowel?
A. Yeah, so if it's a 1½ you go ¾ of an inch and sit back, and you take a tape measure and get this pretty well close to an inch if you're going to cut a 2 inch.

Q. What's the average length that goes into the hole?

A. I done up to 2 inches, I'd do bigger, I don't know. It goes in there a good inch or better. See the reason I was saying, when I do a hole like this to make it fit, well after I cut that in, I make sure it fits enough. And a lot of times you want to tap it in so it's nice and tight. And then also what I do when I do the dowels is I use torque screws. Anybody know what a torque screw is? It's the kind with the little star-head on them. They sink in a lot better; they go right into the wood; they don't strip out on you, and they go in far enough that you don't see them.

Q. Do you use wedges on the inside at all?
A. No. I put them pretty snug and I try to take this and put it in where you aren't going to see them on the beds. I go up on an angle with them and it helps bring them in. Again they don't strip out and they are a lot easier to use. And like these benches and stools here, I don't know if I built this one or not, but a lot of times when you're putting these in here like this and after you get this hole drilled in here already, take a screw and usually for a paddle bit there's a little point mark in the middle. Take and put a screw all the way in on each one. So after you put it together, find that little hole, put your screw in here and that pulls them together.

Q. Kind of like a pilot hole?
A. Yeah, I just take a screw and just go all the way through and then I put the screw in from the other way and it brings them together and holds them a lot better. And these here I go up at an angle usually at like right above on the inside. I go up on an angle and it helps bring it up into the wood too. Usually I don't use any glue because these torque screws hold them together really good. And you can make any size of these here. I've got a lot of bar stools like this here. And then also if you do a chair leg, you have a bigger disk and a rounded piece, I put two pieces coming up here sort of in the front, then I put two further back and it helps to hold it back in. Then on my top piece I'll take a log like this here but it's on a band but it's more of a curve, so I'll put that curve on top of that chair to help form it and it's natural looking.

Q. What do you use to finish?
A. I use a lacquer sealer on all of my wood. On my outside stuff I use spar urethane. I've used spar varnish before but in the sun it's blistered up and I talked to a guy at the ACE hardware store and he said, "No, you need to use spar urethane." And on my inside stuff I use polyurethane. With polyurethane, when you're finishing them, like when I do coffee tables and it's going to be fancy, I put a coat of lacquer sealer on it and take 320 paper and sand the whole thing down. It comes out smooth. If you start with a smooth finish, you'll end with a smooth finish. And then I put polyurethane on it and let it drip dry. Take 320 paper over it again with a sander, polyurethane it one more time and it comes out like glass. It will come out a little like this here.

Q. On the cross-section there, those cookies, do you have any problems with cracks? Do they just make those fine cracks and never separates, or makes a big crack?

A. After I cut my logs like this here, they've been drying for 9 months to a year in log form and then after I cut them I let them sit for about 3 weeks after I cut the disk. If they're going to crack, they crack then and then I don't use them.

Q. So you don't treat them with anything?
A. No, if they crack, I just don't use them. I will use them for firewood. But a lot of times they won't crack. If you let your wood dry for 9 months to a year they won't crack because you let them dry slowly. Also one guy told me one time that if you have a stack of logs and you want them to dry quicker, say this is a roll of logs, take a black plastic tarp and go all the way across the top but leave this open and the sun will hit that black tarp and dry your wood out a lot quicker.

Q. Like a little oven.
A. Leave the front and the back open and it will dry your wood a lot quicker. And a lot of times what I'll do is put in front of a fan for a few days and the big ole' circulating fan will help dry them out.

Q. This pin that you are pivoting off of, what angle are you using? 45 degree?
A. Yes. And you don't want to use too much smaller than this. I used a real thin nail when I first started and it will bend on you. You have to have something really sturdy because you press really hard. And after using it a few times that little nail is half the size, it bends. A solid piece like this is better. And actually it should be sharper. The sharper the better, really, a point.

Q. What kind of metal will you use?
A. A friend of mine got it for me; I'm not sure, just a piece of steel rod.

Q. Well I was going to say that it somewhat resembles steel rod, that's why I was looking.
A. And what you can use too that I've used before is you know those really thick nails? They'd be perfect for it. And if I do another one of these, I want it a little bit shorter down. I don't want it as high up and maybe get more of a dowel out of it. So cut it into about half the size.

Q. When you're putting your dowels in for the headboards, something that big, what size dowels are you using?
A. I just use a paddle bit, oh the dowels, I use 7/8". I ended up getting a deal. I went somewhere a few years ago and this guy had a whole big stack of, they looked like they were from doll beds, baby beds. He had a big stack this wide and I got them for $5. I bought a bunch of them. But I usually do mine 3 to 4 inches so there's an inch and ½ on each side. And then if I can't I put a screw on each corner to help hold it while it's drying. But on something like that, that big, about 3/4" or 7/8". You really have to be careful when you drill the hole into the side of the board. Make sure you're straight because if you're not even you're board is going to be offset. I learned the hard way that you'd better make sure you do it exactly right, straight in, otherwise it's going to come through the side of the board. I've done that before.

A. When we do our queen sized bed, we make our boards 60 inches. Our boards our rails are 1 ½" thick. Also if you're doing an entertainment center or something like that and you're doing it with 1-inch wood, and you're going to put something heavy on it like a TV, don't use 1-inch wood, use an inch and a half at least.

A lot of times we don't even use any glue because we cut them so they fit snug. A lot of times too, my son got a bunch of those bits, big round, not paddle bits, (Forstner bits) if you're going to build something like that, then a lot of times you're going to Forstner it. If you can cut a hole right here the same size as this, and I do a lot of mine with Forstner bits, and my partner built this one. Tuck that in there and it looks so much better; a little sturdier. If he would've just taken a second to get it in there further.

Q. So the whole width of your stake is used, and you're not thinning it down. You're just using the whole width and sticking it in there?
A. Yes, and it looks a lot better. That's what I do with my coffee tables and stuff.

Q. Are these pieces always from the trunk or are they branches? Does it matter?
A. Branches.

Q. So you can use branches in this way? Just like any other?
A. Yeah. You could do anything; did you see pictures of the one bit that I built that had the branches? You can use your imagination. I've taken big branches from here all the way down here.

Q. So you use the whole tree?
A. Oh yeah, when I cut a tree down, I use just about all of it. If I've got a good sized tree, let's say it's 24 inches around, I'll give about $100 for a tree because I'll take the branches and everything. You figure you'll pay $100 for a tree plus a friend of mine to cut it for me. Two slabs, paid for. I'll sell a bench for $150 and get my money back.

Q. Big trees have bigger branches. Around here we have little bitty trees with pencil branches and couldn't do anything with them.

Q. Do you have any objections to somebody coming down to see your shop?
A. I don't care; do you have one of my cards?
Q. I haven't but I will. I don't live that far from you. I'm from Roseville, up around Bolivar.

Q. Mike, where do you get your wood?
A. A lot of it is given to me. Sometimes I buy it, but I've got a guy in Arkansas that works for the road commission. He bought some of my furniture and he is in charge of the bulldozing of the highways down there. And if he gets a bunch of cedar trees

he says, "Mike, get your butt down here tomorrow, I have a load for you." He puts them on a forklift and everything for me.

Well, I use pieces from this size to this size but a lot of times I like cutting my own cedar. The fact is that I know of some pieces I just want… it's like I have someone cut down a tree for me and they cut it this one way and I go, "Oh my gosh. They just ruined everything; they ruined my whole dream!" I just had a picture for it and knew what to do with it. It's like if someone wanted to cut all the branches off and I want to leave them on for it to dry better.

I also built bunk beds. Like a queen on top and a full-sized on bottom or a queen-sized on the bottom. I call a long personal friend of mine sometimes and he's turning a bunch of the bigger cedar out. He's got these small ones that he doesn't use. So he sends me a whole truckload for $55.

And I wanted to tell everybody too, that if anybody ever has a fire or the fire department is having a cookout and wants something donated, give me a call. Or someone has a burn out and they need something to raffle, or a charity organization. Don't be afraid to call me. Just give me about a 2-week notice.

Q. That sounds like it would help with marketing.
A. You'd be surprised it helps out. It makes me feel good to, to help.

Q. Mike, maybe you already mentioned this before, I stepped out, but what do you sell these sets for?
A. I sell my beds, if it's just a plain log bed like this here.

Q. And this is a headboard and a footboard? A set?
A. Yeah, and the rails are going to sit right there. You put one bolt through there and that's all you have to have. A regular log bed, this is a queen-sized, it goes for $350. If it was a custom bed like this one over here, then $450. If it was a king-sized it's $50 more. They usually sell for $400. They come with the rails, slats, everything that you want to put it together. All you have to do is put your mattresses right down on it.

Q. What do you use for slats?
A. Oak. A friend of mine cuts oak for me. And also if it was a king-sized bed, what we do is we take a log maybe a little bit bigger than this and we make little pieces like this here and we put a board all the way across and we put maybe 3 or 4 of them and we lay it right on the ground like this. The board run across those logs, that way when your twin mattress is sitting your slats go across there and keeps it from sagging down. And that comes with the bed too.

Q. How many sets a year do you sell?
A. I can make as many as you, I can make a lot. I wholesale a lot.

Q. So approximately how many sets a year do you make?
A. It's hard to say. I never thought about it really.

Q. Everything is custom ordered?
A. A lot of times people want them taller; they want them beefier. One person came up and wanted a twin on top and full size on the bottom, log bed, and we built that for them. We charged them $500 for the bed. The rails and the ladder is built right into it as one solid piece.

Q. Do you keep any kind of inventory or do you pretty much sell everything you make? I've been down to your store and I never see anything hardly ever sitting around.
A. I sell everything that I make. Every time I get a load of furniture in there, somebody will come by and buy the whole load off of me because I'll give them a good deal on it. I've even had loads on the back of my truck the last couple years going somewhere to set up and I'll stop at a gas station and some guy will say, "Hey how much do you want for all of that?" One guy came up and put his arm around me and I was like 'Hey, I don't know you.' He said, "You want to sell all that furniture?" I said, "Well yeah. That's what I'm getting ready to go do." He said, "Give me a price on all of it and I'll see if I can handle it." He didn't look like he had a dime. I said, "Yeah, I want $15,000 for all of it right now." He said, "Give me 20 minutes, can you wait 20 minutes?" Yeah, he came back with a brand new truck and trailer and bought it all. So, you never know.

