CONCENTRIC RINGS OF TREES.

In the December number (1812) of the *Monthly*, you published an article prepared by me, on the "Annual Growth of Trees," which has been somewhat largely commented upon, in the periodicals and press of the day, as also by the *American Congress of Forestry* at St. Paul, I am glad to note this interest in the subject, as it will cause more accurate observation of the facts in the case. As many of my critics have apparently read only extracts from the article, and have accordingly drawn very incorrect inferences as to my views, I wish to restate some of the more important points, and the evidence sustaining them.

In June of 1871 I planted a quantity of seed as it ripened and fell from some red maple trees. In 1873 I transplanted some of the trees from these seeds, placing them on my city lots in Plattsmouth, Nebraska. In August, 1832, finding them too much crowded, I cut some out, and, the concentric rings being very plain and distinct, I counted them. From the day of planting the seed to the day of cutting the trees was two months over eleven years.

On one more distintly marked (although there was but little difference between them), I counted on one side of the heart 40 rings. Other sides were not so distinct; but in no part were there fewer th.n thirty-five. There was no guess-work about the age of this tree. A daily record of the meteorological events for the Smithsonian Institution and Signal-Office for over twenty years, and a life long habit of daily record of all important events, had led to much care and caution in such matters. Hence, from my record, I *knew* the tree had but twelve years of growth; and yet, as counted by myself and many others, it had 40 clear concentric rings.

Here permit me to quote a few lines from the original article, which, so far as I have seen, have been entirely ignored or overlooked by all commentators: "I could select twelve more distinct ones *(rings)* between which fainter and narrower, or sub-rings appeared. Nine of these apparently annual rings on one section were peculiarly distinct; much more than the sub-rings, But, of the remaining, it was difficult to decide which were annual and which were not." When first cut, and while the wood was green and the cells filled with sap, these rings were very clear and plain; but as the water evaporated and the wood contracted, they showed less plainly. I have a section of it now before me, and I cannot make out clearly more than 24, where, when green, forty were clearly visible. This section was not at first so distinctly marked as a section forwarded to Professor Cleveland Abbe, of the Signal-Office, at his request; although that, when forwarded, showed the rings much less conspicuously than when fresh and green.

Mr. P. C. Smith, in the August (1883) *Monthly*, supporting the commonly received reliability of the rings, as an index to the age of the tree, refers to certain disputed corners and lines marked by hacks on trees, and the agreement of the number of the subsequent rings with the record of the surveyor. This indicates an uncertainty in the matter which is hardly receivable as scientific proof. If the record was reliable, why question the hack? If only for confirmatory evidence, how identify the one hack among the many which on old lines invariably accumulate in the vicinity of disputed lines by many resurveys? *Is it not a mere* assumption that the rings do indicate a like number of years; and that, as the record agreed with these rings, therefore, that hack was *the one*? Mr. Smith says, "It will be very difficult to convince an old surveyor, or an old lawyer, who has tried many of these land cases, that each concentric ring on an oak tree, at least, does not indicate a years growth only of such tree." Well, I am an old surveyor, having followed the business for upward of fifty years, and the evidence before me admits of but the one possible conclusion; and, had Mr. Smith or any other intelligent man the same evidence, I am sure there could be no disagreement between us on the subject.

The Hon. James J. Wilson, of Bethel, Vermont, an "old lawyer" and late Senator in the State Legislature, writes me, under date of August 15th, that at a trial in the District Court at Woodstock, Vermont, on a disputed line based upon a cut in a hemlock tree, a section of the tree embracing the cut was produced in court, and the rings outside the cut counted up from forty to fifty, while those on the opposite side were only nine or ten! The verdict of the court was, that "the rings were not a sure indication of the age of the tree"

Hon. Robert W. Furness, late Governor of Nebraska, so well known as a practical forester, has kindly furnished me with several sections of trees of known age, from which I select the following: A pig hickory eleven years old, with sixteen distinct rings; a green ash eight years old, with eleven very plain rings; A Kentucky coffee tree ten years old, with fourteen very distinct rings, and, in addition to these, twenty-one sub-rings; a burr oak twenty-one years old, with twenty-four equally distinct rings; a black walnut five years old, with twelve rings. Governor Furness adds that he has a chestnut of four years, with *seven rings*; a poach of eight years, with six rings; and a chestnut oak of twenty-four years, with eighteen rings. He attended the recent meeting of the American Association for the Advancement of Science, at Minneapolis, Minnesota, and presented this question and his specimens to the section on forestry. He reports that Professor Budd, of the Iowa Agricultural College, presented also a specimen spruce from Puget Sound, of known age, or nearly fifteen years old. The section was twelve inches in length, and on one end had eighteen rings and on the other end had only twelve. Commissioner Loring expresses the opinion that "this settled the question, that rings at all times could not be relied upon as an index of the age of trees."

