A Survey of Private or Bureau Log Scaling Practices and Problems in the Columbia River Douglas Fir Region

by

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CHAPTER I.

Objectives of Log Scaling

Every type of business should have some means of telling the amount of finished product which will come from a given amount of raw material. The lumber manufacturer naturally wants to know the number of board feet which will be manufactured from a given quantity of logs. The means by which this is determined is called log scaling. In most countries except the United States the measurements are computed in terms of cubic feet rather than board feet.

It is practically impossible to figure accurately the board foot content of all sizes of logs by converting from cubic feet content. Therefore, the lumbermen in this country developed a special means for measuring the board feet in logs. This has resulted in log rules, which are tables giving the number of board feet in logs of various sizes.

There are at present many types of log rules in use and the entire difficulty in making one resolves itself into determining the amount to be allowed for the slab and sawdust. Some of the items which affect the amount of slab and sawdust and which must be taken into consideration are: (1) Thickness of the saw; (2) Width of the smallest board which may be used; (3) The thickness of the board; (4) The skill of the sawyer; (5) The sawing method used; (6) The efficiency of the machinery; (7) Defects in the timber; (8) The amount of taper; (9) Shrinkage.
The log rules vary a great deal. Different log rules have different saw kerfs and some take care of taper while others do not.

Another reason for scaling practices is to allow for the defects in a log, and the scaler must have a good knowledge as to how the log is to be sawed. If there were no defects in the timber it would be a simple process to measure the diameter and length of the log and then consult a log rule to determine the board footage. A scale or grade at all times should only represent a carefully made survey of the timber.

According to rules set in this area, the log scaler's responsibility to the buyer, the seller, and the lumber industry as a whole, requires that he furnish an accurate and absolutely impartial appraisal in his scaling and grading of logs.

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The position of a log scaler is that of an appraiser, therefore he must have sound judgment and must be opposed to arguments that would influence his opinion or decision unless the arguments are backed by substantial evidence, in such case he should take steps to correct his error. The scaler is always subject to harsh criticism, but rather than argue, he should prove his point if possible.

The log scaler must know the log rule and be well acquainted with the rules and regulations governing the scaling and grading of logs in the district in which he is working. He should know the different species of growing timber as well as any peculiar characteristics or diseases with which the timber is infected. In order to judge accurately the proper deductions to make for such damage as might result in falling, bucking, yarding, loading, or unloading logs, the scaler should have a fair knowledge of lumber practices. He should have a general knowledge of sawmill, lumber yard, and logging camp setups. He must also be able to adapt himself to various kinds of weather conditions.

In the early days of log scaling and before present day rules came into use various means of dishonesty were practiced among the scalers. Some of these dishonest methods are as follows: Keeping two separate and distinct records of the scale; inflating the number of pieces on the landing;
recording the scale to a different mark; cutting off from ½ to 3/4 of an inch from the bottom of the scale rules used by the scaler and inspector. These practices have practically disappeared with the coming of present day scaling rules.

The duties of the log scaler as compiled by the Columbia River Log Scaling and Grading Bureau are:

(1) To furnish a fair and impartial scale and grade in accordance with the rules of the Bureau.

(2) He must be free from undue influence from either the buyer or seller, and he must scale each individual log upon its own merits.

(3) If, after careful examination of any log, no defect is found, then that log shall be scaled at its full diameter inside the bark and full length with necessary trim. When any waste or defect is found in any log a deduction in scale shall be made which will adequately and sufficiently eliminate the waste.

(4) On logs requiring both scale and grade the log shall be scaled first and graded second.
CHAPTER III.

Present Practices

The log scaling business is full of peculiarities which make it extremely difficult to establish fixed rules which would resolve log scaling into an exact science and the best that can be expected of rules and regulations is a means of establishing certain fundamental principles upon which log scalers may base their judgment in making decisions.

The three present methods of making deductions are by reducing the diameter, by reducing the length, and by the percentage system. The diameter reduction distributes the estimated defect over the entire log and the length deduction involves all of the wood in the part deducted whether it be defective or not. The percentage system, on the other hand, confines the calculations entirely to the defective part of the log and the sound wood is scaled in full.

