PERSONAL EXPERIENCE IN TRANSPLANTING TREES—HOW WE DID IT AND THE RESULT.

We have had large experience, extending over many years, in transplanting young trees; and having learned a method which is almost invariably successful, we purpose to communicate it fully and clearly to our readers, very large numbers of whom are interested to a greater or less extent in the matter. Out of the first hundred trees that we bought, we lost thirty, and since that time we have transplanted several hundred in a season without loosing a single one. This is our plan:—Dig a hole two and a half feet square, and ten inches in depth, leaving the sides perpendicular and the bottom level, or with the edges a little lower than the middle. As the dirt is thrown out, have it beat up fine with the back of the shovel. Set the tree into the hole so that the roots will lie in their natural position without being bent, and if the hole is too deep for the tree, let a shovel-full of earth be thrown into the middle to raise the tree to a proper hight. Let such such parts of the hole be filled as are not occupied by the roots, care being taken to avoid bending the roots, or having them considerably covered with the soil. Now let two pails of water be poured into the hole, and while the tree is held in an upright position, let the assistant sift the fine dirt from his shovel slowly into the water. While this process is going on, the person who holds the tree should change his position to different sides of it, by which means he will be able to get it perfectly perpendicular. After the tree has stood for half an hour it may be examined, and if it leans at all, it may be brought to an erect position by pressing it over with the hand, and at the same time pressing the earth with the foot against the proper side at the roots. This method *deposits* the earth upon the roots in a manner somewhat analogous to electrotyping, embedding them more perfectly than can be done by any other mode. It also avoids the necessity of supporting the tree with stakes. When the tree is first set in the soft mud, it may be pushed over with the little finger, but after two or three hours, it feels as firm in its new positionas if it had grown there.

If the ground is not very rich, plenty of manure should be mixed with the earth about the tree; and in poor soil we have found it very advantageous to prepare a rich border for the tree during its early growth, by digging a hole four or five feet square and two feet deep, and filling it with manure and soil from the surface. It is also a good plan to mix manure with the water which is used in setting the trees. We think as highly as Mr. Downing did of mulching the ground, or covering it with straw to the depth of two or three inches and for a space of four or five feet around the tree. It is just as important to cultivate the ground about young trees as it is about corn; no weeds should be suffered to grow, and a tree might about as well be put into the fire, as to be set in grass land. All young orchards should be highly manured and cultivated. We once saw two acres prepared for a nursery for apple trees in Illinois. The virgin soil was covered three or four inches deep with strong stable manure, and the ground very deeply and thoroughly plowed and harrowed. The grafts (consisting of a scion three inches long, spliced to a bit of root four inches in length) were placed in this genial soil, and the ground through the season was thoroughly cultivated, not a weed being allowed to grow. As the grafts were so deeply inserted that only one eye was above the ground, when they were first set in the Spring, a person would not notice that there was anything in the field, but in the Fall, five months afterwards, if a tall man walked into the nursery he was so completely hidden by the trees, that it was impossible to see him; so rapid had been the growth.

Large trees also are benefited by an abundance of manure. In Smithfield, R.I., there is a famous apple tree which has yielded 40 bushels a year for several consecutive years, and the secret of its great fecundity is fouud in the fact that a flock of turkeys have roosted in its branches. But the most important thing for trees either young or old, is to keep the ground free from weeds and grass. It is true if the land is very rich indeed, it may bear part of a crop of grass and a moderate yield of fruit, bnt as a general rule the most unsatisfactory of all efforts of husbandry is the attempt to obtain both fruit and grass from the same field. Plant potatoes or corn, or anything that requires plowing and cultivation, and the trees will be benefited by it, but let them grow amongst grass and they will present a most mossy, wrinkled and sickly appearance, they will make a very slow growth, and bear very little fruit.

BURNING SAWDUST FOR STEAM BOILERS.

Messrs. Editors:—I noticed on page 71 of the present volume of your valuable paper a communication headed, "How to Burn Sawdust Satisfactorily," signed by I. H S. I have been building sawmills for 14 years and have tried many plans for burning sawdust, and now have a plan which I think is perfect. It is adopted in the last mill that I built, belonging to W. H. Depue, in Johnson county. The boiler is 40 inches in diameter, and 20 feet long, with two 14-inch flues. Two feet back of the grate bars we have an arch wall within four inches of the boiler, and beyond this wall there is a space of three feet under the boiler to its end. We have sheet iron doors to close the air chamber under the grates, in order to keep out the cold air when the grate bars become naked. With this arrangement we have no difficulty in keeping up steam with oak, beach, elm and sicamore dust; filling both sides of the furnace at once, closing immediately, and letting in but little air. I am satisfied that most mills let in too much air through their grates and furnaces to burn saw-dust to good advantage. The damper the dust, the less air does it require.

N. D. L

Franklin, Ind., Feb. 9, 1860.

A COMMON ERROR AMONG ENGINEERS.

Messrs. Editors:—If steam at 80 lbs. pressure is admitted to a cylinder and cut-off when $\frac{1}{4}$ of the stroke is performed, it will expand the remaining $\frac{3}{4}$ and its pressure be reduced to 20 lbs., according to the common opinion among engineers; but this is an error, the true pressure without any allowance for condensation would be $(80+15\div4)-15=8\frac{3}{4}$ lbs. on the same steam gage that measured the the 80 lbs. initial pressure. Suppose a non-condensing engine working steam at 35 lbs. cuts off at $\frac{1}{4}$ stroke, the pressure at the end of the stroke is $2\frac{1}{2}$ lbs. below the atmospheric pressure, that is, there will be a partial vacuum in the cylinder before the end of the stroke, tending to run the engine backwards. An engine, therefore, cutting off at $\frac{1}{4}$ stroke should carry over 35 lbs. of steam, and all engines working cut-offs controlled by the governor should carry at least 100 lbs., otherwise in cutting-off very early they would form a vacuum in the cylinder to the disadvantage of the engine. Some engineers will not believe that a vacuum can occur in a high-pressure engine.

