PROSPECTS IN THE STATES.

Active preparations for work are being made on every logging stream. With a favourable winter the cut of logs will be heavier than in any previous year, and it will be very large no matter what the winter may be. The high prices which have ruled during the past two or three years will stimulate the mill men to provide for all the logs that the saws will cut, regardless, we fear, of the fact that the outlook for the coming year is not particularly bright. There are some conservative manufacturers who see that there is a great deal of lumber in the country at present, and that a large cut of logs for the season of 1882 3 is not desirable. These, however, are few in number. The majority will use their greatest efforts to make the biggest showing on record.

The cost of logging cannot, in most cases, be accurately computed until the close of the season. When there is heavy snow the wear and tear on horses and cattle, harnesses, and sleds is considerably greater than when it is just enough for convenience. As the logging outfit of the heavy concerns have a value of from $50,000 to $75,000, this percentage of loss, in a season of deep snow, is one that cannot be disregarded.

In some districts there is an advance in stumpage that must be considered. On the Menominee there is no advance. On some of the Wisconsin streams stumpage is from 50 cents to $1 higher than it was a year ago. In the Duluth region it has advanced somewhat, and nearly everywhere in Michigan a small advance may be counted on. There are many instances where such prices have been paid for timber that if the purchaser makes any money out of it he may consider himself fortunate, but these fancy prices, when the lumber business is considered generally, should not count.

Wages, on the whole, will not materially vary from last season. A scarcity of men has been talked of on some streams, but such talk is usually heard every season, and this fall there is no excuse for it. For years men for the woods have not been so readily obtained in Chicago as now, owing doubtless, to the fact that there is a general let-up in railroad building. On one stream in Wisconsin cooks are in great demand at present, and as high as $60 has been offered. Last year they were obtained at from $35 to $45. But such an exception proves little, for as soon as it is known that cooks are wanted there will be a supply at less than $60 per month.

Horses and oxen are higher than they were last fall. The disposition grows every year to put none but the best of draught horses in the woods. Such horses are high, ranging in price from $250 to $300 each. Twenty spans were recently sent to the upper peninsula from this city, for which $520 a span was paid. Last fall $500 would have bought them. Oxen are proportionately higher, and good ones are selling at from $175 to $200 a yoke.

Last fall hay was not plenty, but this fall it is abundant, and sells at $3, and in some locations more than that amount less than it did a year ago. Pork is higher, and beef about the same. Beans are cheaper. Corn is high, but oats are being bought at eight cents under the prices of last year.

The opinions of several careful operators bear a striking similarity. One places the cost of logs for the coming year at 5 per cent over the cost last year, another at 7 per cent., while another says 50 cents on the thousand, which, considering the price of logs in his district, amounts to about to about 6 per cent. It must be borne in mind, however, that these estimates are made on the supposition that the winter will be an average one.—*Northwestern Lumberman.*

CULTIVATION OF FOREST TREES.

There is no mystery in the scientific cultivation of forests, so far as concerns the tillage of the crop. All that is needed is to observe the action of nature in the forest, and follow it, or utilize it advantageously when that can be done. The object of the cultivation should be to obtain the utmost possible advantage from the soil by keeping it always covered with a growth of trees, and when the trees arrive at maturity to remove them in such a manner that the smallest possible interruption may be caused the productive works of nature. When the time has come for the removal of the timber, the ground should on no account be anywhere all cleared of trees at once; but a commencement should be made by felling a tree here and there, and so breaking the thick cover of the forest as to allow sufficient light or air to reach the ground, and cause the seed which has fallen to germinate. In this way one-fifth of the mature trees should be removed every five or six years, never by making large gaps in the cover, but taking a tree here and there, and always leaving the finest and most vigorous trees till the last, so that in about thirty years the whole of the trees will be cleared off, and a new forest established in their place. Thus the seeding of the wood will be effected by the agency of the finest trees, which will be themselves all the while increasing in bulk, and the productive power of the soil will be utilized to the fullest possible amount. It is not only in the removal of the timber and the reproduction of the forest that we ought to study the action of nature, but it is equally necessary that we should do so in felling for improving the growing crop, or, as it is commonly called, the thinnings. The competition between trees after they reach the full height, at half their full age, *is for space to spread their heads, and from this* time until they arrive at maturity they go on always augmenting the diameter of their stems, but at the same time decreasing in number. It is calculated that if 1,600 trees of 4 inches in diameter can stand and thrive on an acre of ground, there will not be more than 400 of them when the trees have grown to eight inches, 200 when they have reached 12 inches, and between 100 and 140 when they have attained 16 inches in diameter. Little more is to be done in the earlier stages of a forest's growth than to keep the heads of the most valuable species from being *overtopped by those which stand near them*; this can be done best, not by removing the others, but by cutting off or breaking the tops, for it is desirable at this stage, for the sake of natural pruning, to have the trees growing as thickly together as possible. At a later stage thinning can be judiciously arranged so as to pass through the entire forest at intervals of from 10 to 15 years, enabling the whole area to be operated on in turn. In executing these, the most difficult of all forest operations, it will be well to remember that the object is to give room to the head of the trees, and not to their stem, for the stem will never be too close together as long as the heads have room properly to develop themselves. The favouring of the most promising trees, and the removal of the weaker ones, together with the preservation of the continuous shade to the surface of the ground, while all the trees have sufficient room to grow, should be the particular ends aimed at.—*Popular Scientific Monthly.*