The scaler should have a free and open mind when he steps onto a raft and should know nothing of any arguments or complaints about the logs. In this way he is well qualified to give a good scale to the logs rather than have his mind under the heavy pressure of prejudicial influence.

The present practices of log scaling in the Columbia River Douglas Fir Region are:

(1) To establish, maintain and promulgate grades and standards of size of logs and piling, produced in this area.
(2) To maintain an accurate system of inspection in the scaling and grading of logs.

(3) To establish, maintain and promulgate an accurate and uniform schedule of charges for such inspection, grading and scaling of logs and piling.

(4) To enter into contracts with persons, firms or corporations engaged in the manufacture, sale, or purchase of logs or piling.

(5) The Spaulding Log Rule is the standard rule which is to be used in computing the lumber contents of all logs.

Where there is no log market such as in the White Pine territory there is no necessity for scaling practices such as those that are used in the Douglas Fir Region.

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CHAPTER IV.
Problems Confronting the Log Scaler
(Mechanical Defects)

(1) **Shake.** A defect of this type in the timber presents a difficult problem to the scaler. It is somewhat more evident in Larch and Sugar Pine than in Douglas Fir, and is caused by wind action swaying the tree while it is still standing. It usually extends either part or all the way around the log and when it becomes filled with pitch it forms a pitch ring.

As far as is at the present time known there is no true index of the extent of these rings. They may run only a part or the entire length of a tree. The scaler customarily makes the deduction for shake on the basis that, unless it shows on both ends of the log, it extends half the length of the log.

To obtain the absolute amount of sound wood outside the defect the following method is used: Obtain the scale of a log having a diameter of that inside the defect and subtract from the volume of a parallelepiped circumscribed about the defect. If the defect is not a complete ring, obtain the loss for a full ring and multiply by the fractional part of a complete circle which the defect represents.

As has been stated before the scaler does not stop to figure all this out since he does not know definitely just how far this defect will run into the log. It would not be possible to cut out the exact amount of sound wood as worked
out by the above method. From actual experience in watching the logs being cut up in the mill he is more capable of knowing just how this type of defect acts, and by using his own judgment, he can cut the log in length to the amount which he feels necessary.

(2) **Broken Ends.** This defect usually occurs during the logging operations in the woods, and is quite often the result of improper felling.

These broken ends are readily allowed for by reducing the length of the log so as to eliminate them. Care should be taken to allow sufficiently for this defect, as often the log is cracked some little distance back from the broken end.

(3) **Bucker's Break.** This type of defect usually takes the shape of a slab torn or broken on the end of the log because of cutting in a bind. If, for instance, such a slab is broken back 8 feet from the end of the log and is approximately one-fourth of that part of the log a deduction of one-fourth of the 8 feet, or 2 feet, is ample allowance for the break.

It must be understood that in scaling broken logs, all breaks or parts of breaks necessitating a loss in the production of lumber of merchantable lengths must be eliminated in the scale.

(4) **Slivers.** Slivers of wood are sometimes pulled from the butt of the tree when it is felled, but this is not a defect of very great importance. It is not uncommon to some-
times find logs with slivers pulled out of the butts for a distance of from ten to twenty feet. In a defect of this sort the scaler can easily see the size and extent of the damage and cut the log in length accordingly.

(5) **Straight Splits or Cracks.** These defects occur from faulty felling and bucking and sometimes extend for a considerable distance in the length of a log.

A deduction for splits which show in the butt or large end of the log may be made as follows:

In large logs, and in logs containing excessive taper straight splits through the heart shall be eliminated by reductions from diameter in the same manner as for heart checks. Reductions for badly split or stump shot ends are made by reductions in length of sufficient amount to eliminate the waste.

(6) **Cat-faces, Fire-scars, and Lightning Defects.**

In the case of these types of defect which sometimes run the entire length of the log, it is possible to divide the cross section of the log into sectors, throwing all the waste into one, and deducting the percentage of waste from the gross scale.

