

MUNICIPAL DEPARTMENT

ROAD MAKING.

At a convention of the Illinois Society of Engineers and Surveyors, Mr. Arthur Lagron, City Engineer of Freeport, Ill., read an interesting paper on "Road Making and Road Maintenance," in which he gives some hints on road construction. Mr. Lagron was at one time in the service of the Department of Bridges and Highways of France, and was accustomed to construct roads by spreading on a good earth foundation a course of about 9 inches of good limestone, broken in pieces not exceeding 2½ inches in their greatest dimension, and giving the top a crowning of one-fiftieth of the width of the metaled highway. Beyond the stone the roadway is sloped away at the rate of 4 per cent. to a ditch on each side, so as to secure perfect drainage. He has built about a mile of macadamized road in Freeport, which compares favorably with the best of these French roads, and as a result of his American test of French methods advises the following method of construction:

A good earth foundation can be secured anywhere in the state of Illinois by grading up the centre of the road enough to get a good surface drainage by means of side ditches. Then it will be seen that the roadbed is all right; if there is anywhere a roller that can be had, the expense being but a trifle, we may roll it. Telford, corduroy, drain pipes, etc., are generally spoken of in connection with this, although there is no use for them except in a very insignificant proportion where a road has to go through a pocket of quicksand or some marshy spot. This will not occur on over 1 mile in 1,000. Next in order comes the spreading of 9 inches of broken stone. There is a prevailing idea that the bottom course ought to be of coarse stones, varying with individual ideas from 2 feet to 6 inches. I acknowledge that the idea has puzzled me, not because I have any doubt about the subject, but because I am about alone of my opinion. Nevertheless I will most emphatically say there is no earthly use of a coarser layer of stone at the bottom of the macadamized road. One may construct very nice looking roads with coarse bottom and fine topping, but the engineer that will have charge of the maintenance will have a job of it. After fighting chuck holes for a while he will probably have the whole picked loose, rebroken and relaid.

The only shadow of an excuse, however, would be if it is found more economical to crush two grades of stone, I would then put a first course of 4 inches, no more, and a top of 2½-inch stones. The next question is the rolling and the topping. I have seen roads that

were never rolled and became as hard as adamant and as smooth as a floor, but as we are here a nation of progress it is certainly advisable to roll rather than to wait for years of traffic to do the work. As for topping with screenings, gravel, or sand, that is a luxury which can be indulged in in the cities where we want the roadbed to be complete at once, but the cost attached to it is more to please the eye and show that the engineer knows his business than to benefit the road.

If a macadam is properly rolled, wagons, buggies, or bicycles can travel over it with ease; it is smooth but not compact at first, but it will be seen that the weather, assisted by the traffic, and perhaps an occasional rolling, will soon crush and pulverize enough of the angular corners of the stones to form a regular cement, and before one will be aware of it the whole thing will be a solid mass of concrete, so compact indeed that, if properly crowned, it will be impervious to rain.

If it is wrong, as I claim it is, to exaggerate the work necessary to make good roads, it is equally wrong to lead people to understand that when a road is done once it is done forever. Macadamized roads need constant repairs, the first year's ruts must be prevented, then we have to spread new stone to replace the wear, and that has to be done, and done judiciously. In fact the maintenance of roads is a branch of engineering by itself and requires no little experience. I cannot go into details here, but will simply quote our maxim: "That it is cheaper to maintain a good road at any expense than to let it go to wreck and then repair it."

I will conclude by stating briefly that before a road is improved it should be as carefully surveyed as a railway, with plans and profiles, the importance of the road being the basis to determine the maximum grading to be done or to what extent it should be straightened, whether right of way should be secured through private property or whether the road should be surveyed around every corner of everybody's farm. The construction should be in all cases under the strict direction of a civil engineer.

DANGERS OF CHEAP PAVING.

It will be of value to municipal officers in towns where the cry of monopoly has been raised against reliable paving companies to read the following extract from the annual report for 1895 of Water Purveyor Edward P. North to the Department of Public Works of New York City: "One of the most serious questions presented to the department grew out of the dilapidated condition of the asphalt pavement on Eighth avenue. Through a lack of skill or some other cause the pavement did not wear well, the reserve for its maintenance had been expended, the company which laid it had disappeared, and the sureties would not advance money to continue the repairs. Under these circumstances an effort was made to convince you that asphalt was unfit for a street of such heavy traffic.

The entire question of noiseless pavements, permitting increased loads and greater speed of circulation for our main thoroughfares, hinged on the decision as well as the continued liabilities of the sureties for that pavement."

Fear of newspaper criticism often induces public officers to award a contract to the lowest bidder even when every consideration of experience and prudence indicates that a higher bid would secure the cheapest article in the long run. Competition has its value and at the same time its limitations; which fact should not be lost sight of in awarding contracts for pavements, as well as any other public work, and especially so when durability and maintenance are the essential features required.—Engineering Record.

THE FIELD OF MUNICIPAL ENGINEERING.

In the 1896 issue of "The Technician" Mr. C. C. Brown, M. A., Soc. C. E., discusses the qualifications which a municipal engineer ought to possess and touches upon a number of important matters connected with his subject, which it is well for civil engineers and many others to consider carefully. He states, among other things, that many city engineering positions are filled with occupants without the requisite training either of an educational character or in suitable fields of experience, and he is undoubtedly correct. The inevitable and indeed natural results, constantly follow such a state of things. The disqualified engineer is capable of performing in an indifferent manner only that portion of the full duties belonging to his position which are of a subordinate character. The city officials whom he ought to guide by his professional advice and council at once assume the higher functions of his office, as is quite natural under such conditions, and practically treat him as a technical clerk. What is still worse, such officials necessarily acquire low esteem or no esteem at all for even the well-qualified engineer in the municipal field.—Engineering Record.

BRICK FOR PAVING.

The Clay Record in recent issues is laying great stress on the number of cities and towns in the Union that are adopting vitrified brick for permanent paving for streets, and the number of such cases recorded in each issue bears out the statement. This general adoption of vitrified brick is the result of trials made in many localities, the test having proved that this style of pavement is well adapted to the requirements of heavy traffic, and that its life, if properly laid, is long enough to make it economical.

The town of Sudbury, Ont., has taken over the waterworks, sewerage and electric light systems.

John N. Gamewell, the inventor of the Gamewell fire alarm system, died at his home in Hackensack, N. J., on the morning of the 20th July, at the age of 73 years. He was born in South Carolina, and during the civil war was superintendent of a powder mill in Columbia, S. C. He had lived in Hackensack thirty-five years. Mr. Gamewell made a fortune from his invention, but met reverses a few years ago in a railroad speculation.