

WHY WE HAVE SO FEW GOOD ROADS.

A COMMON purse for a common purpose seems to be a necessity of modern municipal government. The individual citizen contributes to the purse in order that he may share in the benefits to be derived from the execution of the purpose. He surrenders the right to spend his own money and to enjoy the results of this expenditure, in order to spend the money of other people as well as his own and secure greater results. The right to tax is based theoretically upon the return to the taxpayer of more and better results than he can secure by the expenditure of his own money in his own way; hence the argument for the contribution to the common fund. The purse is usually easily filled by taxation. The purpose is generally more or less clearly defined and understood, but the income of the purse and the outcome of the purpose are by no means commensurate.

Between these two points there is, in ordinary municipal government, a sad shortage. It may be the fault of the laws which provide for the expenditure of money raised by municipal taxation; it may be that there is inherent weakness in the organization of the machinery which is used to secure results; or it may be, when law and machinery are both satisfactory, that incompetent or dishonest agents administer the one and manipulate the other. Whatever the cause, it is undoubtedly true that in the ordinary application of the purse to the purpose there is a sad failure, and the contributor to the purse fails to receive what is his due as a citizen in the results flowing from the attempt to execute the purpose. This is true of the revenue raised by taxation for all specific objects in a given municipality; it is especially true and noticeable in regard to the moneys raised for and the labor expended upon the ordinary public roads of America.

There is undeniably a felt want in the community for better public highways. The subject is now generally agitated. It has been presented by the chief executive officers of a dozen different States to the attention of their several legislatures. It has received intelligent and careful consideration at the hands of commissions, of experts specially appointed for the purpose, of committees of several of our

legislatures, and of the legislatures themselves. It must be confessed—in spite of all that has been said, of all the study that has been given to the subject, and of all the effort to reach practical conclusions—that nothing generally satisfactory has as yet been attained. The main difficulty in the case is perhaps to be found, not in the inherent defects of present laws or in the inability of legislators to make better ones, but in the indifference of the general public upon the subject.

Unless general interest can be awakened, such an interest as will demand from those who make and those who execute the laws such legislation and such administration as will secure different and better results, these results are not likely to be secured, and there is little prospect of an improvement of present conditions. It is perhaps scarcely fair to say that there is complete indifference upon the subject. Most people are interested in securing a better condition of the common roads of the country for their own convenience and pleasure. But the disposition to antagonize a forward movement in this respect, or to retard an intelligent and comprehensive administration of present laws, is based, perhaps, upon the fear of the amount of money necessary to be expended in securing, in the first instance, a thoroughly good road. In all discussions of the subject, this seems to be the final resort of those who oppose improvements upon the present system.

Using Pennsylvania as an illustration, because I am more familiar with the details of management of its local municipal affairs, we have in every municipality three specific taxes—the school tax, the poor tax, and the road tax. Few of the citizens of any given municipality are directly interested in the poor tax. Its imposition is based upon the supposed duty of the community to care for its own citizens; and so the many care for the few, because it is both inhuman and impolitic to allow any member of the community to suffer. Society is interested in securing the return of those who are unfortunate and mere consumers of the wealth of the community to self-support and to the condition of producers.

We cheerfully pay the taxes levied for the support of our schools, not because we are personally or even directly interested in the results—for in many cases those make the largest contribution to the school fund who have the least direct interest in the institution which is thereby supported—but because society in general is interested in seeing that every member of it is educated and fitted for an intelligent

and faithful discharge of the duties of citizenship. In both of these cases we expend large amounts of money for purposes other than those which directly affect the classes interested. We build our county homes, our hospitals for the insane poor and for those who are injured and unable to care for themselves, at an immense expenditure of money, not only that greater comfort may be secured for those who are directly interested in them, but that these increased comforts may be secured at a less cost than can be otherwise had. It is undeniably true that a very large amount of the money expended in our public-school buildings is to raise monuments to municipal pride and local rivalry rather than simply to secure the accommodations absolutely necessary for securing the best results in our schools. In these cases where the contributors to the purse are in many instances not directly interested in the results of the purpose, the community which fails to tax its citizens for comfortable county homes, expensive and thoroughly equipped hospitals and asylums for the insane and the injured, and imposing school buildings for the education of the young, is regarded as lacking in progress and in the commonest elements of humanity. All this has arisen because of a public sentiment which demands such expenditures of the public purse.

Out of the poor purse the many support the few. Out of the school purse those who have children and those who have none alike make their contribution for the education of the young. When we come to the road purse, in the expenditure of which every member of society—young and old, male and female, stalwart and decrepit—is personally interested, our policy and practice change entirely. We utterly refuse to make such investments for substantial and enduring foundations as are made out of both poor and school funds. We are satisfied with, or, if not satisfied with, endure, the system, or lack of system, under which our forefathers blazed their roads through the primitive forests, and made their contribution to their maintenance by a few days' work in each year, which caused them to be more impassable than they were the year before.