If a scaler is well experienced in his art he would, instead of going through the above calculation, deduct one-eighth from the length of the log and if the log was a 16 foot log he would give it a scale of a 14 foot log. The results are the same, but the scaler is not bothered by performing the calculation.
The explanation is simple as to just how he does this. It is well to remember that in 16 foot logs, by cutting out a sector containing one-eighth of the cross section it will produce the same effect as cutting off two feet from the end of the log, and by removing a sector containing one-fourth of the cross section the same effect is produced as cutting off four feet from the end of the log.

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CHAPTER V.

Problems Confronting the Log Scaler

(Entomological Defects)

(1) Worms. Worm holes are evident around scars or in such logs as have been down for some length of time. The scaler may get a good idea of the extent of damage to the timber by these worms by looking at the ends or by chopping into the log with an axe. Some of the more harmful borers build such extensive galleries that it is necessary for the scaler to watch some of the logs cut up in the mill in order to gain an accurate knowledge of the extent of damage to the wood.

The ambrosia beetles are one of the harmful types of insects. They sometimes bore entirely into the heartwood and plant a fungus which stains the wood a blackish color. These holes and the resultant stain cause a serious lowering of the grade of the boards cut from the sap wood.

In a general way it is sometimes said that worm holes are no more serious defects in a log than knots.

Logs containing grub worms shall have the portion containing such defect, eliminated from the scale, and the remaining portion shall be graded according to the class of lumber it will produce.

On the contrary logs showing powder worms in one end, in sufficient degree to indicate the log is considerably affected, shall have a fifty per cent reduction in scale,
but logs showing powder worms in both ends must be culled.

As far as dead standing timber is concerned, the worm holes may be found far inside the sap, and sometimes well into the heartwood. In a case of this sort the holes are usually not very numerous, and part of the log is suitable for the manufacture of lumber in the cheap or inferior grades.

If the owner of this type of timber were clever he might place a value on it according to its adaptability for manufacture and then these logs can be scaled in full.
CHAPTER VI.
Problems Confronting the Log Scaler
(Pathological Defects)

(1) Stump Rot. Certain rots attack only the butt of the tree and only through experience is it possible to determine how far this rot extends into the log. Allowance is made for this defect by cutting the length of the log. It is sometimes necessary to cut a few feet from the butt of the log for rot when the bucker fails to long-butt the log before it leaves the woods.

A rule by which most scalers base their judgment is due to the fact that a decided bell shaped stump end of a log seldom contains the rot far beyond the length of the bell. The deductions can be made in proportion to the amount of decay showing in the end.

(2) Dry Rot. A defect of this type is usually the result of the surface of the tree having been broken in such a way as to admit fungus growth to the heartwood while standing or from having been down for a long time.

Although there are formulae for determining the amount of sound wood left in a log which has dry rot running through the center, they are not of great importance here.

Logs or part of such trees which are affected by this disease can usually be scaled by ascertaining the causes in a general way and deductions made by cutting the length in proportion to the amount of the log affected. A scaler should
be familiar with the timber in the area in order to make reasonable deductions. If he is not familiar with the timber, a general application of the following system in cutting for dry rot can be used:

When one end of a log is entirely decomposed with dry rot, from 10 to 16 feet of log is seldom fit for merchantable lumber. The scaler should be very careful to look over the entire log for rotten knots if the rot only shows on one end. This will give him an indication of just how far the rot extends into the log and how far it will be necessary for him to cut it in length.

(3) Conk Rot. This type of rot is very common in the Douglas Fir region and receives its name from the conks which appear on the outer surface of the log indicating the presence of the rot. It is also known as Trametes pini, and the logs are commonly called conky logs. This fungus usually grows where the bark has been bruised or where a limb has been broken off the tree. Actual experience is the main rule which guides the judgment of the scaler in cutting this type of log. A great deal depends upon the age and size of the timber and the general characteristics of timber from different localities.

