

Popular Errors about the Rise and Fall of Sap in Trees.

BY PROF. LINDLEY.

What curious hallucination is that which supposes the sap of trees to fall or settle in the winter into the roots! One would have thought that the notorious difficulty of cramming a quart of water into a pint measure might have suggested the improbability of such a phenomenon. For it certainly does require a very large amount of credulity to believe that the fluids of the trunk and head of a tree, can by any natural force of compression, be compelled to enter so narrow a lodging at the root.

We shall assume the word sap to signify the fluids, of whatever nature, which are contained in the interior of a tree. In the spring the sap runs out of the trunk when it is wounded; in the summer, autumn, and winter it does not, unless exceptionally, makes its appearance.—But in truth the sap is always in motion at all seasons and under all circumstances except in the presence of intense cold. The difference is, that there is a great deal of it in the spring and much less at other seasons.

When a tree falls to rest at the approach of winter, its leaves have carried so much more fluid than the roots have been able to supply, that the whole of the interior is in a state of comparative dryness, and a large portion of that sap which once was fluid has become solid in consequence of the various chemical changes it has undergone. Between simple evaporation on the one hand and chemical solidification on the other, the sap is, in the autumn, so much diminished in quantity as to be no longer discoverable by mere incisions. The power that a plant may possess of resisting cold is in proportion to the completeness of this drying process.

When the leaves have fallen off, the tree is no longer subject to much loss of fluid by perspiration, nor to extensive chemical changes by assimilation. But the absorbing power of the roots is not arrested; they on the contrary go on sucking fluid from the soil, and driving it upwards into the system. The effect of this is that after some months of such an action, that loss of fluid which the tree has sustained in autumn by its leaves is made good, and the whole plant is distended with watery particles. This is a most wise provision in order to insure abundant food to the new born leaves and branches when warmth and light stimulate them into growth.

During all the winter period the sap appears to be at rest, for the refilling process is a very gradual one. But M. Biot many years ago proved, by an ingenious apparatus, that the rate of motion of the sap may be measured at all seasons, and he ascertained it to be in a state of considerable activity in mid-winter.—Among other things he found that frost had considerable influence upon the direction in which the sap moves. In mild weather the sap was constantly rising, but when frost was experienced the sap flowed back again—a phenomenon which he referred to the contracting power of cold on the vessel of the trunk and branches, the effect of which was to force the sap downwards into the roots lying in a warmer medium; then, again when the frost reached the roots themselves and began acting on them, the sap was forced back into the trunk; but as soon as a thaw came on and the ground recovered its heat, the roots out of which a part of the sap had been forced upwards, were again filled by the fluids above them, and the sap was forced to fall. A large poplar tree in the latter state, having been cut across at the ground line, the surface of the stump was found to be dry, but the end of the trunk itself dipped with sap. Sap then is always in motion, and if it ever settles to the root in a visible manner, that is owing to temporary causes, the removal of which causes its instant re-ascend.

As to the idea that the bleeding of a tree begins first at the root, and in connection with this supposition, that what is called the rise of the sap is the cause of the expansion of buds and leaves and branches, nothing can well be more destitute of any real foundation. If in the spring, when the buds are just swelling, a tree is cut across at the ground line no bleeding will take place, neither will the sap flow for some distance upwards, but among the bran-

ches the bleeding will be found to have commenced. This was observed some years ago by Mr. Thompson, at that time the Duke of Portland's gardener, who thought he had discovered that the sap of trees descends in the spring instead of ascending; a strange speculation enough it must be confessed. The fact is that the sap is driven into accelerated motion first at the extremities of a tree, because it is there that light and warmth first tell upon the excitable buds. The moment the buds are excited they begin to suck sap from the parts with which they are in contact; to supply the waste so produced, the adjacent sap pushes upwards; as the expansion of the leaves proceeds, the demand upon the sap near them becomes greater; a quicker motion still is necessary on the part of the sap to make good the loss; and thus from above downward is that perceptible flow of the fluids of trees, which we call bleeding, effected.

The well known fact of trees sprouting in the spring, although felled in the autumn, proves that the sap had not at that time quit the trunk to take refuge in the roots. Such a common occurrence should put people on their guard against falling into the vulgar errors on this subject.

Swedish Laws with Respect to Intoxication.