TIMBER.

In examining the transverse sections of the stem of a tree, it is shown that it consists of three parts, namely, the bark, the wood and the pith. Around the pith the wood appears to to circle in rings. The external rings are not so hard and possess more sap than those which closely twine the pith, forming what is termed the heart-wood. These rings are also crossed by rays called the *medullary* rays, which reach from the centre of the stem to the bark. In structure the tree is made up of minute vessels and cells, the sap circulates upward in the tree through the vessels, and in its descent is conveyed to the leaves through the wood, and during the life of the tree the wood performs the functions of nutrition and secretion. The solid parts of a tree consist almost entirely of the fibrous parts composing the sides of the vessels and cells. It has been learned through various experiments that in the spring of the year the sap begins to ascend through the small vessels in the wood and descends through the bark to the leaves, and having passed through them, is deposited in a changed state between the bark and the last year's wood, forming a new layer of bark and sapwood; the old bark being pushed forward. As the annual layers increase in number, the sapwood ceases to perform its original functions, the fluid parts are evaporated or absorbed by the new wood, and the sides of the vessels being pressed together by the growth of the latter, the sapwood becomes heart wood or perfect wood, and until this change takes place it is unfit for the purpose of the builder. The vessels in each layer of wood are largest on the side nearest the centre of the stem, and smallest at the outside. This arises from the first being formed in the spring, when vegetation is most active. The oblong cells which surround the vessels are filled with fluids in the early growth, but as the tree increases in size, these become evaporated and absorbed, and the cells become part filled with depositions of woody matter and indurated secretions, depending on the nature of the soil, and affecting the quality of the timber. There is a great difference in the character of the annual rings, in different kinds of trees. In some they are very distinct, the side next the heart being porous, and the other being compact and hard, as the oak, the ash and the elm. In others the distinction between the ring is so small as scarcely to be distinguished and the texture of the wood is nearly uniform, as in the beech and the mahogany. A third class of trees have the annual rings very distinct, and their pores filled with resinous matter, one part being hard and heavy, the other soft and light colored. All the resinous woods have their character, as larch, fir, pine and cedar. The *medullary ring*, are scarcely perceptible to the naked eye in the majority of trees, but in some, as the oak and the beech, there are both large and small rings, which when cut through obliquely, produce the beautiful flowered appearance called silver grain.

In preparing timber for the uses of the builder, there are three principal things to be attended to, namely, the age of the tree, the time of felling and the seasoning for use. If a tree be felled before its full age, whilst the heart-wood is scarcely perfected, the timber will be of inferior quality, and from the quantity of sap contained *it will be very liable to decay; on the other* hand, if the tree be allowed to stand until the heart-wood begins to decay, the timber will be weak and brittle, the best timber comes from trees that have nearly done growing, as there is then but little sapwood, and the heart-wood is in the best condition.

The best time for felling trees is either in midwinter when the sap has ceased to flow, or in midsummer, when the sap is temporarily expended in the production of leaves. An excellent plan is to bark the timber in the spring and fell it in winter, by which means the sap*wood is dried up and hardened; but as the bark* of most trees is valueless, the oak tree (whose bark is used in tanning) is almost the only one that will pay for being thus treated.