The size and location of a conk or conks, and relative size of the log must govern the scaler at all times. Sometimes these conks are not discernible and the scaler must pick around suspicious places and roll the log over if nec-
essary in order to locate them.

More than one conk may appear on one side of a log and be so lined up or located as to allow 50 per cent of the log to be sound and free from stain, or a conk may be located near the end of a log and 50 per cent or more of the log may be free from stain or rot. By examining carefully both ends and the entire surface of conky logs the approximate amount of stain or rot can be estimated, and by proper scaling technique the conky logs can be scaled with a fair degree of accuracy.

Two or three conks fairly well distributed over the entire surface of the log will beyond a doubt class it as a cull.

(4) Blue Stain and Sap Stain. Blue stain in logs is caused by the bluing fungus (Ceratostomella species). It is not considered a defect for which discount should be allowed, since sound or firm blue-stained lumber is merchantable. It is, however, knocked down in grade.

Sap stain, on the other hand, is caused by some of the wood destroying fungi. It is considered stained only when it appears blue or black since sap having a reddish or yellowish color merely means the presence of acid in the wood and it is considered sound. Where the sap is stained on only one side of the log a one inch reduction will take care of it, and where the entire surface is stained two inches should be deducted.

It should be understood that in scaling a dead or rotten
sap log, the diameter, when taken inside the dead or rotten sap, is considered the full scale of such a log.

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CHAPTER VII.

Problems Confronting the Log Scaler

(Other Defects)

(1) Pitch Pockets. Defects of this type are usually caused by insects and, therefore, are not found in all areas. The work of the insects in the standing timber causes wounds, and the tree immediately attempts to counteract this by a flow of pitch into the wound. Sometimes the insects are trapped by this pitch flow and destroyed and the tree grows around the wound. In a case of this sort, a pocket of pitch would be left in the wood, and would prove a great handicap in cutting good lumber from the tree.

These pitch pockets are very hard to allow for since they do not always show on the ends of the logs. A log grader can only gain a knowledge of this type of defect by watching the logs cut up in the mill. Where the defect shows on the end of the log, a reduction in the length of the log according to the size of the defect is the best solution.

(2) Pitch Rings. Pitch rings are usually the result of a circular shake in a log becoming filled with pitch. They constitute one of the most serious problems in scaling logs. A log with a pitch ring running through it usually breaks up on the carriage when it is being sawed. In making deductions by the system of percentage of waste, the scaler works from a different angle. To determine the amount of solid wood left when the defect is deducted the same method is
employed as was stated before in taking care of shake.

The most practical method and the one used by scalers in the Columbia River area is as follows: The scaler should be well acquainted with the damage which pitch rings do to the log. A log containing a ring so near the surface that no lumber can be produced outside the ring should be scaled by taking the diameter inside the ring, and when the ring is near the heart of the log the deduction should never exceed an amount sufficient to cover the actual waste.

The scaler should be well acquainted with the approximate number of board feet which would be lost by cutting the log a certain number of inches in diameter for certain length logs. With this in mind he should also know approximately the number of inches to cut a log when the log shows a complete ring in both ends and in only one end, and when the log shows a half ring in both ends and in only one end. This practical knowledge and experience will enable the scaler to handle this type of defect fairly accurately.

(3) Sprangle. This type of defect has the appearance of a crack on the end of the log and is sometimes filled with pitch causing what is known as a pitch sprangle. It is usually the result of wind or poor falling technique.

In making deduction for this defect the scaler must have experience in determining the extent to which it will run into the log by taking into consideration its size and dimension. A cut in length will then be made in proportion to the
amount of the log actually affected.

(4) Sweep. Sweep usually results from the timber being continually bent from wind action or perhaps from growing on steep hillsides. Sometimes it is the result of one tree leaning against another one.

There are two good methods of scaling logs affected by sweep. The more practical method is to estimate the amount of waste resulting from the sweep and make the necessary deduction by reducing the length of the log.