Q. What do you do to take the bark off of your pieces? Do you take it off by hand or power-wash it?
A. On my wood to peel the bark and everything I use an old hickory knife, the blades are real thick and sharp, they're easy to handle, they don't break and they don't bend. If the wood is more than 9 months or a year, a lot of times it will just about fall off. So if you put your knife underneath the bark it will just peel off like a banana. The longer you let your wood dry out the more natural it's going to be and the less work you'll have to do. So a lot of my wood, I've got it piled up all over the countryside just drying, because I don't like peeling green wood. There ain't no way. And it's worse yet if it's half dry and if it's half green. You're going to put some elbow power into it. It also lets the bugs do their work and makes it look gnarly and worm holes. That's how cedar looks good, that natural look.

Q. Mike where do you get a lot of the material that you use to make your furniture?
A. People see me building cedar furniture at a craft show and a lot of times people will come up and say, "Hey, I've got these cedar trees in my yard. I'd rather see you use them than to burn them. If you want to come pick them up, you can have them." And sometimes if it's a good sized tree the guy will ask how much I can pay him. I say, "I'll give you $100 but I want the limbs too." If you take one of my 8-foot benches, a piece of wood, I'll cut it in 4, so for 1 ½ pieces of slab I've got my money back. So it's worth it. A lot of people don't give good money for cedar but I do because it's worth it to me. Everybody wants to give $25, $50 a tree and I'd rather give $100 because hey I'll use it! I'll 10x that.

Q. Would you rather purchase trees that are 13, 14, 15 inches in diameter? Or would you rather purchase smaller ones?

A. I use all different sizes of trees. I've got piles of trees right now that are 4 to 6 inches in diameter, 13, 14 inches tall, specifically for bedposts. I have other stacks like this one here, 4 to 6 stacks, drying for the branches. So I can go over any time I want and pick through them. And they've been well over a year drying and the bark just falls right off. A lot of the log wood that I use is around 14 to 16 inches because my benches are 14 and 16 inches. And I sell a lot of benches. That's my best seller. And like I say, I wholesale my furniture. My beds are anywhere from $500 on down. For a custom bed, it's $500. It's like, in other words for a king-sized, regular, standard bed, it's what I call a center log bed, it's $400 for a king-sized bed, $350 for a queen, and $300 for a full. And then it's $100 more if you want to beef it, I mean I've even done 6, 8 foot tall posts and really custom beds. And I've taken, say 7-foot tall about like this here, and I've used posts about this big around for the up and down pieces. They want them beefy and you know anything to satisfy the customer.

Another thing to mention is that a lot of the new mattresses have different thicknesses to them so you have to know how thick the mattress is in order to pick out where you're going to put your bed at and how high. And also if sometimes you have your poles, your straight piece going across the bottom of it and it's too high up, your poles are going to fall right through it.

Q. Do you install the hardware for them and stuff, slipping the bed frame in?

A. Yeah, the rails are right there. Before long, just pre-drilling a hole, and all you have to do is put one light bulb and tighten it up. They are already put together. I also put galvanized seal on the bottom. And on a queen-sized you don't need slabs or anything. We make them fit real snug. When they say 60 inches, it's 60 inches so you just put your bed right down on it. And if it's a king-sized bed it will come with the rails, plus the cross pieces and the slabs.

Q. When do you find that you have a problem with things splitting?

A. The only time I have any trouble with things splitting is when we cut these disks. But I usually make sure the wood is really dry. A friend of mine he has logs just sitting there drying. They're usually pretty dry. The only time they ever crack is if you're out there in the sun too long, even if you put a piece of furniture on the back and you're out in the sun for 2, 3 hours in the back of your truck, it's going to crack. Especially in this heat now. So if you cut your slabs like this here and put them in a room with no sunlight and let them sit for 2 or 3 weeks you're all set, especially if you put it in front of a fan. If I took that log out when it was green and sat it outside this afternoon, it'd be all cracked.

Q. So those cookies are cut off of green wood?

A. Off of dry wood after it sits for about 9 months to a year, but still even though they are cut and dry, if you put them out in the sun they are still going to crack.

A friend of mine has a band saw. And also another thing that I'm getting into, a lot of people have these stumps that have holes in the middle of them. They have holes so if you take your imagination and like Dave, he and I are getting into it now. He does scroll work. If you do a big pattern of a deer or a humming bird or something and put it over that hole and draw it so the hole is hidden. You never know there's a hole there. And there's a nice table you can sell. I've sold tables for $50 to $75 just for a stump table. Why let it go to waste? A lot of people like them for outdoors. If you put polyurethane on them, people will be out there drinking or have them next to their chairs, they put their drinks on them and that way you don't have to cut them into fire wood.

Q. How long does it take a customer of yours to describe for you what they want exactly in a custom piece? How long is the conversation where they are trying to explain to you what they want?

A. It depends on what they want. If they put it on paper, I can probably see what they want. A lot of people come up to me saying; hey so-and-so said you can build anything. And I have, you know what! The weirdest thing I've ever done, I had this guy come up to me and said, "I heard you build anything". I said, "Hey, I'll try anything once." So I need a box 9" x 9" x 9" and I want the lid to fit tight. I said for what? "My dog's ashes." So I did it and he was happy. Then a friend of mine died about a little less than a year ago. He decided he didn't have a pot to pee in so his wife asked for an urn and so I made one out of cedar for them. But there are so many different things you can do with cedar.

Q. Can we talk about how he does these over here?

A. We are just starting to do these here. You have to really let them dry good, we were thinking about getting the thinner wood kiln dried because these will crack on you, as thin as they are they are only 1 inch. But that one sort of came out nice. We're going to be building a bunch of these before long. They really look nice. And we'll put any picture you want on them.

And that's also the optional things like this, coffee tables, everybody's got a favorite. And here's Dave.

Q. We're used to the impromptu, show-up-at-the-shop and start asking questions so we're going to try and mimic that experience here.

A. I was just mainly asked to come up and explain the finish and the stuff that I do basically is wildwood work. And there's a number of different organizations that you can get the magazines of. One of them is Wildwood Designs and I wish I had brought some of these so I had the address. Most have access to the Internet, Cheery Tree Inc, Meisel Hardware, there's a spectrum, but I don't use the Internet much.

Q. Are those the places that you go when you want to buy some of the finish?

A. Yes, that's for this particular finish. Somebody asked me if you could get this finish. This is a two-part mixture. It's resin and epoxy.

Q. You can't buy it from Lowes or Home Depot.
A. No. It's not likely that you'll find it in any hardware store or anything like that. You do have to order it. It's kind of hard and tricky to work with but you figure it out after working with it a few times. But it's resin and epoxy. Cheery Tree, Meisel, and Wildwood all have it. You can get it in gallon kits, ½ gallon kits, 3 gallon kits and 5 gallon kits. 5 gallons is a lot of this stuff. I mean a gallon kit, how long have we had that now? Several months and we've poured a dozen things. We've been experimenting on these.

Q. These discs are kiln dried. I don't know if you caught that or not? They don't just cut it from a wet log.
A. We had a lot of them that we poured that started splitting and then they started breathing from the back. We sealed them with white glue and we tried a number of different things on them. So from here on out they will be kiln dried to stop that.

Q. Do you think maybe you could talk a little bit about the process that you go through when you do the clock, the scrollwork? A lot of people have never even seen that before.
A. How many are familiar with this scroll saw? Okay, well then you have the basic idea. What those organizations to know is wildwood, cherry tree… all these are wildwood creations. Stuff like this they will sell you a pattern, and they do not sell kits. They sell you a pattern and what I do is I copy it once I get it and then I have it forever. But you cut out the section for instance, this is one individual piece right here and you will take this piece out and you will glue it to your lumber. You've got to drill each individual hole. The scroll saw blade is like a piece of thread and you needle it through that hole and you cut your pattern out, your design. So that gives you a small idea of how much time goes into something like this. And my problem is a lot of people ask me how long it takes? And I'm kind of scatter-brained, I jump from one thing, I get tired of one thing so I jump up from the scroll-saw so I jump up and I'll glue something, then I'll go get a glass of tea or something like that. So I never have tracked my hours, but if I was to guess at how many hours I have in this, and I'm a pretty fast scroller, I've been scrolling now for probably 15, 18 years. I would guess that I probably have 35 to 45 hours in straight cutting time.

Q. And how often, I mean they are tiny, delicate, little pieces all connected. How often do things crack or break unexpectedly with the tiniest of the connections?
A. Real often. You get used to putting those back together and matching them up. Everybody here is used to cedar; it's a hard lumber to work with. It's in between hard and softwood; it's really unpredictable. And something like this really should've been done out of oak or walnut but cedar is just so much more beautiful. But it's stuff like this fragile is really easy to break them but after a while of working with it you get to where you can piece it back together. Mike has seen me do this 1000 times.

Q. I want to know if you brought this on your lap?

A. It really did, inside this chest if you catch your eye on it but it's been pieced back together. It's mainly to show what we do. It hangs on my wall; there were spider webs and dust on it. There's a bunch of places on here that have been broken and repaired but that's typical of cedar. If you make it and hang it on the wall you don't have to worry about that. Maybe if I move it around and…

Q. What kind of finish is on that?
A. This is polyurethane. Now the reason is with polyurethane, if you're going to keep it inside the house, most everybody's got temperatures in the house that polyurethane will stand up. Urethane is a harder finish and if you're going to do a cedar chest, even though it's inside the house too, it's more subject to travel. A lot of guys come in like me and I throw my wallet and keys on top of it. Urethane is a much harder finish. Something like this is going to be hanging on the wall; you aren't going to be setting dishes down on it and stuff like that. But urethane is much harder; it's mainly for bar tops and bar stools and stuff like that. That's what we use on our chests because a lot of people throw stuff on them. A lot of people sit on them and it's a lot tougher finish and harder to spot. But this would be polyurethane.

Q. Now do you cut your own lumber that goes into making these or do you buy it already cut and kiln dried?
A. A lot of the stuff stock that I've used lately that mike gets, and we get it in 1 inch stock and then I just put it down to dry. I put a seal coat on it which is a mixture of polyurethane and I just weaken it with lacquer or whatever; it's just a seal coat to dry. Then I start the process of scrolling it out.

Mechanical Redcedar Harvesting

Bill Webb, Webb Farms

Presentation

Pardon my voice. The cedar business has been good to us; we've got a unique product. I'll get into the slides in a minute and you'll see that in our outfit, we're pretty well bare bones. You won't see a lot of concrete; you won't see a lot of steel buildings. But we've got about 700-900 thousand feet of cedar a year, marketed. We primarily market to the cedar chest business. We truck to New York. If any of you guys have done any of that, then you know what that's about.