D. S.

San Francisco, Cal., Jan. 10, 1860.

CLARIFYING COAL OILS.

We translate from *Le Génie Industriel*, the following:

"Messrs. Dumoulin & Cotelle, have been making a series of experiments with a view of rendering heavy oils suitable for ordinary lighting puposes, and have succeeded in producing a magnificent light, free from smoke and smell, and adapted in all respects for burning in a close room. The following is their process:—In a close vessel are placed 100 lbs. of crude oil, 25 quarts of water, 1 lb. of chloride of lime, 2 lbs. of sal soda, and half a pound of manganese. The mixture is violently agitated and set to rest for 24 hours, when the clear oil is decanted and distilled. The 100 lbs. of coal oil are to be mixed with 25 lbs. of resin oil; this is one of the principal points in the manipulation, it removes the gummy parts from the oil and renders them inodorous. The distillation spoken of may terminate the process, or the oils may be distilled before they are defecated and precipitated."

Incombustible Crinoline.—At a recent meeting of the Pharmaceutical Society in George-street Hall, Edinburgh, Dr. Stevenson Macadam exhibited a crinoline dress, one half of which had been immersed in a solution of sulphate of ammonia, in order to test its non-combustibility. On a light having been applied to the crinoline, the part of it which had not been steeped in the solution was at once enveloped in flame; but the only effect which the light had on the other part was to char it. This was considered a satisfactory experiment; and it was stated that as ammonia was only twopence per pound, it was accessible to the humblest classes.

SPONTANEOUS COMBUSTION IN A FLOUR MILL.

Messrs. Editors:—I send you the following account of a peculiar accident by fire which took place in my flour mill in the month of September last. The cause of it still remains a mystery to me; perhaps you can explain it. The subject is one of deep personal interest to millers and mill-owners, and for this reason I send this letter, as well as for my own satisfaction.

The spout in my mill, which conveys the meal from the stones to the elevators, passes through the floor (above which it is closed) into the foot of the elevators. Below the floor, for a distance of about two feet, the spout is open to allow the steam that is generated, when grinding damp wheat, to pass off. The distance from the floor where the spout passes through, to the ground on which the foot of the elevators stand, is about four feet. While the meal is passing down the spout, a very fine dust escapes with the steam, and falls on the ground at the foot of the elevators. The vapor or steam generally condenses on the under side of the floor, and drops down upon the fine dust on the ground. About four bushels of this dust had accumulated into a heap when, one morning about six o'clock, as the engineer and myself entered the mill, we found it filled with a dense black smoke, which caused us to search for the fire with considerable alacrity and fear. We first found smoke issuing from around the curb of the stone, which caused us to conceive that the bush in the bedstone was burning. On opening the meal-spout, however, we saw the smoke ascending through it, and when we opened the trap-door in the floor we found, to our great surprise, the heap of flour dust which I have already mentioned on fire. It was not blazing but was a mass of fire in the inside, with the outside not quite burned. The question with us was, "How did this catch fire?" No person had been under the floor for two weeks; and there had been no fire whatever within 30 feet of the spot, nor could it have taken fire from any fire on the premises. Atone time I thought that a nail or some piece of metal might have passed through between the burr stones and had become heated: then had fallen over the edge of the spout and set the flour dust on fire. To try whether this would have caused such a result, I heated a piece of iron red-hot and thrust it among some such dust, but it would not take fire. I then put some red-hot coals among the flour, when these were extinguished also. The conclusion at which I have arrived regarding the cause of this fire is, that it was due to spontaneous combustion; some of my scientific friends, however, consider that this could not have been the cause. Will you, then, Messrs. Editors, be pleased to give your opinion? We generally find it correct.

C. D. G.

Greenbush, Wis., Feb. 16, 1860.

[This is a serious and interesting matter for millers. If the dust-heap in our correspondent's mill set itself on fire (took fire spontaneously), then all millers should be careful not to allow such heaps to accumulate. Spontaneous combustion does not take place very often; but there is no fact better established than that certain substances, under peculiar circumstances, will thus take fire. We are of opinion that the dust-heap in our correspondent's mill took fire spontaneously. It perhaps had imbibed a certain amount of moisture, which tended to produce active decomposition, and this was concentrated in the interior until active combustion resulted.—Eds.

Gardiner's Galvanic Gas-igniter.—On page 320, Vol. XII. (old series), Scientific American, we published an illustrated description of Gardiner's apparatus for lighting gas by electricity. We are pleased to learn that this improvement is being rapidly introduced, and that it is in all cases perfectly successful. In 1858 it was applied to 1,500 jets in the United States Senate Chamber, where it has been in use to the present time, *never* having failed in a single burner. At the last fair of the American Institute, the wires were arranged ou the large chandelier in the main hall, and the gas was turned off and on, and lighted from 50 to 100 times each evening, without making a single failure. It is now in use at the exhibition of the model of Solomon's Temple, at the store of Messrs. Tiffany & Co., 550 Broadway, at Mr. Belmont's picture gallery, for lighting the stage at the Academy of Music, and in a number of private houses; in all cases working successfully and giving perfect satisfaction. The inventor says that it is peculiarly adapted to lighting street lamps in cities.