The seasoning of timber consists in the extraction of or evaporation of the fluid parts which are liable to decomposition on the cessation of the growth of the tree. This is usually effected by steeping the green timber in water, to dilute and wash out the sap as much as possible, and then drying it thoroughly by exposure in an airy situation. The time required to season timber thoroughly in this manner will of course much depend on the sizes of the pieces to be seasoned, but for the general purpose of carpentry, two years is the least that can be allowed, and, in seasoning timber for the use of the joiner, a much longer time is usually required.

Properly seasoned timber placed in a dry situation, with a free circulation of air round it, is very durable, and has been known to last for several hundred years without apparent deterioration.

This is not, however, the case when exposed to moisture, which is always more or less prejudicial to its durability.

When timber is constantly under water, the action of the water dissolves a portion of its substance, which is made apparant by its becoming covered with a coat of slime. If it be exposed to alterations of dryness and moisture, as in the case of piles in tidle waves, the dissolved parts being continually moved by evaporation and the action of the water, new surfaces are exposed, and the wood rapidly decays.

Where timber is exposed to heat and moisture, the albumen or gelatinous matter in the sapwood speedily putrifies and decomposes, causing what is called rot.

The rot in timber is commonly divided into two kinds, the wet and dry, but the chief difference between them is, that where the timber is exposed to the air, the gaseous products are freely evaporated, whilst in a confined situation they combine in a new form, viz the dry rot fungus, which, deriving its nourishment from the decaying timber, often grows to a length of many feet, spreading in every direction, and insinuating its delicate fibres even through the joints of brick walls.

In addition to the sources of decay above mentioned, timber placed in sea water is very liable to be completely destroyed by the perforations of the worm, unless protected by copper sheathing, the expense of which causes it to be seldom used for this purpose.

The best method of protecting woodwork from decay when exposed to the weather is to paint it thoroughly, so as to prevent its being effected by moisture.

It is, however, most important not to apply paint to any woodwork which has not been thoroughly seasoned, for in this case, the evaporation of the sap being prevented, it decomposes, and the wood rapidly decays. *Timber Trades Journal.*

TAR ROOFS.

The London *Builder* says that the German Government has on several occasions pointed out to farmers and others interested in agriculture that too great an expenditure of capital on buildings is a mistake. With a view of illustrating the application of this principle of economy to roofing, the *Cologne Gazette* points out that the system of using tar for roofing purposes is at the same time economical and suitable for agricultural buildings, and what is said may serve as an answer to a recent inquiry in our own pages. The framework of the roof can be of relatively slight construction on account of the nature of the covering it is intended to support, and the perpendicular height of the roof *can be one-eight or one-tenth of the entire depth* of the building. The distance of the rafters is arranged according to the width of the covering material, the scale being that from the middle of one rafter to the middle of another. The distance should be 2⅜ in. less than that the width of tar roofing sheets.

Immediately upon the rafters come boards, and upon these (exactly in the centre of the separate rafters) are placed strong laths, about 2 in. wide and 1⅜ in. thick, the upper edges being taken off. The roofing sheets are now placed so as to cover the spaces between the laths, *and are nailed. Over the laths are placed strips* of paper, 5 in. to 6 in. wide, fastened with nails at intervals of 2⅜ in,

In order to make the sheets lie smoothly upon the boarding, it is suggested, in case they are too dry, to soften them by immersion in water. It is recommended that the workmen should not wear heavy-nailed boots, and also, that if the rain comes on, the roof should not be walked upon immediately after. When the entire surface of the roof is covered with sheets, the strips of paper (or caps) already named, as well as joints, are painted over with a hot mixture of coal tar and pulverized lime. Pure dry sand is at once sprinkled over this coating, and particular care must be taken that all the nail heads are well covered. When the paint is dry the whole surface of the roof is once more coated with the same mixture, and is sanded.

The object of this careful method of overlaying the roof with several coatings of specially prepared solutions is to preserve in the tar those oleaginous and fatty properties which it soon loses if exposed to the air, and the retention of which is an indispensable condition of its resistance to water. Clay and sand do not afford sufficient protection, and they are removed by violent winds.

Refererence is made to various systems of coating the tar roof with protective substances, for the purpose indicated. One of the most successful methods consists of a mixture of cow dung and thin white lime, which is spread over the entire surface of the roof. If such a coating is not applied the tar paint must, during the first four years, be annually renewed, which enhances the cost of the roof. If the last named productive composition is used, and renewed every two years, the coating of tar and lime can be dispensed with. Particular mention is, however, made of a coating of tar mixed with Portland cement, the tar being well heated and used in the proportion of 111 pounds to 200 pounds