We can mechanically cut cedar. It does a good job. I don't know how many feet I've cut with a chainsaw. That's the reason I've been looking for this for about 25 years. But whatever we take away from this, let me tell you this; don't sell me your chainsaw. Keep it in good shape. In our situation we use a John Deere 490 excavator. And we put up a 4-roller head on it. I don't know how familiar you are with all of this but you have to have the saw on the bottom. And the knives actually rip the tree. We cut it off, we can actually bring it down not damaged too much. And put it in a loose pile. In other words we can guide it into a pile. In our case and by the way, as we guide this down, we can actually, now this sounds fantastic, we can actually delimb a 3-4 log tree in a minute. That's a pretty decent job. Sometimes we might have to back up and hit it again, but in most cases the rollers dig into the logs somewhat but it won't get into the white wood; it won't damage your log. And you don't break very many trees. In our case we delimb the whole thing. We delimb it out all the way down to one inch or whatever we can get. We cut it off. Now, you can cut it to length also in that amount of time. We use 8 foot 4 inch logs and we can do that. At Louisville we will delimb the whole tree, gather the skidder and take it to a facility and cut the logs to length. The part of the tree that we don't use for logs, we make mulch out of. Logs in one pile, mulch in the other.

This whole thing is kind of a system. You're cutting these things to length in the woods, free logs. It's a thicker truck; it's a skidder with a picker on it. In our case that's what we first came up with but we went into grapple and it works good.

Let me say this, I'm not here selling this equipment, okay. Now, can we make money with it? I don't know. That's the good part of this machinery. And our industry needs this equipment. If you notice and I noticed all these meetings, we're having marketing meetings, we're having machine meetings, anything. And we all know here, and I look to you guys that have been out in the cedar patch, this kind of damp weather. You know why I want to delimb it. I don't care how well you like it. It gets about boring and it gets a little bit tiresome. By the way, production on this like anything else in cedar, it depends on the type of cedar, field cedar. We think a good average is probably 400,000 feet a year and about 700 cords of wood. That's with a two-man crew. And that's a lot of cedar. I always figure working for a yard I could cut 700 feet by myself, put it on a ton truck and take it to the middle. And I didn't do that too many days like the weather we've got now. So yeah, it works.

Okay, let's go the other route, here's what's wrong with it. Cedar logs are at about 40 board feet, $0.40 a board foot. In other words a 10-inch log that's got 30 foot in it, it's about a 12-hour log. That's not enough money because of the marketing thing. And in our operation that's marketing's fault, but unfortunately I think the marketing's okay. And I also buy the equipment, so.

Problems. Believe it or not we have very little maintenance problems with the saw. If it's got a lot of limestone on it then you're going to have some trouble. What you're doing is taking that head, hydraulic head, it requires high hydraulic pressure because they can't get big enough motors to turn these things and you're talking about electronic. Now we're talking about hydraulic pressures and hoses, 4000 pounds. Which means that if you can't go to John Deere or a regular hose guy, make up our own hoses. Instead of having a $20 hose you have a $50 hose. And I think that our high point was 8 one day. So that day was shot.

I will tell you one other thing, using a track rig is a big plus for the simple reason that all we do is throw the brush down. We can sell everything that cooks brush. The brush we can't mulch because it puts hole in the bag and they won't buy it. So the brush and the mulch and whatever that we take off goes on the ground and with the excavator, we can push it down. So the area looked pretty clean if it's for pastures or something like that. My suggestion is landowners put grass down before we go in there and we can throw gravel on it or whatever because by the time the limbs gets down there and deteriorates, grass gets down there you've got grass coming through. And any place that there is cedar, the ground is pretty decent pH.

Okay, operating this thing. I've never done this but, I've never flown a Tomcat, F-16, F-18 Tomcat on the carrier in a thunderstorm but you're just about that busy. You've got both legs, both hands, eight fingers going at the same time. And it takes a long time, it takes a while. I can't walk and spit at the same time and I can run it.

That's where we are. Let's just go through these slides real fast.

Q. Is that the delimber right there?
A. This is the delimber. We've already cut that, delimbed it, cut it off, and getting ready to throw it in a pile and put it in the skidder. And this is down in the oak.

Q. What happens if you hit a pretty good-sized limb? Will it cut it off?
A. If it's a 3-inch limb, you may have to hit it once or twice.

Here's something else let me say. This year we are running 65 gallons a minute. That's not enough. I'd like to add 90 because of that reason. Now oak, anything else it will delimb better for the simpler reason, momentum. Once you start that through there like with oak or anything you've got 8 foot to pick up speed. This thing you have maybe 5 inches, right on cedar? And your ends like that, just a keep going. As a kid we used to say the hardest thing in the world was a pine knot. I don't think so, I think it's cedar.

Q. Do you get into a patch like field cedar, they have limbs all the way down to the ground, what do you do there?

A. Stick her in there and let her go. Guys, when we have a chainsaw we don't take an ax and cut through that sucker. Some people might not want to but that ain't my deal.

Q. Is this where it's cut? Is that the saw coming down?
A. Yeah. See it's all here on this end.

Q. So it's actually cutting off the branches, is there a grinder head on there or something? What's cutting off the branches, is it a grinder or is it breaking them off?
A. You have grippers. See that right at the back of the saw? That is a knife. You've got a knife on the other end. The knife is a radius knife, shaped to the tree. You actually go up and your knives are what grabs the tree. Electronically you can release those a little bit, the pressure, after you get the tree where you want. You've got the knife next to the saw, it's up there and you can see the mechanical arm come in there ahead of the roller. I don't know what we've done there. That saw cut is not on a real loose saw cut, a chain, those links are about an inch long at least. And you've got a lot of hydraulic pressure as you put it through there but it's alright.

Just to give you some kind of an idea. When we run over the brush, that's a pretty rough drop there. A lot of brush is typical. If you're going that far, we were taking say, the timing on the skid, say with a table skidder we were skidding, not a quarter of a mile. Our turnaround time, I believe, was taking about 23 minutes. It's a grappled skidder. The guy never gets off of it. That's the kind of job I always wanted.

Another problem with the cedar business guys is everything is too big. But we can use it. That may look ridiculous but that's where we're at. If you've got a lot of cut length logs, you've got a pretty good bunch of logs there too.

Q. What length?
A. 8" 4'. That's what our standard is cut to. It's very scientific. This is a job after we skidded them out and delimbed them. That's the brush on that side, the cord wood is in the center there. And we've got a shot of it later where it's cleaned up.

When you get the logs on the truck you've got 90% of your cost. Cedar is not that hard to transport; it's fairly light, about 11 pounds per foot in the log.

They're feeding it. They're feeding flaps into the horizontal grinder. That's not a very good way to feed slabs in there either. That's just another shot. Another one. My son must have taken this. He runs the mulch.

Q. That's a lot of mulch.
A. We put out about 200 loads a year, 100 yard truckloads a year. It needs to be up farther but we're still learning. We've only been into the mulch thing a little over 3 years. Trailers, you'd better fool with those, a great trailer.

I told you it ain't pretty. We're pretty well bare bones. What we do run, and by the way, the reason we bought all this was we didn't just by it for the mechanical logging; we didn't do it

just for the logs. We thought we could combine these slats and the piece that we take out of the top of the log for mulch.

I'm going to be real honest with you. With where we are right now, because not only the initial cost of this equipment but guys we've all been hit with the price of fuel. Our whole fuel, the extra, you can't pass on with it to the customer. It was pretty close to what our profit and write offs were. In other words an accountant would say, you're working for nothing. But we're not, we like the business, we're in it and we're going to stay in it. We're in it; we've got a product that will be alright. This is a temporary thing - just a thing we're all going through.

That's the log yard. We built this. I refused to buy the big stuff. It was just entirely too big. This we built; we talked a lot within the center. We carried up overhead, we run two saws. Hair saws, set works on each saw. Actually we set one saw and the other exactly the same. We square it up and run it through. Take two slabs, bring it back, rotate it, pull the other two and we drop it. We cut a square and that's how we cut cedar down. This is a fairly recent thing. I used to cut cedar with big bands. We used 6 inch by 30-foot saws. By the way, if you're going to saw cedar and want an exciting time of your life, that's the way to do it. You don't know what a problem is until on your back stroke of that log as you're coming back, you pull that 30-foot band off, okay. The first time I did it we had a log back about 20-foot long, 10-foot wide and I don't even remember it going over.

This business is a lot of fun. One time we had a spoke wheel on the top and it cut cedar to keep those ducks, hard knots in the band saw. You have to take whatever standard band saw and you speed it up 1/3. Or you put more teeth on it or you do something to keep it from getting that duck out of there because you have a hard knot and you have softwood around it. That's the only way you can do it. With a cedar knot, you can't. You've got to cut it. So that old saw, 12,000 feet, we were moving on. Out through the top of the saw, through the old shed I had it in. Like I said, the saw wood weighed, I don't know, probably 10,000 pounds. It was leading a concrete path I had it on about that far. So I was halfway to the highway. I had an old buddy of mine that was right on the edge there. And that's the first time I knew he'd been drinking on the job. He walked up and turned that saw off. But that wasn't a bad way to catch it but it would just prove that it was just too slow.

So we do it like this now. That piece of machinery looks terrible. We didn't build it to sell. But it works. Even owners go to the hardware store and get parts to our. By the way, you mechanically inclined people here, the set works on this saw, is built out of small air bags. We fill them and we bust them. We fill them and we bust them in a series. If you ever need to do something like that it's the simplest most positive way of doing it. You don't have to have a lot of electronics that can't work. I hate having something that's smarter than me.

By the way the Cat on that is an old John Deere. It's a three-saw set up; it's automatic. We use Baker's plus we speed it up. We use a few more bearings. We don't have a thick and thin; we don't have the waviness that you normally have cutting cedar with an inch and a quarter band. This is pretty well automatic. I know we need them to build our places but it knows how to build a house or something.

That's one of their log haulers, trucks.

What we found by the way that we deliver, and I don't like trucks guys, I'm not a truck fan. But the mid-west here, I hear a lot of bragging all over the country, but I do know this. If you have any problem and the truck is coming this way. Get in the back haul lumber. Pennsylvania, whatever, Ohio. That quick. And we were forced to buy trucks. So by the way, the same thing as the mulch business. That was all set up for a contractor. That used to do some of my hauling of lumber. Anyone under would put gas in it to appeal to anybody. So that's what we're doing at the trucking business center.

If you've never been in it, you sure will enjoy it, but it sure does take a lot of time. I have to spot where we had the rows of stuff we were going to mulch and that's where this was. We were able to clean up everything except the limbs. That's the best job we've ever done. I thought it looked beautiful myself. Anyway, this is what you are going to run into and this is what you can do. It doesn't take much extra.

But here is something we have to watch in this business. Yeah, we can do it, it just takes a little more. I don't know, they probably take the Bobcat out there. One more piece of equipment, and we can do it right, but you aren't making a dime.

Questions and Comments

Q. How is it unloading?

A. We use a walking floor bed - very typically has slats running the full length of the floor. As they come out they all come out together. As they go back they only go back one and two at a time. But now you can unload and as you're unloading, you just allow the pile to push the truck fork. But you can unload it in 10 or 15 minutes.

