

to and from town; the loss from worry and over-exertion to horses and all draft animals resulting in shortening lives and limited periods of greatest usefulness; the loss in added wear and strain upon vehicles of all kinds; the loss that comes in the shape of diminished loads, the loss as we have shown in inability to take advantage of the most favorable markets, all these mean a direct and absolute loss of money that would astonish the objecting farmer could he know the amount. But there is a loss of those things that go far towards making the farmers life worth living, the value of which is too great to be measured by the standard of dollars and cents. Man's social nature is strong and demands sustenance that is the result of intercourse with his fellows, deny him this sustenance and he becomes narrow, selfish, and morbid. Social intercourse adds immeasurably to a man's capacity for enjoying the good things of life, and contact with his fellows broadens him in his character and makes him a more useful member of society. Each town or village is the intellectual and social centre of the neighborhood around, and when the people can readily reach these centres, they are improved in mind and manner by coming into touch with the intelligence and culture that in turn comes from the larger towns and cities. By bad roads this co-mingling of country and town is prevented or rendered difficult. Again the loss becomes a financial one for viewed in the light of the broadest economy an intelligent, well informed citizen is worth more to the province than a dweller of the back woods who never sees a train of cars nor reads a newspaper.

Granted the proposition that we need better roads, that economy and the greatest good of mankind demand them, how are we going to get them? Clearly the way to an improved system of highways lies in legislation. Education of public sentiment must precede legislation—that is the way of all reforms. The present system must be shown up in its true light, as a wasteful, antiquated, unbusiness like method of dealing with one of the most vital parts of social machinery. Few people have even the faintest idea of the enormous waste of public funds through the so-called road system that prevails in their own county—a custom borrowed (inherited) from the old world more than a century ago, and long since discarded by them as unworthy of civilized nations.

It is to be hoped that the officers of the Association formed in Toronto, in February last, for the purpose of dealing with this question will not forget the responsible positions they were elected to fill. That they will think out this difficult problem, seek information from every quarter, search the books of their municipality to find out the amount of money that has been expended on roads, observe closely the work performed for that money, urge upon every person in their municipality to take an interest in this question and the

necessity of studying it up, so that when the next meeting takes place reliable statistics may be at hand, and every person present will be in a position to talk facts which will enlighten those who think only of complaining of high taxes and at the same time threatening vengeance on those managing the affairs of the municipality for not improving the roads which even they with the means at hand cannot but deplore.

#### Drainage

That drainage prevents drought is a somewhat startling proposition at first view. How can draining land make it moist? One would as soon think of watering land to make it dry. A drought is an enemy all farmers dread. If we take up a handful of rich soil of almost any kind after a heavy rain, we can squeeze it hard enough with the hand to press out drops of water. If we should take of the same soil, in a large quantity, after it was so dry that not a drop of water could be pressed out by the hand, and subject it to the pressure of machinery, we should force water from it. Any boy who has watched the process of making cider with the old fashioned press has seen the pomace after it has been once pressed apparently dry, and cut down and the screw applied anew, give out quantities of juice. These facts illustrate first, how more water may be held by a pulverized and open soil than by a compact and loose one. Water is held in the soil between the minute particles of earth. If these particles be pressed together compactly there is no space left between them for water. The same is true of soil naturally compact. This compactness consists more or less in most sub-soils, certainly in all through which water does not readily pass. Hence all these sub-soils are rendered more permeable to water by being broken up and divided; and more retentive by having the particles of which they are composed separated one from another, in a word by pulverization. This increased capacity to contain moisture by attraction is the greatest security against drought. The plants in a dry time send their rootlets throughout the soil and flourish in the moisture thus stored up for their time of need. The pulverization of dry land may be produced partly by deep or sub-soil ploughing which is always necessary to perfect the object of thorough draining; but it is much aided in stiff clays also by the shrinkage of the soil by drying.

Drainage resists drought again by the very deepening of the soil of which we have already spoken. The roots of plants we have seen will not extend into stagnant water. If then, as is frequently the case, even on sandy plains, the water line be in early spring very near the surface the seed, may be planted, may vegetate, and throw up a goodly show of leaves and stalks, which may flourish as long as the early rains continue; but suddenly the rain

ceases, the sun comes out in his June brightness, the water line lowers at once into the soil; the roots have no depth to draw water from below, and the whole field of clover or corn in a single week is past recovery. Now if this light sandy soil be drained so that at the first start of the crop there is a deep seed bed free from water, the roots strike downward at once and thus prepare for a drought. A moments reflection will satisfy any one that the dryer the soil in spring, the deeper the roots will strike, and the better able will be the plant to endure the summer's drought. Again, drainage and consequent pulverization and deepening of the soil increases its capacity to absorb moisture from the atmosphere and thus afford protection against drought. Watery vapor is constantly in all dry weather rising from the surface of the earth; the plants in the day time are, also from their leaves and bark giving off moisture which they draw from the soil. But nature has provided a wonderful law of compensation for this waste, which would, without such provision parch the earth to barrenness in a single rainless month.

The capacity of the atmosphere to take up and convey water, furnishes one of the grandest illustrations of the perfect work of the author of the universe. The numerous great rivers and their millions of tributaries constantly flowing into the sea, convey to it only as much water as the atmosphere carried back in vapor and discharges upon the hills. The warmer the atmosphere the greater the capacity to hold water. The heated thirsty air of the tropics drinks up the water from the ocean and bears it away to the colder regions where, through condensation by cold, it becomes visible as a cloud, and as a huge sponge pressed by an invisible hand the cloud condensed still further by cold sends down water to the earth in rain.

The heated air over our fields and streams in summer is loaded with moisture as the sun declines. The earth has been cooled by radiation of its heat, and by constant evaporation through the day. By contact with the cooler soil, the air borne by its thousand currents gently along its surface is condensed and yields its moisture to the earth again in form of dew.

Experience has abundantly proved that thorough drainage, upon soils requiring it, has proved a great relief to the farmer and that crops upon such land have been far better generally than those upon undrained lands in the same locality, and that in some instances the increased crop has been sufficient to defray the expenses of the improvement in a single year.

James Woodyatt, city clerk of Brantford, died at Belleville, on the 20th August. Mr. Woodyatt was born in England on June 20th, 1819, and came to Brantford in 1835. In 1859 he was appointed city clerk, a position he has occupied for 35 years. He was a Past Grand Master of the I. O. O. F., of Ontario, and representative to the Sovereign Grand Lodge for eighteen years. He was the first Grand Patriarch of the Grand Encampment of Ontario.