The laws against intoxication are enforced with great rigor in Sweden. Whoever is seen drunk, is fined, for the first offence, three dollars; for the second, six; for the third and fourth, a still further sum; and is also deprived of the right of voting at elections, and of being appointed a representative. He is, besides, publicly exposed in the parish church on the following Sunday. If the same individual is found committing the same offence a fifth time, he is shut up in the house of correction, and condemned to six months' hard labor; if he is again guilty, to a twelve months' punishment of a similar description. If the offence had been committed in public, such as at a fair, an auction, &c., the fine is doubled; and if the offender has made his appearance at a church, the punishment is still more severe. Whoever is convicted of having induced another to intoxicate himself is fined three dollars, which sum is doubled if the person is a minor. An ecclesiastic who falls into this offence loses his benefice; if he is a layman who occupies any considerable post, his functions are suspended, and perhaps he is dismissed. Drunkenness is never admitted as an excuse for any crime; and whoever dies when drunk is buried ignominiously, and deprived of the prayers of the church. It is forbidden to give and more explicitly to sell, any spirituous liquors to students, workmen, servants, apprentices, or private soldiers. Whoever is observed drunk in the streets, or making a noise in a tavern, is sure to be taken to prison and detained till sober; without, however, being on that account exempted from the fines. One half of these fines go to the informers (who are generally police officers,) the other half to the poor. If the delinquent has no money, he is kept in prison until some one pays for him, or until he has worked out his enlargement. Twice a year these ordinances are read aloud from the pulpit by the clergy; and every tavern-keeper is bound, under a penalty of a heavy fine, to have a copy of them hung up in the principal rooms of his house.

These Swedish laws are far in advance of those of any other nation. If Great Britain would enact the like, she would be much happier in every respect, and we might well take the example ourselves.

Patents of Nobility.

When titles, says the Scottish Temperance Review, which were originally conferred on some individuals for meritorious actions, become mere forms, and are transmitted from generation to generation, without regard to the character of those who successively enjoy them, they degenerate at last into petrified vulgarities. The time is coming when the most noble the Marquis of Muffins will voluntarily abandon his ancestral caricature. When the Landers were travelling in Africa, they tarried for a time at the court of one of the native potentates. During their sojourn, the rations of his tawny majesty were not sufficient

to prevent the travellers from consuming the contents of sundry hermetically-sealed tin vessels they had brought with them from Europe. The empty tins which, as a matter of course, were thrown away by the travellers, were eagerly picked up by the natives. Guess the surprise of the Landers, one fine sunny morning, on seeing one of the chief nobles stalk into court, with his head thrust into one of the identical empty square tins, on each of the four sides of which the English maker had printed in large characters, "Concentrated Gravy." The splendid new helmet of the African duke excited the envy of his compeers, and even roused the covetousness of the king. Perhaps it is at this moment stiffly embracing the woolly head of the sable monarch. When "Chambers's Information for the People," however, begins to circulate in Africa, it will speedily be discovered, either that his majesty has no claims to the titles conferred upon him by his crown, or that his head is an "organised hypocrisy;" while in Europe the opinion is daily gaining ground, that all patents of nobility, however respectable, smell more or less strongly of "concentrated gravy."

Laws and Customs about Mechanics in Germany.

The different crafts in Germany are incorporations recognised by law, governed by usages of great antiquity, with a fund to defray the corporate expenses; and in each considerable town a house of entertainment is selected as the house-of-call, or "harbor," as it is styled, of each particular craft. Thus you see in the German town a number of taverns indicated by their signs, "Mason's Harbor," &c. No one is allowed to set up as a master workman in any trade unless he is admitted as a freeman or member of the craft; and such is the stationary condition of most parts of Germany, that no person is admitted as a master workman in any trade, except to supply the place of some one deceased or retired from business. When such a vacancy occurs, all those desirous of being permitted to fill it present a piece of work, executed as well as they are able to do it, which is called their masterpiece, being offered to obtain the place of a master work-man.

As soon as the years of his apprenticeship have expired, the young mechanic is obliged, in the phrase of his country, to "wander," for three years. For this purpose he is furnished, by the master of his craft in which he has served his apprenticeship, with a duly-authenticated wandering-book, with which he goes to seek employment. In whatever city he arrives, on presenting himself, with his credentials, at the house-of-call or harbor of the craft in which he has served his time, he is allowed, gratis, a day's food and a night's lodging. If he wishes to get employed in that place, he is assisted in procuring it. If he does not wish it, or fails in the attempt, he must pursue his wandering; and this lasts three years before he can anywhere be admitted as a master.