We can cut cedar and in our part of the country we've got, 25 sawmills that has 30 to 50 thousand feet a day. We're left-hand cousins up there, okay. But I'll take our business over there. Right now we buy, I think Joe called the house yesterday and we bought 18,000 feet of logs. And everyone of those guys used to haul to the oak guys because oak has gotten so bad, the lower grade level that they can't afford to haul it. In the timber business I think we've got the top in cedar. I know it.

Management Panel Discussion

Craig McKinley, Rod Will, Skip Mourglia, David Gwaze

David Gwaze:

Good morning everybody! In the management sessions we had some very, very good discussions. I don't think we solved anything, especially the pruning issue. I thought it went very well. What I came out with is that we need to have more information on management. There's a lot that we need to do, particularly in thinning and also pruning. These issues have not been addressed comprehensively. And I think if we need to move forward, and acquire that information, we need to prioritize, you know from this workshop, we think we need to do this research. It needs to come from you so it's important that we have information to help you manage redcedar. I'm hoping there is someone here who will stand up and say, we need research. Because, some of us, when we go to our own agencies, if we tell them that it came from you guys that it is a priority, I think that we might be able to get some funding for that sort of research. Thank you.

Rod Will:

What he said. I would agree with David and I think there were some very good discussions in the management session. Particularly in my talk about maybe prescriptions for managing for redcedar and in oak stands visited on the field trip. I definitely agree with David in terms of research. There's a lot that needs to be done in terms of management and unfortunately there isn't a lot of money out there for the research. USDA I don't think is going to give a lot of money for that type of research. Not to say that you all have check books and can write a big check, but you can help us with research by providing places to do the research or identify the problems for us and let us go out and beat the bushes to find the resources to do the research. Hopefully this is a good opportunity for us as scientists to network and meet folks who have questions that need to be answered and a site that could be studied.

Q. Do you want sites only in Missouri?

Rod Will: I would say the advantage of regional networks and conferences that we've got the ability to look at regional-wide resources. Oklahoma, Missouri, Arkansas, I know a lot of folks are here from Arkansas and even Nebraska and Kansas folks here, that's an important resource there as well. So I'd say region-wide is the real value here.

Panel Member:

I'm here to fill in for Bruce Moltzan who did the insect and disease talk yesterday. Unfortunately I was unable to sit in on that talk but I as well as a couple of the other certified arborists in the crowd here can certainly answer any questions you have on insects and diseases for eastern redcedar. We're fortunate in that because so many juniper varieties are used for horticultural purposes and for landscape shrubs and things, we have a lot of information on insects and diseases. Because that's where a

lot of insect and disease problems arise and become an issue, is when those cultivated cedars and junipers are planted around homes. So, we do have a lot of information on that. Not where it directly applies to stands of eastern redcedar in a managed situation but I had an interesting conversation with someone last night, this kind of goes in the opposite direction, because he said, 'Well I was glad to learn about Phomopsis blight because I'd like to try and find out how I can get some and put it on my eastern redcedar to get rid of it.' But if you have any questions about the insect and disease issues that were brought up during yesterday's session, I'll certainly try and address those.

Panel Member:

Before we open up I guess I have one more comment in terms of management and the importance of management. Many of you out there are maybe producers, and if you get a load of logs from it doesn't really matter where, and there's plenty of resource out there, region-wide. But I'd say that good management helps everybody. It helps the landowner; more profit more value from the resource on their land, and also for manufacturers because they can be more efficient in terms of harvesting and a better quality down the road. So, I'd say that everybody in the room has a vested interest in better management.

David Gwaze:

Yesterday we talked a lot about managing stands, one thing we didn't talk about yesterday is, are people interested in managing mixed stands? You know oak/cedar stands…?

From Audience:

While you're talking about research and money, I know I can inject an idea that might be obtainable. The original cedar that came into this part of the country, it has its own name and its own description and it's called pencil cedar. And the guys that cut this out of the big canyons know that it has less than ½ inch of sap and all the limbs on it are very big limbs. It's a full body tree. But it's almost gone. I'd like to suggest that if you have the availability to do some kind of genetic research on these sub-species of cedar, that you can capitalize on this better quality, original, pencil cedar and introduce some of those genes back into this field cedar and this columnar cedar and some of this big sap cedar and put some better quality in that. It would be far more attainable on the retail end to have those genetics in our cedar than to have the bush cedar that we have growing out in the prairie. I'd like to see some kind of research done on that and anything that I could do to help facilitate that, I'd volunteer to do that.

Rod Will:

Great, a comment on that, in my first presentation yesterday I showed that columnar form cedar and I made a comment. I had two people come up to me later afterwards and say that they had actually tried some kind of transplanting of sources of the columnar and the old field and the preliminary evidence from those types of things that the columnar form didn't revert back to the that old field. This would argue that

it could be instead of genetic differentiation, more of a site quality issue. So I think that this issue is very, very important in my estimation and it needs more work.

From Audience:

I'd be glad to show you the difference I talked about. I can show you the difference in two different species or subspecies on the same ground. And you can distinctly see the difference in the old, original cedar versus the subspecies or the limby, short, mighty cedar growing in the same location. There is some of that pencil cedar still around and it is far superior wood than what we commonly see today.

From Audience:

I don't doubt you. There's obviously a lot of variation out there in genetics and the potential to exploit it. Global warming right? I'm just kidding.

Q. Oklahoma recognizes that they have a serious problem with eastern redcedar infestation. Is there a way to get their money where their mouth is or is that just something that just can't be done?

Craig McKinley:

I think that if we look at Oklahoma as a culture, and some people think it is a different culture, it is a rangeland culture. The number one agricultural product has always been livestock and it probably always will be. You go past interstate 35 it becomes a different kind of climate. East of interstate 35, northeast part of the state they call it green country, southeast part of the state is where the commercial forests are. You pass I-35 you go to range and prairie, that's wheat and cattle country. So what's Oklahoma going to do? There's a lot of folks who say we don't want redcedar because it encroaches on our rangeland. The only way we get that changed is for people west of I-35 to realize that there might be a profit and an economic benefit to having the cedar. Right now, they'll pay money to get rid of it. If we had the processing facilities, what would happen is the first week they would pay you to get rid of the cedar and then when they discovered you were making money off of it, they'd want some of that cut. So it's going to be a changing economic condition as well. As far as the state putting money to say let's utilize redcedar, I don't see it's going to happen in a large way because cattle is still the king in that part of the country.

From Audience:

As a follow up to that, I would be looking for the research to find out for example the cedar mulch advantages. Why is it better than other mulch? Do the research so we could use the information to promote that product. By promoting that product we are going to create value and that will help eliminate the problem from the citizen side of it. So while we aren't looking for the funding to do it, we are looking for funding for the research to show what's good, what's bad when using cedar mulch. By doing that, you can use that to create demand.

Craig McKinley:

I will not disagree and I think what we have to do in order to get that next step is not me go to the Dean. But you as individuals, as clientele, as stakeholders, to come to campus with your data and your legislature to meet together and say here is a company or here is an industry or here is a business that if you will provide us research dollars, here is what we think the outcome will be. We can use the governor's task force from several years ago as a base for that. But it's going to take more than just faculty members walking up to the Dean saying we sure do wish we had more money down here. That's just not going to get it done.

From Audience:

It's not a redcedar, but it's the same thing. I'm from Arizona where we have cattle is king for 100 years, several hundred years actually since the Spanish showed up, and the heavy cattle grazing instead of bringing in cedar brought in mesquite. And we have mesquite rangeland that used to be grass - it's mesquite and almost no grass. They've done some studies there and even for fire wood the mesquite is worth more than the grass is for grazing. And if you get into timber tracks, you got timber tracks that are worth $50,000 an acre of mesquite that would have been grazing land that might have brought in $200 a year, maybe, maybe $100. I think that if you really start to look at this stuff and you start to look at it as a resource and an alternative to cattle, or maybe, to have a mixed resource and you have a mixed stand of better cedars, higher quality, possibly pruned cedars with your cattle resource you may find that you can increase your overall income dramatically. And not have to get rid of it frankly.

Craig McKinley:

We've got a lot of people to convince and it's going to take those dollar signs. It's economic.

From Audience:

It takes a big paycheck, that's right. And the big paycheck starts showing up and they see that the neighbors are making money. That's when everybody thinks it's a great idea. The first guy is always an idiot.

Craig McKinley:

We see that in a lot of different businesses, nursery business, I remember there was a single company in Bryan, Texas, that made and sold gooseneck trailers. Why Bryan? Why goosenecks? Some 20 years later there's about 5-6 gooseneck trailer operations going on in the same city. So the same sort of thing, once that first person is willing to be that groundbreaker, good things can happen. But it's a cultural change that has to be shown economically, sustainability-wise, etc. then we can go somewhere. I don't disagree with any of it. I appreciate Richard's comments on the research because you have to have the research but it's got to be that type of research that is usable. For some research, we can say, it is going to pay dividends in 40 years, but it looks to me like we need something that is going to pay dividend a whole lot quicker than that.

Rod Will:

Yeah, I just want to second what Craig said about you all getting out there and giving some pressure to legislatures and even people at the universities higher up. When we write proposals to get funding we need to have a rational section where we can justify why this research is valuable to stakeholders, people in Oklahoma or the region. Being here at the meetings has been giving me information for those sections and having you all talking to folks and speaking up on behalf of cedar research would be a great benefit for us and you as well.

David Gwaze:

I think the comment by Rod was good and we need a follow up.

Mike Gold:

In an agroforestry system, meaning using cedar in some sort of integrated way, I mean right now cedar is used in the plains and other areas for wind break, for crops, for livestock and so on. Perhaps into areas in Oklahoma where you have so much encroachment and you have the cattle culture there would be the opportunity to determine what the changes are and the carrying capacity if you modify the cedar. How much cedar do you want in an acre in order to perhaps improve the microclimate so that you actually have more forage, more carrying capacity than if you didn't have it at all? One of the things that we found with a little research done at the University of Missouri, not with cedar but with pine, is that there are a lot of cool season grasses and some warm season grasses that will actually do really well in 50% shade. So if you don't have the cedar in the thicket, you want to also have cattle. The grass will green up earlier in the spring because of the microclimate effect of the trees. The grass will green up and stay green again once it cools down later in the fall so you can reduce your hay costs. So there may be opportunities. And also it has a lot of benefit to animal health. You go outside today and where do you see the cattle? They are under whatever tree they can find. If you have more trees spread out you might have more grazing throughout the season. So if you mix pure open pasture with what we call silvo-pasture and using cedar where there is a lot of cedar, just take advantage of the resources. That's where the research may help out.