Hon. J. T. Allen, of Ohmaha, superintendent of tree-planting for the Union Pacific Railroad Company, in a recent letter says:—"Any intelligent man, who has given any attention to this matter of yearly tree growth, knows that the rings are no index of a tree age. H. P. Child, sperintendent of the Kansas City stock-yards, shows me a section o' pine eight years old, with nineteen rings, and a soft maple of nearly fourteen years, with sixteen very distinct rings, in addition to which there are forty-seven less distinct sub-rings."

In conclusion, that the more distinct concentric rings of a tree approximate, or in some cases exactly agree, in number with the years of the tree, no one, I presume will deny; but that in most and probably nearly all trees, intermediate rings or sub-rings, generally less conspicuous, yet often more distinct than the annual rings, exist, is equally certain: and I think the foregoing evidence is sufficient to induce those who prefer truth to error to examine the facts of the case.

These sub-rings or additional rings are easily accounted for by sudden and more or less frequent changes of weather and requisite conditions of growth—each check tending to solidify the newly deposited cambrium, or forming layer; and as long intervals occur of extreme drought or cold, or other unfavorable cause, the condensation produces a more pronounced and distinct ring than the annual one. Query: Has a tree grown in a conservatory, or place of unchanged conditions of heat and moisture, any concentric ring?—*Popular Science Monthly*.

HOW CREOSOTED TIMBER BURNS.

One objection which has been urged against creosoting as a means for preserving timber, in addition to its expensiveness and the difficulty in the way of thorough injection, has been the alleged inflammability of wood treated by the creosoting process. As the creosote is in the form of dead-oil or tar the burning quality of wood impregnated with it would, inferentially, be excellent. Yet it is claimed that in a recent case this theory was substantially demolished by results. An establishment for creosoting piles and planks was burned in New York a few days ago, to which the presence of creosote afforded considerable protection against the fire. The fire is thus described: The building was of pine and spruce in their natural state, except the sills, which were made of creosoted pine. The latter were set on posts and raised about a foot above the ground, so that the flames had a chance to get under them; they were charred, yet retain their form and a certain amount of strength, whereas not a piece of the untreated lumber could be found. Scattered over the premises were numerous creosoted piles and several thousand feet of plank all charred, but the pieces mostly retained their original form and a certain degree of usefullness. Where the flames could reach the comparatively uninjected heart wood, they ate into it, leaving a charred creosoted shell. In all the above charred pieces the fire went out of itself; creosoted wood burns with a dense black smoke, which has a smothering effect.—*Northwestern Lumberman.*

SAWS.

The improvements made in saws constitute one of the most important steps in modern progress. It is now practicable to run circular and band saws with a capacity of 4,000 feet per minute. Circular saws have been run in soft wood with a circumferential velocity of 9,000 feet (nearly two miles) per minute, but the difficulties, says the *Engineering Times*, of any higher rate than that we have indicated as the ordinary maximum are due to heating and trembling, especially if the parts are the least dull and unbalanced. Band saws dodge; they can be made to bear a great number of the moderate flextures required by sufficiently large wheels, and can be guided very successfully at the points of entering and emerging, but no practicable amount of skill can make them saw in absolute planes through thick and knotty wood. Circular saws heat and buckle in working, unless just enough distorted when cold to allow it. Reciprocating saws cannot work with a speed satisfactory for modern progress. The teeth of power saws may hook, and draw the wood indefinitely. Hand saws cannot be shaped for unless the cut is gauged they will take hold too rank.