Every member of society is interested in the public road. At birth, at death, and at all intermediate points during life it is used, to a greater or less degree, by or for every individual member of society. It carries the doctor to the bedside of the sick, the minister to administer consolation to the dying, friends to the house of mourning, and the dead to their graves. It brings purchaser and consumer together. It is the avenue alike of pleasure and of traffic. The farmer seeking

his market, the commercial traveller looking for customers, the millionaire in search of enjoyment with his coach-and-four, the wheelman in pursuit of health, the few seeking pleasure or profit on wheels, and the many in like pursuits on foot—all are interested in the public road. And yet, direct and immediate as these interests are, we are content to follow the methods of half a century or more ago, to submit to inconvenience, to discomfort, and to the immense waste of money and patience; not because we do not admit the advantages of a good road over a bad one; not because we cannot see, in theory at least, that a solid, smooth, level road which allows the farmer to convey to market twice as much with half the power is advantageous to him; not because it cannot be clearly demonstrated that in the end (because of the saving in annual repairs and the saving of waste in vehicles, horseflesh, harness, and the like) a good road is cheaper than a poor one—for all these things are distinctly and fully admitted by those who have given careful study to the subject—but because prejudice, opposition to change, and indifference control the masses of our people and dictate the course of legislation.

In the discussion of the road question, one of the most popular and oft-quoted remarks is that relating to the evidence of the civilization of a country which its roads exhibit. It is not a question of civilization, however, and we have not yet reached the point when we can fairly view it from the æsthetic side. It is a question of the simplest, commonest, most practical business sense. It reaches the everyday life of every man, woman, and child in every community. Those of us who advocate a reform in the mode of laying out, constructing, and repairing our public roads must show, and are responsible for showing, to our people that their direct and immediate pecuniary interests are involved, and will be subserved by a radical change in every department of road management.

It is asserted by some that the multiplication of our railroads takes away, to a great extent, the necessity for an improvement in the common roads of the country. The very opposite of this is true. Our railroads reach only the centres of population and traffic. Those who can reach these great avenues of travel only by a drive or a walk of five to ten miles for business, for pleasure, or for trade, should be able to do so in comfort, with celerity, with economy, and with some degree of certainty. Our railroads have multiplied those who travel for pleasure and for business and the traffic transported from the country to the great centres of trade a hundred-fold within the

last fifty years. It is a matter of intense practical moment to the farmer to know that he can reach the railroad-station, ten miles distant, in one hour rather than in three hours, and that he can transport two tons of his farm products with two horses more cheaply and in every way more satisfactorily than one ton with four horses; and yet this striking contrast measures the difference between what can be done over a good road in all seasons of the year, and what it is possible to do over our ordinary roads in certain seasons when the conditions are unfavorable.

The present condition of our roads and the palpable defects in their location and construction are usually laid to faulty or deficient laws upon the subject. There may be vast improvement without material change in present legislation; but if we are to secure the best results, it is undoubtedly true that we must change the laws enacted fifty or one hundred years ago so as to meet present needs and conditions. One of the difficulties in securing a change in our present laws is found in the importance of the subject, which has attracted so much attention that many of our law-makers have plans and codes of their own which they are unwilling to exchange for those of another. Any simple plan which will secure the location of a road by a competent engineer and its construction by a man who is familiar with the principles of road-making, and is able to give to the community one hundred cents of value for every dollar expended, will reach the results at present desirable and attainable.

With us in Pennsylvania, the fundamental defect in our law is the right which is given to the taxpayer to "work out his road tax." The result of this system is that repairs are made when they are least needed, and the smallest amount of work for the largest amount of pay possible is secured. The ordinary mode of operations is to plough up the sides of the road in the spring, throw the dirt thus loosened into the centre, and allow the rains and travel to force it back in the remainder of the season, so as to be available for the same purpose the next year. Some one, commenting upon this mode of road-making, has well said that we might as well construct our roads with ice in midwinter and expect to secure substantial results as to follow this absurd and unsatisfactory practice.

In general, our roads are located by those who have no enlarged experience in engineering, and who prefer to accommodate their neighbors by following the property lines between them, or making the road near or distant as may suit their convenience, rather than to

consult the general good of the public. Those who must use our common roads for heavy hauling do not seem to understand that the size of the load which they can transport to market is measured, not by the nine miles and three-quarters of level road which separates them from their destination, but by the other quarter which is hilly. We must have, first of all, therefore, in the construction of our roads, a good location; we must next have a solid foundation. As to the remainder, the Scripture injunction of the great prophet applies with as much force to-day as nearly three thousand years ago, when it was uttered: "Cast up, cast up the highway; gather out the stones."