From Audience:

There was a magic phrase that jumped out of some of the materials that I got during this seminar, and that phrase was carbon sequestration. I don't recall where it came from but that's been a hot subject into other areas and they're talking about dollars for that type of effort. Maybe Oklahoma can become one of the hot spots for carbon sequestration in the United States.

Rod Will:

Yes, that's definitely correct. The numbers that I had in my talk yesterday, when you compare carbon storage in prairie by 22 times greater carbon storage in a cedar stand than you would in the prairie. To maintain the prairie, you have to burn it. You burn it; carbon is turned back to CO2 and emitted to the atmosphere again. The

conversion of prairie to cedar forest or cedar thicket will undoubtedly dramatically increase carbon stored on the landscape. In terms of value the whole system is still being worked out. The future, I'd say, is bright but highly uncertain. How things will be actually applied and ultimate value once the marketplace sorts all that out. But current prices are up to about $3.65 per ton of CO2 taken out. We have 4-6 tons of the CO2 taken up on an annual basis by cedar stands. $15-20 an acre in terms of carbon sequestration in terms of current value right now. That's not huge. Added to other management activities it might help pay taxes or might push something for us, an economic break point. The value of carbon goes to $12 a ton; the future could be very bright. It would be politically very difficult to justify converting what people see as a functioning ecosystem in a tall grass prairie to cedar thickets for carbon storage. So, the future is bright.

From Audience:

This is a very interesting topic, this carbon sequestration. On September 28th of this year at Overton, Texas, Texas A&M University, Oklahoma State University and LSU are co-sponsoring an all day carbon credit workshop. If any of you are interested in attending that let me know. I have the materials. Again that's September 28th, in Overton, Texas. It's kind of on the other end of this region. It looks to be one of the early workshops in this arena. There was one a week and a half or so ago, there will be more, but I think we are just now beginning to get a handle on what is going on.

From Audience:

At the Missouri Society of American Foresters meeting in February we will be doing carbon sequestration. We will be having the aggregator that is here in Missouri; there's only one right now as far as that goes, but we'll be having more updates. Steve Flick is the director. That will be at the end of February in Columbia.

Moltzan substitute:

One of the issues that's already surfaced that's been talked about with this carbon sequestration as it pertains to managing a forest is that when you have a management plan written and you intentionally carry out different activities in your forest to manage it, a lot of times you are intentionally concentrating growth and sunlight and water on particular stems. You're enhancing and improving and increasing their growth. And the thought right now is that a forest that's left to its own devices already takes up X amount of carbon. When you practice management you are able to increase the ability of the forest to take up carbon. What's being batted around now is they're trying to define what that increase is. How many metric tons per acre does that translate to? And I've seen figures for our Midwest hardwoods of 2.25-2.5 metric tons per acre as being the increase in a managed forest. So it's hope that in the future as this carbon-credit scenario plays out, those that are practicing management with a regular management plan or process where they actually accomplish conservation practices and improve the forest, will also be paid for that process as well as what exists now. Which is the opportunity to receive carbon credit for seedling plantings and plantations and things like that.

Q. I would like to comment that when you do manage, you are moving yourself over the root system and there is some damage. You need to be aware of that.

We used up our allotted time for the management panel, so I'm going to invite the marketing speakers to come forward and sit at the table, but first before these people leave if they are willing to stay, we might just used them as a combined panel with the marketing because I think we are going into some very general topics.

Marketing and Utilization Panel Discussion

David Gwaze, Rod Will, Craig McKinley, Mike Brittain, Hank Stelzer

From Audience:

Comment regarding the relationship between cattle and timber production.

Mike Brittain:

I'm only going to speak in terms of Taney County because I'm very aware of how we do things there. Cattle and cedar in Taney County are very co-habitable, they love each other, they get along together. But what we do in Taney County that they don't do in a lot of prairie states, we do intense pasture management. It's a simple fact that if you don't want cedar in your prairie, you need to buy a box of matches, a brush hogger, or a set of pruning hooks; it's real simple, if you don't want cedar out there bothering your pasture, get rid of it. We brush hogged in our country all the time, but we also burn quite frequently. We keep a lot of that small stuff, and then the larger stuff we manage it and allow it to grow its course and we cycle our cedar a lot faster than these guys understand that we do. I noticed yesterday we were talking about some 40-year-old-cedars, well actually a lot of those cedars where they do their study, some of that stuff might have been about 15-18 years old. And if you cut the other stuff out from around it then it grows a lot faster than your records will show. But pasture management, cattle and cedar, go really well together with just a little bit of planning.

Panel Member:

Mike made an excellent point in that as we look at this there is a difference in pasture and range land, by definition. I think you made a very good point about management of the pasture and whether in fact we are allowing the use of a rangeland in more of a wild land situation. Management is obviously less intense in the rangeland, different inputs and outputs. So good point, Mike. Thank you.

Panel:

I guess to kind of speak up for the tall grass prairie; conversion of the tall grass prairie to cedar thicket is going to have some serious ecological consequences in terms of species diversity, wildlife that are in the prairie. I guess when I talk about management in central Oklahoma, I'm not advocating turning it all into a cedar stand but there is inherent value in tall grass prairie beyond what's there in terms of grass or cattle. But at the same time what we're seeing is being converted by accident, by neglect. And if a landowner isn't going to take the steps and allow it to convert to cedar, I would advocate strongly that they take a little bit of active management and get the density correct, get some high-quality stuff, low biomass, more volume for your time. And I guess also, we were talking about $15 a year for carbon sequestration. All that's irrelevant if some rich guy from Dallas comes into Oklahoma to buy a 260-acre-ranchette and be a genuine farmer. All that goes out the window when you consider land prices and other economic issues.

From Audience:

I'd just like to inject as a landowner and involved in forestry in different aspects, this carbon sequestration may be the answer to a lot of people's prayer. It's kind of the common denominator between the cowman, the row man, and the timber man. We can all come to an agreement if we can make money at it. And this is an opportunity, and this is just my opinion, everyone in this room ought to be studying carbon sequestration because it's probably our future and the way to keep everything on an even keel where everybody gets along and does well. I don't have enough good things to say about this. This is the first time in my lifetime I've seen an opportunity to have your cake and eat it too.

Richard Newton:

Carbon sequestration. Is that not a government supported program or does it come from powerful companies? Is that where the money comes from?

Craig McKinley:

Richard, my understanding right now is that there is a Chicago Carbon Exchange that works exactly like the stock market. It's not Government funded, but it's Government driven. It's driven from the Kyoto Protocol that says we are going to cut emissions. Now the U.S. has not signed up to the Kyoto Protocol yet, so we're kind of out there doing our own thing, but the idea very simply, the Government says you cannot have over x-amount of emissions for any one organization, any one company, any one power plant. If that company wishes to produce more greenhouse gas emissions, in this case more carbon dioxide, then they somehow have to pay the penalty. They either they have to pay money back to the government because they are exceeding the emissions or they're buying credits because somebody else is not producing as much emissions as they are allowed. So we're trading what we're polluting for that which somebody else is not polluting. And the idea is that this has economic value. So if we are in fact sequestering carbon in a forest stand, some company can buy those credits and then over pollute if you want to call it that. That's pretty bold talk, but that's what they are doing; they are exceeding their emissions. So it is a free enterprise market system, government driven. Go ahead Hank, you've worked with this here in Missouri, I know so you can give us that background.

Hank Stelzer:

Well since we ran that piece it's generated a lot of interest. I've talked to a number of people both at the Chicago Climate Exchange and the aggregators that are involved, the big players that are out there right now. There are about 55 on the Exchange if you look at it. And the best thing right now is like I said, buyer beware because we're getting some calls from folks saying, asking folks to sign up. And all I'm telling folks is, as they go on, to make sure they are an aggregator. The way this thing works, the bigger picture, everybody has heard of Kyoto. Okay, well all of the countries are signed up for that. They're already trading theirs. There's an international exchange, it's not just a Chicago exchange. There are countries right now that are trading amongst themselves in the world market. Carbon is going just to show you. We're not

players yet. And the world market is going for about $35 at the time compared to 365 in this country. So once we become a player in this vacuum…

Q. What about carbon? Is there a place they can get on a website and take a look at how that works?

Panel Member: In the vacuum of that, there are a number of other ways folks have done. What Greg was describing was cap and trade. There's cap or you can trade your emissions away. And the federal government is not involved at all in this only from the standpoint that they are not playing according to protocols. What's happening is some states have taken it upon themselves. California is a really good example of that. They've got a registry; it's another level thing that's registry, cap, and trade. And there it's regulated by the state or there is now a compact that you've kind of heard in the news with the senators and representatives out there, 17 states. They are tired of waiting for the federal government to do something so some of the states, California taking the lead, but it's Oregon, Washington, they're doing this. The free market system, this was really just a number of groups that come together. Normally you don't say Farm Bureau and Farmer's Union in the same breath. But the first player that really hit the splash on this was the Iowa Farm Bureau. And they along with the North Dakota Farmer's Union were one of the chartered members who will have founded the Chicago Climate Exchange. They decided to go for a free market system because they saw this happening. They saw some need to do this. And there were a number of other folks that are involved in this. So what's happening now? And what they have to do - find an aggregator, And Mike you can correct me on this, I think it's 10,000 acre blocks or 100,000 acre blocks. That's why we have what you call aggregators. You know, Julie's got 40 acres, I've got 80 acres but there's no way to do it. So the responsibility as aggregators is to pull all the individuals together and they are responsible for submitting these blocks of timber or these blocks of no-till corn or whatever it is, to trade in these 10,000-acre blocks, if you will. There's been no money exchanged. Not one landowner yet has received dollars yet because he's still in the process of being aggregated. At least on the forestry side, no there's no till, there's some other ones that are out there, but back to us, we're still kind of in that aggregation phase. And what's happening because of the world market is that everything's really been traded and exchanged and caught. And so the world is looking at North America as an untapped resource. I mean: China's situation, Southeast Asia's explosion of industrial growth, they've looked around they've done pretty much all the international and the Kyoto's have been going on for quite a while. So what's happening now is everybody is really wanting the outside, international communities to put the pressure on the United States to play the game. But they are also looking at it as an untapped resource. And so there could be in Europe, last week when I was talking with Steve, there's some entrepreneurs in the U.K. they're looking to come here. They're betting that a carbon market in the U.S. is going to break. And so while they are not offering you 35, they've been sending out feelers for $10. So 5 times what's being traded. But the point to bring to everyone is: stay calm, don't do anything, just look at the aggregators, they're out there. If you're approached, or if your organization, Tree Farm, is trying to be a player in this, whether or not they are going to be an aggregator themselves. I've been talking with