The other method gives more closely the amount of wood which is actually wasted as a result of this curvature of the log. A straight line is extended between the ends of the log in the plane of greatest sweep and the distance is measured from this line to the edge of the log at the point of greatest sweep. The amount of sweep is divided by three times the diameter of the log and this in turn is multiplied by four times the scale of the log. This represents the amount of wood which is actually wasted when the log is cut up in the mill and it is deducted from the gross scale.

(5) Crook. This type of defect in the log appears as a curve usually in the butt end of the log, and is the result of some sort of pressure being brought to bear on the tree during some period of its life. It is not a very serious defect and is handled by making the necessary deduction in the length of the log.

A skillful Sawyer will load a crooked log of this type
on the carriage with the belly extending either in or out, and in this way obtaining the maximum of lumber from the log.

(6) Checks. This defect takes the shape of different size cracks appearing on the ends of the logs and sometimes extending its entire length. They may be either openings of a straight line through the heart of the log from the seasoning of the timber, or open cracks in a straight line through the heart, or a series of splits or openings in the heart caused by wind action when the timber is standing. They are often an indication of flaky heart.

The following system is used in this region to handle this defect: For an open check in one end of the log, or a straight close check showing in both ends an inch is deducted from the diameter. Two inches is usually deducted from the diameter of the log when cross checks, or double checks show in one end, or four inches if they show in both ends.

(7) Sun Crack: This type of defect causes a number of small cracks to appear on the outer surface of the log due to the heat of the sun pulling the wood fibers apart. It is not an especially serious defect, but one which makes it necessary for the scaler to reduce the diameter of the log to a point where he will get away from the cracks.

(8) Roughness. A defect of this type is caused by knots
of different sizes and varying in number. They can exist in such quantities and of such a size that the log or a part of the log will not be suitable for the production of lumber. A coarse, knotted, rough log containing knots in clusters, or so close together that a portion of the log will produce cutting that will fall to pieces or necessitate a material waste, should be reduced in diameter a sufficient scale to cover the waste.

Logs which contain knots so large and so numerous that no part of the log will produce lumber should be classed as culls. When the knots are large and numerous and of a character that taper rapidly to smaller dimensions toward the heart of the log, and a considerable part of the log will produce low-grade lumber, an allowance can be made for the side cut and the balance of the log should be scaled and graded.

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(1) **Culls.** In scaling cull logs no definite amount of lumber can be guaranteed from log scale owing to varying conditions of such logs. The following conditions are taken into consideration by the scaler in the Columbia River Douglas Fir Region:

A cull log should contain 20% per cent of the solid contents suitable for the manufacture of merchantable lumber, or the greater part of which is suitable for the manufacture of the inferior grades of lumber, such as cull boards, No. 2 mining timbers, etc.

In scaling cull logs, as above outlined, they should be scaled full, making no deductions therefrom except for worthless sap and trimming ends free from breaks and total loss from stump rot.

Any log so badly decomposed or badly shattered that it is not suitable for manufacture should not be scaled but classed as cull outs.

It might be worthwhile at this point to take into consideration the kind of defect necessary to cull cedar since cedar is of great importance in this region as well as Douglas Fir. Cull cedar logs are any logs which are generally affected with worm holes in the heart wood on both ends. Logs having large knots so numerous or other defects that they will not permit the manufacture of $33\frac{1}{3}$ per cent
common lumber or shingles of a No. 2 12-inch clear or better shingles, will be culled.

(2) **Twist.** Grading spiral or twisty grained logs is just another of the perplexities of the business of log scaling.

The amount of twist penetration can usually be estimated by the checks in the ends of the logs. A log might show slope of grain amounting to three inches to the lineal foot on the outer surface, and the same log may be perfectly straight grained three inches inside the perimeter and produce a sufficient quantity of No. 2 clear and better to be graded as No. 1. However, in other cases the twisty grain follows clear through the log.

The scaler should have a clear knowledge of the twist characteristics in each locality in order to properly grade the logs, since it is possible for logs from one locality to have deep penetration of twist and those from another to have twist only on the surface or outer portion of the log.