Hungarian Enclosed Wooden Bridge.

The first in date and merit is that of Schaffhausen, built over the Rhine, where the influence of that river's cataract, a couple of miles lower down—at Lauton—is felt in great force. From its firm construction, it was accounted the best wooden bridge in the world, though the flatness of the banks on each side offered no facilities, and the merit of its projection and construction is due to a common carpenter of the place, called John Ulrick Grubenman, in 1757. Its entire length was 353 feet 7 inches without support from below, its breadth was 15 feet 6 inches. With the passage of an individual it vibrated sensibly, but was kept immovable and firm when heavily laden wagons passed over it. The same builder in conjunction with his brother, built another hanging and covered bridge in 1778, over the Limmat, near Wittengen, with a span of 346 feet and with some improvement and greater firmness than the Schaffhausen earlier one. Both were burned in 1799 by the revolutionary hordes of France, when retreating after a defeat by the Austrians. In modern times the art of wooden bridge building has been carried to great perfection in Hungary, by the Austrian road architect, John Gross, who in

1807—8 built a covered bridge over the Waug in the county of Thurotz, on the principle of the former Schaffhausen, which seems to have served as a general model. The most curious feature in these Magyar structure, is their small cost; the above was built for only 35,000 gulden, or about \$15,000. So cheap is labor and indigenous material in that country, which may almost account for the obstinacy of the resistance offered by it to the Austrian arms, where men are so readily to be procured, and such immense woods exist to cover a retreat or to check the operations of an invader.

The Mormon City of Salt Lake.

A correspondent of the Pittsburgh Gazette, writing from the Mormon City, on the great salt Lake, says it covers more ground than Pittsburgh, and contains about 10,000 Mormons:—

The whole valley is occupied by the Mormons, who build their houses entirely of sun-dried bricks. They are building a church of stone which is already one story high and will be a fine building. They assemble every Sunday morning under a large shed. The society is governed by a president, the twelve, and the seventy. The president and the twelve do all the preaching. I went this morning when the bell rang, to church, where I saw a large assemblage, some dressed quite fashionably, and all clean and neat. A brass band first played a lively tune, and then the clerk rose and read several notices. They are very strict in the administration of justice. One of their number stole a pair of boots from an emigrant, he was sentenced to pay four times their value, fined \$50, and was compelled to work fifty days on the public roads. One of them was sentenced to death for borrowing some property from a neighbor and selling it; but finally, owing to the intercession of his family, his sentence was commuted to banishment. When they arrived they were very much troubled by some Indians, who killed their cattle and stole from them. They sent to remonstrate with them, and the Indians replied that their president was an old woman, and they would not mind him. They then sent out a company of soldiers, and killed a few, since which time they have not been annoyed.

Feeding Cattle.

An English writer observes that two great points in feeding cattle are regularity and a particular care of the weaker individuals. On this last account there ought to be plenty of trough or rack room, that too many may not feed together; in which very common case the weaker are not only trampled down by the stronger, but they are worried and become cowed and spiritless; than which there cannot be a more unfavorable state for thrift, besides, they are ever compelled to shift with the worst of the fodder. This domineering spirit is so remarkably prevalent among horned cattle, that the writer has a hundred times observed the master beasts running from crib to crib, and absolutely neglecting their own provender for the sake of driving the inferior from theirs. This is much oftener than is suspected, the chief reason of that difference in a lot of beasts after a winter's keep. It is likewise, he says, a very common and very shameful sight, in a dairy of cows to see several of them gored and wounded in a dozen places, merely from the inattention of the owner and the neglect of cupping the horns of those that butt. The weaker animals should be kept apart; and in crib feeding in the yard, it is a good method to tie up the master beast at their meals.

Dr. Dean says, there should be more yards than one to the barn, where divers sorts of cattle are kept. The sheep should have a yard by themselves, at least; and the young stock another, that they may be wholly confined to such fodder as the farmer can afford them.

A Freak of Nature.

A specimen of a singular vegetable was recently taken from the Garden of Wm. Choate, Esq., of Derry, N. H. Seeds of squash and watermelon were both planted in the same bed, the result appears to be a vegetable, half squash and half melon—in this case the melon the larger end, and the squash the neck, and the line of distinction between the two is distinctly shown.