Simpson and the folks there, they don't quite have their act together but they are trying to move on it. They have certification so there's something to be said there. But I think what you're going to see in the next 6 months, 12 months it's going to be a fast changing world. So just kind of hold on; if you can get to those folks in Oklahoma, like Greg's workshop, I think it will change from the time Greg has his and we have ours. It's just going to be something to say tuned to. You've got a good idea: everyone needs to do their homework because it's changing so fast. But it is coming. One of our folks, the comment was made, from unmanaged to managed. That's right, there's a term out there called additionality. That's the big one that the environmentalist our saying, 'Look, your trees are already out there producing so you can't double-dip.' But it we can show on the managed vs. unmanaged, that's where it's going to come. And one of our key players is really working with the Chicago Exchange is Pioneer Forest here in Missouri. They've been documenting their forest since 1950 so they've got the records to show what an unmanaged stand vs. a managed stand does. One last thing as far as how does Chicago Climate Exchange work right now, there's a forestry committee in the exchange and it's run by a bunch of 20-somethings, great on the economic side great on the hedge funds and everything else, but they know squat about forestry. And a lot of the folks that are on there were the old industrial companies. Mead Westvaco is a big player on the committee. But that said, they no longer own the land so that committee is changing around. Forestry has always been a kind of thing… there's 22 members on this committee. They say that when they call this monthly meeting, if they get 4 people to show up, it's good. So some of these folks are looking at this as an opportunity, like tree farmers, some of these folks know a little bit about forestry to make trees a big effort. The only thing that comes as no cost to you is where they make their money. There's a fee for trading but it's a small percentage, then there's usually a 10% of the dollars that come to you can go to the aggregator, for doing their job, the auditing, signing you up and all of those things. So that's where that comes from and that's where they make their money. 10 % is the norm, but there are some folks out there trying to be a little bit more greedy saying 20-30%, well that's not going to happen. If you do your homework, the market is going to drive that percentage. But the way that a lot of folks are looking at this is, they aren't looking to make money on this. It's the hippy throw-back to some of us still. They figure there's enough of a market that everyone can be happy. They make money doing what they are doing but the whole idea is to get the incentive to the landowner to do something. So right now we're at the mid-cost for it, the motives are good. I think as everyone becomes aware, the motives will remain relatively pure. The thing is right now, just beware. You can go online to ccx.com it's the piece. Just stay tuned; I'm sure you can call attention to in various states. There's possibilities there.

Panel Member:

Another thing I wanted to mention about being vigilant this sequestration program, I want everyone here to prepare themselves and be ready to fight to make darn sure that there's not going to be a penalty phase on this carbon sequestration at the sawmill. We don't want the Europeans and the academics to say, "Oh by the way, we can penalize those people that cut this carbon and destroy it at the sawmill buy giving

them a penalty fee of 10 or 20 cents a foot for every log that comes in there for taking it out of carbon sequestration. As a landowner and as a business man in the forestry industry, I want to make darn sure that we're not going to be penalized in order for these other guys to get a free ride on their carbon sequestration.

Mike Gold

I just want to comment that the thing about taking wood to the mill is that essentially that carbon has been sequestered, but in putting it into forest products you lock it in. If you burn it, you put it back into the atmosphere. If you mill it, you've locked it in and it stays out of the atmosphere, so that's a positive.

From Audience:

I understand that and I'm all for that and I'm a proponent of what we're talking about. I'm just telling you that you need to make darn sure that these other people know that. It's easy to pass a penalty along with big businesses involved. And who's the smallest business involved in carbon sequestration… the farmer and the forester. And we don't want them to make us bear the burden. It's just my opinion.

From Audience:

Again the education comes in to everything. Another thing that you might want to do, if anyone is approached on any agricultural practice for an aggregator, you really ought to make sure that they're not going to follow the Chicago Climate Exchange wood policy, but rather is following the generic wood policy. When we go international the bar is going to go up. That's one of the things that I've seen as a potential watch-out. And I don't want to get into that, but the Chicago Climate Exchange, their contractor and procedure went up by 10 on the international side. I have not gone through it in its entirety but what I do know make sure that these aggregators out there are meeting that higher standard and there are some like I said, but make sure that they are playing by the international rules even though they don't have to now. They do anticipate this, whether it becomes an administration change, the U.S. is going to be forced to play by international rules.

From Audience:

One thing that worries me about this whole project, let's say the city of Beijing has bought a lot of carbon credit, they certainly need them for the amount of pollution that they generate. What is the poor bloke on street in Beijing going to think of all this when he's got a heavily polluted city and he understands that city has bought a bunch of these credits? And I just give that as a hypothetical example but you've got people living in heavily polluted environments, will it comfort them to know that someone has bought some carbon credits?

From Audience

In America? If they buy international carbon credits from Beijing, they could buy carbon credits in Springfield, Missouri.

From Audience

Right but what about the purchases of the carbon credits? What effect is that going to have on the environment of the people who live in that area?

From Audience:

It won't stop Global Warming. They'll have to buy a sawmill I guess. There's no hope.

Panel Member:

I think that's a very valid point: What does the person living in a polluted area think about their city buying credit so the city can continue to pollute? My opinion, and that's all it is, the first thing is very simply, that they don't care. It's polluted now, it'll be polluted tomorrow; what's the difference in buying credit and not. However, the credit system is a first step and a first step only, because as we move forward some of these cities and organizations will not want to buy these credits. They will then invest in technologies that is cheaper in the long run to prevent the pollution rather than buying credits to off-set that pollution. So I think in a 30-50 year span that city should clean up and those industries should have less emissions. The first step is where we are at right now.

Mike Gold:

Just one comment about that, perhaps a lot of you have heard about it. But there are hundreds of cities in the United States who have taken it upon themselves to reduce their carbon emissions. The city of Columbia, Missouri is just one of those cities so they made a commitment to provide 15% of their power within not too many years from alternative sources: from wind power, other sources other than coal, electric, and so on. So it's going on already, it's happening. The Federal Government isn't driving it, the states and the cities are. It's happening; it's underway. It's just something that's responsible or needed.

From Audience:

There's a saying in another arena, that justice delayed is justice denied. And for the person living in Beijing, who knows better and has an understanding better than his forefather did, to know that he is living in this polluted environment because his city purchased these credits, seems strange to me. I'm not against credits, I'm just thinking about the other bloke.

Redcedar: Today and Tomorrow

Richard Newton, Eastern Red Cedar products

Introduction

To get another view on today and tomorrow relative to redcedar. We asked Mr. Richard Newton to give us his thoughts. Most of you met Richard yesterday and were able to visit with him some. Hopefully you learned something because he's just truly a wealth of knowledge. And this morning he will give some more of that knowledge to us.

Presentation

Thank you very much. This has been a great, great gathering over these few days. If you go away from here and you don't have that tid-bit of knowledge that is going to help you, then you just haven't been listening. There has been a wealth of information. Also, the ability to network here is extremely important. You've got to know people; you've got to work with people. And Paul (Todd), the Aromatic Cedar Association should be a framework for expanding, I think, into a national group that will market eastern redcedar.

Now, I'm going to have a little fun with some numbers and the nice thing about this is that in the future when everything that I say is absolutely wrong, I'm not going to be around for anybody to tell me about it. And another thing, if I could actually predict the future, I'd be filling out lottery cards or I'd be at the racetrack. I think there are 4 areas that are vastly untapped markets. We need some way of getting into them. I'm going to throw some numbers out.

1. Mulch

We're heavily involved making mulch in Oklahoma. Before we started in Oklahoma, we heard that cedars were encroaching on 762 acres per day. Well, we and a competitor or two, have got that down to about 759 per day. Whoa! Talk about potential. Now, we need research to show that cedar mulch is superior to other mulches. We think cedar is superior to cypress. That is logged from the swamps, near the gulf. Put the word out. Cedar is environmentally friendly - cypress, environmentally unfriendly. It's fair game. You build up your own compared to the competition. The mulch market in the U.S. is absolutely enormous. It can suck up 700 acres of mulch per day if all those cedar trees went in that. So that market is there. It simply needs someone to promote it. People need to know about cedar mulch. As an example, we have a website. We sell cedar. People will call and say, "Man! I've been hunting for weeks for someone who can sell me some cedar boards." And those of you who are making cedar, think Geeze. I thought everyone knew I was here." In my local community I've advertised in the paper since the 1980's. Every week it comes out. And I'll just about guarantee it that over 50% of the people in our area don't know we exist. We have signs. It's hard to get the word out; it takes constant effort. Coke keeps advertising because they feel they have to. We aren't even touching the surface.

2. Cedar Paneling

I just read that there's going to be about 1.4 million new homes built, down considerably from what's been in the past. Take 10% of that, 140,000 homes. If you put about 500 sq feet of cedar paneling in that home, do their ceiling, do their den you will need 70,000,000 feet. Cedar makes good flooring. Gorgeous! Everybody goes, "Oooooh. Wow!" It'll work just fine. It's a busy wood so it doesn't work in all cases but there are places where it will be great. Marketing - you've got to market. When's the last time you saw an ad anywhere for cedar paneling. Do you ever see any? Giles and Kendal, they market a lot of it. Advertising. I guess they're selling all they can make. Ozark Mountain, they're number 2, selling all they can make. The potential is huge. All these homes, each have 500 sq. ft., just 10% of the homes can make. Built, not counting the older homes being remolded could use up 70 million square feet. 70 million! What an opportunity. I think there's a pretty good mark up on this if we do it right. Why not? If you're not dreaming, then where are you? Here's something you should dream about, log homes. I live in a cedar house made with 6 x 6s. Some of the logs in there were growing in the woods two days before we put them up. No problem, no checking, no shrinkage to speak of. They worked just fine. Low shrinkage is a nice property of cedar. Try doing that with poplar, or pine. What are you going to get with pine or poplar not dried right? Lawsuits. Just 1,000 homes takes 12 million board feet. That's just in the logs. That doesn't include the trim and other things that could go in to the home. That's just for 1,000 homes. There are sub-divisions that have more homes than that. Why? Market in that direction. We've got to market if we are going to increase cedar usage and stumpage price. You have to create the demand. People will not just think, "Well we're going to use cedar because we think it's good." You tell them, "Hey, you ought to use cedar. It's the greatest thing since sliced bread." Market it. You've got to market.

3. Privacy Fencing

If just 5%, 1 out of 20 homes put up 500 linear feet, 6-foot tall it would take 3,000 square feet of fencing boards per house or 225 million square feet. What a potential! 45 million in the posts to hold up the rails and another 50 million in the railings. 320 million feet of cedar could be used in privacy fencing. If any of you, that run a mill have had fence companies call you up, do they talk in wanting 1,000 feet of cedar or 10,000, it's, "Can you supply a semi-load a week? Fence boards 6 inches wide, 6 feet long?" Nope! Well how much can you supply? I don't think we even need to talk to you because we can't even come close. So we're not thinking at 6 foot. We could go 4 foot, 8 foot. Could we do 6 foot? Would it work? Can you expand your thinking and accept? Geeze. 3 ½ inches wide, 5 inch log will square up 3 ½ to 3 ½ just fine. A 6 foot log, 3 ½ to 3 ½, makes a great post for a 4 foot high fence. All of a sudden all of the loggers have a new place to go with their 5 inch logs.