The saws made by three layers, each side cast steel and the inner layer tough iron, are very serviceable. For woods of a woolly fibre, such as poplar, the teeth of the saw should be of coarse space and set, to effect a clearance and overcome its clearing properties. For cutting the harder and close-grained woods, such as oak, beech, etc., the saw should be increased one gauge, the teeth should be more upright and spaced finer, and the set also should be reduced. A cross-cut saw must be sharpened with reference to the wood, whether hard or soft. If not properly set, it is evident it will take incrdased power to drive it. For sharpening cross-cut saws for hard wood the file should be at an angle of 45 degrees; for medium wood at an angle of 35 degrees, and for soft wood at 12½ degrees. So much for position. There is no difference in the angle of a small or large file; difference of action in working depends on the fine or coarse cut of the file. We prefer for the purpose of sharpening a good sized file, not less than four and a half or five inches, if it is cut equally fine and sharp on the corners. The cutting angles and the tops and faces of the teeth should be beveled exactly alike, and the gullets also should be of even depth, the saw working freer and with less power if the teeth are allowed to get short and stumpy. In clamping a saw for sharpening, the jaws of the vice should be covered with sheet lead, about one-quarter inch thick. If not so covered, the saw will vibrate in sharpening, and most probably strip the file.

In setting saws with a hammer, the best plan is to fit the saw horizontally on a stud fitted in a wooden frame having a transverse movement. A small steel anvil with a beveled face should be placed at one end of the frame, and the saw traversed backward or forward for the teeth to overlap the anvil centre the distance of the set required. A series of short, sharp blows should be given to the hammer in preference to a heavy one.

For setting saws, several different machines have been patented by which the teeth may be set to a uniform level, one of which is made in the form of pliers.

The object of setting saws is to lessen friction. The reason of greater power being requisite for cross-cutting than for ripping is that the former is not parallel to the grain. In filing, the edges are, of course, beveled opposite ways. The sharp beveled edge will be outward on the side to which the tooth is bent.

In sawing a large amount of lumber, the thickness of the saw, as affecting the saving of wood, *is a matter of consideration; the thinner* the saw, too, the less is the power required to drive it. An objection, however, against thin saws, worked in tension is, that from their pliability the cuts are apt to diverge from a straight line. On the other hand, with a thick saw-blade, the thrust tends to bend it, whilst the pull on the thin saw straightens the blade. The thin blade in tension must be considered as preferable for hand and machine frame saws as well as band saws.

In scroll bands, the thickness and narrowness of the band permit the saw to cut out corners, and segments of circles of extremely sharp curvature.

In hand saws the teeth and blades are solid.

A great improvement in the circular saw is the application of inserted teeth, this allowing of ready renewal in case of any being broken, and that, through renewals, the diameter of the saw is not permanently reduced by the process of sharpening.

In the use of saws, care must be taken that the teeth are on the same general level; if the opposite be the case, proper action of all the teeth cannot be secured, they will become more readily blunted, and through the longer teeth being drawn more deeply into the timber than the others, they will be apt to be broken off; power, too, will be lost in driving the saw.—*Cotton, Wool and Iron.*

THE CREOSOTING OF TIMBER.

As is well known, the preservative properties of creosote are owing to its preventing the absorption of the atmosphere in any form, or under any change of temperature. It is noxious to animal or vegetable life; and it arrests all fermentation of the sap, which is one of the primary causes of dry rot and species of decay in timber. The action of creosote—says Mr. Bale, in his work on "Saw Mills—Their Arrangement and Management"—*may be thus* described: When injected into a piece of wood, the creosote coagulates the albumen, thus preventing any putrefactive decomposition; and the bituminous oils enter the whole of the capillary tubes, incasing the woody fibre as with a shield and closing up the whole of the pores, so as to entirely exclude both moisture (water) and air. By using creosote, inferior porous timber and that cut at the wrong season, and therefore sappy, may be rendered durable. The Bethell system of creosoting is as follows: The timber is first thoroughly seasoned and cut to the required dimensions. *It* is then placed in a wrought iron cylinder, fitted with doors that can be hermetically closed by means of wrought iron clamps. The air and moisture contained in the wood are then exhausted from it, and from the cylinder, by means of a powerful air pump. The pores of the wood being now empty, the preservative material (creosote oil) is admitted into the tank. When the wood has received all that it will after this manner, more oil is forced into it by means of hydrostatic pumps, exerting a pressure of 120 pounds to 200 pounds per square inch. This pressure is maintained until it appears that the proper quantity of creosote oil has been absorbed by the wood, which is determined by a gauge. Timber intended for railway sleepers, bridges, etc., should absorb 7 pounds of oil per cubic foot; and timber required to be protected against marine insects, etc., requires *at least ten pounds* of oil per cubic foot. The cost varies from 4d. to 5d, per cubic foot, according to the quantity of oil required.