(3) **Knots.** Knots are caused by the end of the limb in the tree, and they present the most important defect for the log grader to master.

As long as a limb remains alive, there is continuous growth at the junction of the limb and the trunk of the tree, and the resulting knot is called an intergrown knot. After the limb has died, additional growth on the trunk encloses the dead limb and an encased knot results. The encased knot and the fibers of the trunk are not continuous, and conseq-
ently the distortion of the grain around the knot is less than for intergrown knots.

A good log grader should watch closely the size, number, and placement of knots and have a good idea of the knotty core as well as a knowledge of how the knots will appear in the final lumber.

A log which has knots on its surface so numerous and of such a nature that they are only suitable for the manufacture of lumber below a grade of No. 1 common is considered a rough log and is usually graded as a No. 3 log. This is always a subject of great argument between the log owner and the scaler. The owner is always trying to make at least a No. 2 out of it, but if the scaler decides that it is a No. 3, his deduction usually holds.

Knots can exist in such quantities and of such a size that the log or a part of the log will not be suitable for the production of lumber. A coarse, knotted, rough log containing knots in clusters, or so close together that a portion of the log will produce cutting that will fall to pieces or necessitate a material waste, should be reduced in scale sufficient to cover the waste.

A log may contain knots so large and so numerous that no part of the log will produce lumber, and such logs should be classed as culls; but when the knots are large and numerous and of a character that taper rapidly to smaller dimensions toward the heart of the log, and a considerable part of the log will produce low-grade lumber, an allowance can be made
for the side cut and the balance of the log should be scaled and graded.

In the case of black knotted timber, or that timber containing knots which are dark and usually loosely encased in granulated pitch the following system is used by the scaler and grader: Where only one-half of the log is affected, from one to two inches in diameter is taken from the scale of the log. Where the entire surface is affected, from three to four inches should be deducted from the full scale of the log. This rule is always sure to vary among different scalers.

In scaling rotten knotted timber only such deductions should be made as to cover actual parts affected. Where the rotten knots are very large and the log is stained from them, the scaler should make careful examination of the log and a deduction made for the amount thus affected.

Where only a few well scattered soft knots are found and no stain accompanies the knots, a cut of two to four inches should be sufficient. The scaler should be very careful when looking over the knots to be on the lookout for conk rot, as it very often shows up around the knots, and might not even show on the ends of the log.
Chapter I. Objectives of Log Scaling.

It is the main objective of log scaling to determine as accurately as possible the board foot content of a log by deducting the proper amount for defect and to satisfy as nearly as possible both the buyer and the seller. By taking into consideration certain factors, a definite log rule shall be constructed and must be followed closely to determine the true board footage.

Chapter II. The Log Scaler.

The log scaler must not only be possessed with sound judgment and experience in his field, but must also be well acquainted with present logging and lumbering practices, and must follow closely the rules set forth in the area in which he is employed.

Chapter III. Present Practices.

Although certain fundamental rules are set for the log scaler to follow, it must be realized that scaling is not yet an exact science and he must rely a great deal on his past experience.

Chapter IV. Mechanical Defects.

Such defects as shake, broken ends, bucker's break, slivers, straight splits or cracks, cat-faces, fire-scars, and lightning scars fall under this category. The majority of these defects are caused in logging and the necessary
reduction is made by cutting the log in length. However, for straight splits or cracks in large logs with considerable taper a reduction in the diameter is sometimes more satisfactory.

Chapter V. **Entomological Defects.**

There are numerous types of worms which are responsible for the entomological defects in a log. Some bore deep into the tree while others only affect the sapwood. By becoming acquainted with the actions of the different worms a scaler can properly handle this defect by making the necessary deduction in the diameter of the logs.

Chapter VI. **Pathological Defects.**

The pathological defects in a log are the result of various kinds of wood rotting fungi. Some are found in the top, some in the trunk, and some in the butt of the log. Through experience in locating the external indicators of these rots, the scaler is capable of making the proper reduction in the scale of the log. A cut in length is the usual procedure in handling these defects.