So what are we doing? I'm playing the what if game, throwing numbers out there to try to get you to think. Go beyond your wildest imaginations of what is possible. Modernization. Shelby Jones stated that we're producing 100 million more feet (excess growth) a year in these states and he's missing half of it that's growing west of 135 in Oklahoma by the way. It would take 100 mills, each producing 4,000 feet a day or a

million feet a year to use up just new growth. Potential. Potential. Potential. And you are still going to have a couple billion board feet of standing cedar out there. That's the kind of resource available. What are we using now? I heard that the industry is using about 60 million feet, might be using 80 million. I don't know if that's in the 4-state area or the whole United States. I heard figures in United States that it's 60 to 100 million feet a year. I don't know if anyone has a real handle on these numbers. Just throwing numbers out, they could be wildly inaccurate, but it gives you a checkpoint. You can research and see if there's a germ of truth in what I'm saying.

4. Markets

Now to make it happen you need to increase markets. That is the driving force. As I run my sawmill I think of 3 things that I'm trying to balance. First: resource and procurement. I need to have feedstock going in the mill. Second: I need to have production facilities. I need to be able to do something with resources. And then I need to market it. But I just listed them backwards from what I really do. I find the markets; I listen to the folks on the phone dictate to me what I've got to be able to do, which determines which processing equipment I need to have and that tells me what my resource needs to be. It might be 6 foot logs or 4 foot. I got a call for a dozen 10 inch by 19 foot logs. Can I supply it? I'm open to it. I want to make that customer happy. By making them happy, they will happily give me their money. That's what I want. I'm in business to make money. I'm not in the business simply for the fun of taking a cedar log, making it into something and then trying to sell it but, I also I enjoy the business. I enjoy the action all the w ay through. That's what an entrepreneur does. It's more than just the bottom dollar. There's satisfaction in making people happy.

So we're going to have to have organization. The hardwood industry in Indiana has the Indiana Hardwood Lumberman's Association to promote the usage of Indiana's hardwoods. Exchange of knowledge, networking, sharing the knowledge, increasing demand, that is where the future of redcedar needs to go. Right now, Paul Todd has reacted to that challenge, so when he gets that all done then he can go and start chasing cats. That's kind of where the cedar industry is right now.

Questions and Comments

Q. You were right. 90 to 100 million feet is possible.

A. That's the numbers I came away with. You seem to concur with that. And that's just the 4-state area here. It's probably low. It's missing some of the Kansas cedar and some of the pockets of cedar in Oklahoma, but fairly accurate for Arkansas and Missouri. That does not include the growth in Kentucky, Tennessee, Alabama, Mississippi, Georgia, North Carolina, and South Carolina. I went to Connecticut and they had a problem with cedar growing underneath the power lines. Remember when we had that big black out up there where the trees got up into the big, high tension power lines? I went up there and looked at 3,000 acres that has eastern redcedar growing under those lines. That happened before I was in the mulch business. My advice for them was to make mulch out of it because it wasn't saw timber. It was just something that they needed to be rid of. That's Connecticut! Anybody think of

Connecticut as having a lot of cedar? Then there's Virginia. It has a tremendous resource. So does Indiana where I'm at. I think there's about 25 million feet in forest inventory. That's not very big. We're not cutting all that's growing even there. The forest resource is just fantastic. Oh, and I forgot to mention the biggest state, Texas. Is there any cedar down in Texas? Anybody from Texas?

A. Some of the biggest cedar in America comes from Texas!

A. Now why does that not surprise me to hear that?!

Q. Is there anybody doing research on the comparison of different kinds of mulch?

A. I don't think so at present. There's been a lot of research on mulch. I can answer that question, for example, what were you curious about? I can give you mulch 101 right quick: Cedar, Cyprus, and Redwood all have a neutral pH factor, that's why it's so attractive for flowering plants. If you put hardwood on flowering plants, it fixes the nitrogen in your soil and starves your plants. They'll live but they won't work. If you put hardwood mulch on large shrubs and trees, the tannic acids are attracted to those but it's not flowering plants. The difference between the other three is cedar has natural oil called citrol which kills mold, fungus, and repels insects. It's a Godsend for the horticulture industry. It's the very best mulch in the world of any kind, shape or form.

Q. We need that information. We need the source of that so we can document it.

A. Our university, under the direction and benefited by Giles and Kendall, has done extensive research on cedar. Remember the cedar oil? Auburn University did it first because their benefactor needed that for their commercial industry and they have tons and tons of information available on research and results of cedar and cedar application. Richard just made one of my points - why meeting and networking are important. If I learned nothing else by being here these days, is an extremely important bit of knowledge that will help me in my business. And that's just one of many that I picked up here.

Q. I have some more for you Richard. I've all kinds of mulch, and cedar lasts longer. Not longer than oak mulch, but holds its color longer than oak mulch. I always use cedar because it has all these little hairs and protrusions on it. When you put it on a slope it will stay there,

A. We need that information put in advertising.

Q. Let me give you one more property of cedar mulch. If you're using cedar mulch in a commercial setting, let's say next to a restaurant. You don't have a problem with bird scratch. One of the biggest problems with commercial mulch is bird-scratch. Every morning if you use cypress or hardwood or pine bark or pecan shells or walnut hulls to use in your commercial setting mulch, the first thing the dishwasher does every morning is go out there and sweep the mulch back in the flowerbed because at daylight, every bird in the country is out there digging up bugs, termites, and ants.

If you use cedar in there, not only does it smell good for the customers walking in and out of your business, but you don't have to sweep all that mulch back in there from bird-scratch.

Richard Newton:

These are very important things that we need to use. And it'll do two things: 1. It will increase demand. 2. It's signifying that we have a superior product. And when you have to superior product, guess what? People will pay more for it and knock your door down to get it. And we're talking about lowly, cedar mulch. I think Shelby talked about something that he never thought he would come to see, it's the utilization of all the waste products in the cedar industry. And these saw mills, each one of them if they're like me, being able to grind it up to make mulch. It's just like dying and going to Heaven. You're bending over and just picking up money every day. It's a blessing and it also gives you a good feeling to know that you're not taking that pile out back and burning it. Because I don't know anybody that … we like to see a fire every once in a while, but we sure don't like to see all those cedars go up. 20 years ago that's what we were doing with them. Stick them out back, get a damp day, light those things off and poof. Make it disappear. So instead of it being a cost, they become an asset. In fact, one person in Missouri is making a pretty good living just taking cord wood and grinding it up into mulch, getting a premium price out of that product because it is a premium product.

Q. Actually there's more than one doing that.
A. I just know of one in Missouri. Several before we got started, we stopped by and visited to check out the grinder.

Q. Yeah, there were guys doing it before we started. And that's another thing about cedar, one of the reasons that there's not a whole of information out of the cedar industry is a lot of these guys don't talk about their business. It's kind of a little niche business and people have found their spot and they don't want you to know anything about what they're doing.
A. And that is having the opposite effect of what you think it would. Yeah, there's going to be competition, but you're going to be good at what you do if you're starting in it. You're going to have to work at it. But if you keep it a secret then the general public is not going to know about it and if they don't know, how are they going to be knocking on your door to get more of it? If you work as a team you get a lot farther. And I understand that's how the cedar industry is. But if I want know who you are selling your product to, I bet that within just a few days, even though you wanted to closely guard that secret, I'll find out. All I've got to do is follow the truck to the first truck stop he stops at and talk to the driver. Anybody had that experience? Truck drivers know a lot and they haven't signed any confidentiality agreement that I know of.

Q. Ours do!
A. All you've gotta do is just follow that truck to where it goes if he won't talk. They're going to make a bee line to where their delivery is. So there are ways if you really

want to find out what's going on. If I want to find out what my competitor is selling lumber for, I call up and ask him. Why not? What's the difference between me and a customer calling up? If someone calls me up I say, "Hey, yeah! I've got a web site with an extensive price list!" I want people to know what I'm selling cedar for because I think I'm competitive.

You were talking about the market, and I was talking to Greg right here, and Rod, and it sounds like you have a rudimentary interest for a larger organization. And we heard a comment earlier today with 12 universities; we need to be doing research. So I can tell you Greg, I was asking him, and I know it's true in Missouri, I'd say it's true in Nebraska, and Kansas State as well. We do well on zero money. We get a lot of things now that come from industries, case and point. If you look at something down the road, like master's student or something to get done quickly, 2 years, you get some information like mulch. Just to throw out and make a point of education. It costs us to take a master's student through the program, depending upon the situation, somewhere between $40,000 and 50,000 for a 2-year program. That's their stipend and they're doing all of their support, their research. A PhD is usually a little bit more because it's 3-year program, usually somewhere between $60,000-$70,000. So that's how it happens. We get groups that come in to our university setting and here's money, this is what we want done. We will fund a position. That's where you come together and decide what is the critical research you'd like - critical questions to be answered. I think this is a great project that a master's student could do. We have a number of faculty from all 4 universities that could easily guide the students the way they want to. We are a working industry. We can't even get chemical companies to look at us to fund work for a pesticide order. We are 1/10 of 1% of their potential markets. This is so far off the radar screen. I say that on behalf of the universities here and Dave Gwaze.

The Next Steps

Michael Gold, University of Missouri Center for Agroforestry

Presentation

This part of the workshop is called "next steps" but we've been talking about next steps the whole time. And so this is the easiest talk I've ever not had to give. There's nothing that I know about the industry that Richard Newton doesn't know, and it's quite the opposite. But I took down all those points; agree with all those points.

Hank Stelzer just mentioned that if there are questions that we need answered that are going to support the industry, have a larger voice. It's really important. So if you've got an orphan industry and if forestry is an orphan then redcedar would be Little Orphan Annie in terms of the radar screen. Shelby Jones said if you put up a sale of redcedar then you'll get zero bids. There's just not that many people who know. We, at the University of Missouri, put out that survey 5 years ago. Of the couple hundred firms we could identify, we had less than 1/3rd willing to share that information, and so again that hurts everybody. Everybody wants to know what we found out about the market but not many want to share information about the market and that creates a problem. We can't lift the boat here collectively if we aren't willing to engage in the information.

Q. Well I'm curious as to how the University goes about gathering their information. Now I'm going to take issue just briefly, you just made the statement that if you issue a bid for cedar no body shows up. In our country, the National Forest issues bids for cedar continuously. I've been to several cedar bids and there might be 20 – 30 guys there.