If the objection be made that such a location and such construction of our roads will involve the expenditure of a large amount of money, the answer is, "Yes, but it is just such an expenditure as any prudent business man would make in his business in order to secure permanency, and satisfactory results in management, and economy in future repair." It may, and probably will, be necessary for the friends of road reform to content themselves with securing a slight amendment of our present road laws, rather than to attempt to secure the enactment of a perfect system which would revolutionize present conditions. Systems which have grown up in any given community through fifty years or more of every-day use and practice are not easily overturned. We must recognize the strength of the sentiment which gathers about them, and must not rudely shock that sentiment by an attempt to secure a complete overthrow of the so-called system. If in Pennsylvania and elsewhere where the system of working out the road tax prevails we could secure a simple amendment which would compel all taxes for road purposes to be paid in money, as other taxes are paid, and if that money tax were expended in each municipality by one man of good common sense, we could in a very few years prepare our people for another step forward. If investments such as are made out of our poor and school funds for permanent improvements were put into the foundations of our roads, the returns would be much greater, more direct, and more satisfying.

It is not impossible for us to hope for some improvement, even under our present unsatisfactory laws, in certain favored localities and under exceptional conditions. An example or two which will appeal to the readers of the FORUM will best convey the impression desired to be made. Mr. A. J. Cassett, whose country residence is in Montgomery County, adjoining Philadelphia, well known in railroad and business circles and in the community at large as an engineer of brill-

iant attainments and as a railroad manager of large and varied experience, and who is also a lover and breeder of fine horses, was, a few years ago, elected—probably partly as a joke and partly in the hope of securing the benefit of his knowledge and experience—a road-supervisor for the township in which he lived. To the surprise of many he accepted the position, levied the largest amount of tax allowed under the law, summoned his neighbors and secured voluntary contributions from those who were interested like himself in good roads for driving purposes, and as a result, during his official term secured for that township the best common roads in Pennsylvania. Another gentleman in one of the suburbs of Philadelphia, anxious to benefit his kind and to secure for his neighbors the greatest comfort and convenience in every-day life, located, laid out, and built at his own expense some two miles of model public road which he presented to the municipality in which he lived. These two practical examples furnished by busy business men are suggestive of what can be done, even under existing circumstances and discouraging legal surroundings.

As to the practical results arising from the improvements just referred to, there have been undoubted enhancement of the value of real estate, an influx of desirable population, and the largest possible increase to the comfort and convenience of all the people of those regions who make use of these roads. If a good road, thoroughly constructed, will endure for a thousand years, with ordinary repairs, what better monument can a man who wishes to benefit his kind raise to his memory, how can he contribute to the welfare of his fellows more fully and for a longer period, and how better perpetuate his memory than by following the example of the gentleman last mentioned, and by giving his own name to the road thus constructed? I know of no law which prevents the enterprising citizen from building or repairing the roads in front of his own property, and there would be undoubted acquiescence on the part of the public in work of this kind. Is it not possible, therefore, for a single enterprising citizen in any given community to show by a practical illustration, at his own expense, the difference between a good road, properly constructed, and those which are ordinarily travelled in our country communities; and will not such an illustration be productive of better practical results than any amount of argument or effort to secure better laws?

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PHONOGRAPHIC STUDIES OF SPEECH.

THE application of the phonograph to my special work is really the discovery of a new field of usefulness for that wonderful instrument, which, up to this time, has held the place of a toy more than that of a scientific apparatus of the very highest importance in the study of acoustics and philology. In many ways the use of this machine is so hampered by the avarice of men as to lessen its value as an aid to scientific research, and the letters patent under which it is protected preclude all competition and prevent improvements. However, I have been able, even with the poor machines in general use, to discover some of the most important facts upon which are based the laws of phonation. I shall here attempt to give in detail but a few of these experiments, as they are yet crude and in some cases the deductions therefrom not positively certain.

From the records that I have made of the voices of men and monkeys, I am prepared to say that the difference is not so great as is commonly supposed, and that I have converted each into the other. I would not be understood to say that I have done this with all their sounds, nor that the monkey's sounds were converted into human speech, but the fundamental sounds of each were changed into those of the other. I find that human laughter coincides in nearly every point with that of monkeys; it differs in volume and pitch. By the aid of the phonograph I have been able to analyze the vowel sounds of human speech, which I find to be compound; some of them contain as many as three distinct syllables of unlike sounds. From the vowel basis I have succeeded in developing certain consonant elements, both initial and final, from which I have deduced the belief that the most complex sounds of consonants are developed from the simple vowel basis, somewhat as chemical compounds result from the union of simple elements. Without describing in detail the results, I shall mention some simple experiments which have given me some very strange phenomena.

I dictate to the phonograph a vowel in different keys while the cylinder rotates at a given rate of speed. I then adjust the speed to