Blue stain and sap stain are also caused by fungi infections in the log. Although blue stain does not necessitate a reduction in scale, it does affect the grade of a log. Sap stain is handled by a reduction of the log in diameter.

Chapter VII. **Other Defects.**

Such defects as pitch pockets can best be handled by reducing the length of the log according to the size of the
defect. Pitch rings are more accurately allowed for by taking a cut in the diameter of the log.

Such defects as sprangles, sweep, and crook can very well be taken care of by reducing the log in length depending upon the extent of the defects. On the other hand a reduction in inches from the diameter of the log will best handle such defects as checks on the ends of the log or sun cracks on its outer surface. Roughness, caused by knots, is also more efficiently controlled by reducing the diameter of the log.

Chapter VIII. Grading.

Any logs whose net scaled content is less than 50 per cent of the gross scale are classed as culls. Those that are too badly decomposed are classed as cull outs. Large knots or wormholes are usually the cause for culling cedar logs.

In determining the grade of twisty logs the scaler must be well acquainted with the twist characteristics in each locality in order to properly grade them.

Knots cause the greatest problem in log grading. Their size, placement, and depth must all be taken into consideration in determining whether the log shall be given one grade or another.

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Following is a copy of the log grading rules as compiled by the Columbia River Log Scaling and Grading Bureau in Portland, Oregon, and suitable mainly for the Douglas Fir in that region. It must be understood that the scaler does not always stand true to the letter to these rules, but relies upon his good judgment and experience.

No. 1 Fir Logs. They shall be logs which will be suitable for the manufacture of lumber in the grades of No. 2 Clear and Better or (B) and Better to an amount of not less than 50% of the scaled contents, and shall not be less than 16 feet in gross length and shall not be less than 30 inches in gross diameter inside the bark at the small end.

No. 1 Logs shall be old growth logs and shall contain not less than eight annual rings to the inch in any part of the outer portion of the log equal to one-half of the scale contents, ring count and measurement to be taken at the top end of the log, and shall be straight grained to the extent of a variation for a space of 6 lineal feet equidistant from each end of the log of not more than 1 inch per foot in logs to and including 40 inches in diameter, 1 1/2 inches per foot in logs 41 inches to 50 inches in diameter, 2 inches per foot in logs 51 inches to 60 inches in diameter, 2 1/2 inches per foot in logs 61 inches and over.

Rings, rot, or any other defects that are deducted in the scale are permitted in a No. 1 log providing their size
and location do not prevent the log producing the required amount of No. 2 Clear and Better or (B) and Better Lumber in widths 6 inches and wider.

Visible pitch-pockets, rings, and knots must be located so that they do not prevent the production of the required amount of No. 2 Clear and Better or (B) and Better Lumber.

**No. 2 Fir Logs.** No. 2 Logs shall not be less than 12 feet in length and not less than 16 inches in diameter, below the grade of a No. 1 Log but which will be suitable in grade:

1. For the manufacture of lumber in the grades of at least 65% merchantable and better grade.
2. For the manufacture of lumber in the grades of 25% No. 2 Clear and Better or (B) and Better or an equivalent value in combination of grades.

**No. 3 Fir Logs.** No. 3 Logs shall be not less than 12 feet in length, having defects which prevent their grading No. 2, but which will be suitable for the manufacture of the customary common grades of lumber. Logs in this class shall be scaled down to and including a 10-inch diameter. Small logs less than 10 inches in diameter when sold for manufacture in a gang mill shall be scaled down to 6 inches in diameter and a minimum length of 16 feet.

Logs having excessive slope of grain and/or logs having an excessive number of visible pitch-pockets shall be included in this grade.

**Fir Peeler Logs.** Peeler Logs shall be old growth Yellow
Fir, suitable for the manufacture of clear uniform colored veneer or plywood stock to an amount of not less than 50% of the scaled contents, selected for rotary cutting which do not contain defects that will prevent their being held and turned in a lathe; such defects being: shatter, excessive splits (crow foot), loose rings, and loose or soft heart rot.