Panel Member:

In the grape industry they are taking cedar sawdust, placing it throughout their grape vineyards in towers, where the wind can blow through. They're mulching their grapes with cedar sawdust. It stops the pheromone activity of the glassy winged sharp shooter, that's the insect that destroys grape vineyards. But that kind of information gets left on the table with no one reporting on it. There's a lot of industry information that I think the academics need desperately, but I don't know how to get that marriage in place. What we've done here is the most amazing thing I've seen in the cedar business ever.

Panel Member:

I agree with you. And let me suggest that, because this was organized, this is the beginning of making the connections and the networking that was just discussed. We've got these tape recorders here because we want to be able to put this information together and get it out. The things that you're bringing up and that many people have brought up, I don't know about. You know I work on, like everybody does, 45 different things and one of them is cedar. So it is invaluable to have people in the industry who see what our intentions are to collectively work with everybody to solve the problems and so on.

Panel Member:

I think the point I'm trying to make is that we need more of what we're doing here because this has really been great. If we could just teach David Gwaze how to prune a cedar tree!

Panel Member:

Just a comment. Junipers are found throughout the U.S. We're fortunate here in the east to have fairly high precipitation, but if some other area of the country exploits their juniper resource we could fall behind in gaining market share. I would encourage folks to act and act quickly.

Panel Member:

Well your comment was that if all of the juniper species are spreading and there might be the opportunity for somebody else to create the opportunity with other junipers and we'll sort of be behind in eastern redcedar. I don't think that's really going to happen because not all of the other junipers have as much of a positive asset from the chemical soup in the heartwood as eastern redcedar, *Juniperus virginiana*. It is by far the most dominant of the junipers you're talking about. And all the industries are located in the region where redcedar grows.

Panel Member:

So what you're seeing here today, I think, is the kick-off point for a lot of growth in the industry with more organization. I think that the industry players themselves are endorsing and supporting it, not the university, then it's going to go and we will partner and others will partner. I know for example, just within Missouri, the Missouri Department of Agriculture does have its eyes and ears open now to alternative markets of all kinds. We're talking to them about tiny little niche markets like chestnuts. They're going to listen to redcedar because there's a lot of redcedar manufacturing in the state. There's real dollars ongoing here, there's a lot of value added, there's a lot of jobs. We just need to put the data together to show them that there's a reason to invest more in the redcedar industry, for example.

Panel Member:

I think also it's extremely important to add to this, for people to add to this information, especially the universities and people doing research, that it becomes available. A perfect example, when Shelby was talking, about all these figures that were done in 2000 and 2003 and they have them for 2006. But what were your latest figures? 2000? Why isn't that information available? Somebody has it. It needs to be on a website called redcedar.com or something.

Mike Gold:

Perhaps most of you don't realize it except those folks that are in the cedar business that this kind of gathering really hasn't happened other than the former Oklahoma now Aromatic redcedar Association. Nobody's been coming to us ever, until we put that market survey together, asking a single question about redcedar. Perhaps they didn't even know we cared. And as soon as people say, "Well we need this

information," then I think you refine the Timber Products Output (TPO), you refine that data. I was talking with Hank Stelzer and just with our mental math we think there is a lot more activity than the TPO shows. They're missing a lot. They missed 2/3rds of Oklahoma's resource. So, there's a lot to do, but that's alright. Now we know some things to do.

Panel Member:

Now I don't want to be redundant, but as a suggestion, you know cedar started on the East Coast (with Atlantic white-cedar, *Chamaecyparis thyoides*). And a lot of what we're talking about here is mature industry there.

For example, George C. Brown, North Carolina, was the forerunner of all cedar. They funded a lot of university research. Giles and Kendall, along the eastern seaboard in South Carolina, those are all old and mature cedar industries that have done very, very well and have been extremely successful for a lot of years. I would strongly suspect that a lot of the research that we're talking about has been done and probably arcade in other communities if you guys in academia have a network that you might be able to reach some of that and pull it forward.

Panel Member:

You're probably right. The term for the literature that's a little hard to find, we call it gray literature. It sits on the shelves in a lot of places in a lot of libraries, and a lot of agencies and companies. And basically we need to start going there and asking if they can dig these things out for us. There's no need for re-inventing the wheel.

Richard Newton:

There is a bibliography on cedar; oh it's about that thick. There's a tremendous amount of research, I've kind of looked through it; I've got a copy of it, so I know it's out there, but just because you know it's there, how do you find it?

Q. Richard, all you have to do is Google it! It's actually published in .pdf format on a website if you want to print off all 100 or whatever pages it is. (Editors Note: Bibliography can be found at: http://www.nrs.fs.fed.us/pubs/rb/rb_nc166.pdf).

Richard Newton:

I operate a sawmill so I'm a little ancient on a computer. I bet there's probably quite a few in the cedar industry. If you've got kids you're in pretty good shape.

Q. Auburn went so far as to produce a video that I used as marketing throughout Asia in a cockroach study. I didn't go to Asia to sell cedar to deter termites because I didn't know if they had termites or not, but I knew they had cockroaches. And I used the video study that Auburn University did to the trade shows. I used the cockroach video that they made because it's a complete visual in how it repels cockroaches. And all that stuff has been done in a lot of places. I don't know if you can get that on video or not but it's out there.

Richard Newton:

Well we've got mutant cockroaches, I can tell you that. They live between our cedar lumber at times and they do come out of the logs. What it may be is that if it didn't repel them it there'd be 100 of them in there instead of just the one. Just because you see some in there, doesn't mean…

Q. You were talking about a chemical stew. Has anybody worked on that end of the spectrum?

A. Well we had that poster over in the other room where we are beginning to break out the individual components of the chemical stew. We're doing that right now and it's been only the last year, but I can assure you that it will be very much public domain. With the connection to the cedar industry we can see where there are opportunities to spin off new businesses based on what we find is effective on what. We looked in the literature and we saw that forest products and others have identified some of the chemicals. As with many things the sophistication of the chemistry and the equipment is so much greater now that we can find things that nobody has seen before because they didn't have the technology to look for it. Is Paul Todd sitting here somewhere? Do you have some comments here Paul, I'm gonna guess.

Paul Todd:

Well first of all I'm going to say that I appreciate the input. It's really good information. Richard is awful good at throwing out mind teasers. I'll throw out another mind teaser out for you. For those of you wanting to prune or control cedar, how about using your natural habitat, that is goats and llamas, will eat cedar. Sheep too? I didn't know that. Some of you want to be creative and control the cedar or prune it up so high. Rent some sheep for six weeks and it's done

Q. Do they eat the bark off too though?

A: I don't think so. They have too many other resources. The llamas, I don't think ate the bark. And speaking of the research that Mike was talking about, I know that the University of Texas has a brochure on that very subject. So we probably need to amalgamate that research and bring it forth to the membership here.

Q. Mike Gold: Maybe you could continue a little bit about organization idea. You've got the framework of an organization.

Paul Todd:

We do have a framework; it's a 501(c)3 corporation, started by myself, Dr. Steve Anderson and several people from Oklahoma State. We started 16 years ago. It saw its heights of about 157 members; it's down now to about 60 in the paid membership. The purpose of the organization is to provide education and promote the utilization vs. the destruction of cedar. We've met with some degree of success. The mulch, whole tree-grinding thing was a multi-year project to try to get that off of the ground. That started in Oklahoma and nobody else has been doing the whole tree grinding prior to Oklahoma bringing that to the forefront. And there are several other projects that we are spearheading that we are very proud of. We would like to see

very much a major cedar oil extraction plant go in. We know that there are two in Hot Springs, Winford Bates, where are you? He has a small one. Then there's another one next to him a little bit larger in size. We think there's room for yet another cedar oil extraction plant. The beauty of that is that once you extract the oil from out of the cedar, you can sell that for mulch. It's still a very saleable commodity. So you devise two sources of revenue out of the same product and there are other avenues that you could venture into.

Q. What is the oil used for?

A. Oil is used predominantly in the perfume industry and it's used in high-end soaps. People down in Houston, Texas called Cedarcide, and that was presented as one of the 'cides' that they buy an awful lot of it. They use it as an insecticide, pesticide, and they market it in that venue so they buy for that purpose.

Q. How does it affect your mulch when you take the oil out? Does it lose those properties?

A. There will be enough cedar oil left in your mulch. It might not last quite as long since the oil is out of it, but it'll still make excellent mulch. But one of the things that you left out that cedar oil is used for is in the electron microscope industry. Because cedar has a neutral clarity and a neutral viscosity and a neutral pH factor, if you place a piece of tissue in a containment of cedar oil, they can place that under the microscope and it doesn't swell, it doesn't shrink, it doesn't float, it doesn't sink and as far as I know it's the only thing that does that. We were just admiring your poetic prose!

A. There's been an awful lot of research looking at that and we know that cedar has 4% oil content by weight. That's just a generalization across the board and it may vary a little bit by region. But those that are extracting oil the most they can get is 50% of their oil out of the wood. That means there's 2% of oil, by weight, left in the wood so you still have that oil.

Paul Todd:

On Oct. 20th 2007 the Aromatic Cedar Association is having its annual convention in Ponca City, Oklahoma. Steve Flick will talk about cellulose ethanol from cedar. So you can also use that, in fact it makes a better product for ethanol to get pulled out. Then once you get through with that, you can see what you feel about it. You're getting the squeal not the hog.

Richard Newton:

I forgot to mention, you know those 1.4 million houses? That's just the U.S. We've got the rest of the world to sell to too. Add that number in there, so what's the potential?

Panel Member:

I just want to add to that. The world is aware of cedar. It is tradition in Thailand to be buried in a cedar casket. There's not a home in all of Asia that would not wish to

have one piece of cedar in their house because traditionally and spiritually it's a good luck charm and a tradition to have cedar in all of their homes. And in Asia today, most of the economic housing is made from concrete cubicles and it was my goal in life at one time to make sure everyone of those cupboards had cedar closet lining in it, and it really does repel the cockroaches. Another little mind-teaser, if every Chinese person had one board foot of cedar. When you get done with China, move over to India.

Panel Member:

I'm telling you there are products out there that we haven't even dreamed of that people are doing. Let your imagination run wild. Think about all of the products we make out of cedar. Talk about a versatile tree!

Mike Gold:

So there it is. I think we are coming to the end of this session. I echo what's been said, it's been a very interesting conference. Great opportunities bringing together a number of people that participated in every facet of the industry had a lot of good conversations. Personally I'm looking forward to this becoming, an annual or every two year event, I think it's worthwhile. Because all of these 15 - 30 minute breaks is where we really have a chance to talk to the people that we want to meet and have some good conversations. So there's a lot of value in these gatherings.

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