Peeler Logs shall be cut from green timber or from windfalls free from season or fire checks.

Peeler logs shall be at least 38 inches in diameter at the small end and 20 feet in gross length. They shall also be free of surface knot indications, season checks, and all other visible defects, except as hereinafter allowed.

These logs shall contain not less than 10 annual growth rings to the inch in any part of the outer portion of the log equal to one-half of the scale content; the ring count and the measurements to be taken at the top of the log.

Logs 38 inches to 50 inches in diameter shall be straight grained to the extent of a variation of not more than one inch to the lineal foot for a space of six lineal feet and measured from each end of the log and not to exceed 1 3/4 inches for logs 51 inches to 60 inches and 2 inches for logs 61 inches and over in diameter.

Visible pitch-pockets not exceeding 3 inches are permitted in the heartwood of the end of the log and the following number of pockets are permitted in one-half of either end.

Logs 38 inches to 48 inches in diameter are permitted one pitch-pocket; logs 49 inches to 60 inches in diameter two
pitch-pockets; logs 61 inches and over in diameter three
pitch-pockets. Logs with pitch-pockets in one end only may
have one additional pitch-pocket.

A short piece of ring not to exceed 1/3 of a full ring
is permitted in the clear portion of each end of the log,
providing it does not have more than one check leading from
it. Any length of ring is permitted within the 16 inch heart
circle. Not more than 1/4 of a ring is allowed when in combin-
ation with a heart check.

One straight heart check is permitted not to exceed 3/4
of the diameter of the log, and under no circumstances shall
the check extend through the sap wood. A combination of
heart checks (crow's feet) is allowable in a circle not
exceeding 1/3 of the diameter of the log.

Logs with bark seams running the full length of the log
(if not more than two such defects on one-half of log only),
may be scaled as Peelers when depth of the seam at either end
of the log does not exceed 3 inches. Logs with bark seams
not exceeding 6 inches deep at butt end only, if not affect-
ing more than one side of the log for one-quarter the full
circumference, may be scaled as peelers.

In scaling Peeler logs all proper deductions shall be
made as would be made in scaling sawmill logs.

**Standard Length for Logs.** (All species—excepting Cedar).
All scale and grade rules are based on standard length logs.
The minimum length is 12 feet and the maximum length is 40
feet.
**Long Log Scaling and Grading.** (All species, but Cedar).

Long logs are definitely defined as being logs which are 42 feet and over in length.

All long logs, whatever the species, should be scaled to grade, the grade requirement being the same as for short logs.

The scale on these logs should be made by using the top diameter for the top log only; second, third and fourth logs should be scaled by adding to the top diameter an allowance of 1 inch for taper in each 10 feet of length.

Logs from 42 to 80 feet inclusive in length shall be scaled as two logs of as nearly equal length in even feet as possible and in case the two logs are not exactly even length in even feet, the longer of the two shall carry the smaller diameter.

Logs from 82 feet to 120 feet inclusive shall be scaled in the same manner except that they shall be scaled as three logs.

Logs in excess of 120 feet shall be scaled in the same manner except that they shall be scaled as four or more logs, it being the intent of having the maximum length of any one log 40 feet.

**Rules for Trim.**

Trim 8 inches on logs to 40 feet but no trim less than 8 inches. 2 inches to each 10 feet or fraction on logs longer than 40 feet.

<table>
<thead>
<tr>
<th>Length Range</th>
<th>Trim Amount</th>
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<tbody>
<tr>
<td>12 to 40 inclusive</td>
<td>8 inches</td>
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<td>42 to 50</td>
<td>&quot; 10 &quot;</td>
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<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Width (inches)</th>
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</thead>
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<tr>
<td>52 to 60 inclusive</td>
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</tr>
<tr>
<td>62 to 70</td>
<td>14</td>
</tr>
<tr>
<td>72 to 80</td>
<td>16</td>
</tr>
</tbody>
</table>
BIBLIOGRAPHY


5. "Log Scaling" (Published by The Timberman, International Lumber Journal, Portland, Oregon.)


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