Buffalo Pitts, Holt and Wallis traction engines were at the show. Buffalo Pitts and Troy dump wagons were exhibited, a Packard motor dump wagon also being shown.

The increasing use of concrete for road construction, whether for foundations or surfaces, was indicated by the number of different makes of concrete mixers exhibited, which included the Austin, Big-an-Little, Coltrin, Eureka, Hartwick, Kent, Koehring, Lansing, Milwaukee, Rapid-Heated, VanDuzen and other makes.

Various methods of building culverts were exhibited, the cast iron pipe interests being represented by the American Car and Foundry Co. and the United States Cast Iron Pipe and Foundry Co., while corrugated metal culverts were shown by the Shannon Self-Locking Metal Culvert Co., the Portsmouth Culvert Co., the American Rolling Mills and the Galion Iron Works. Collapsible forms for concrete culverts were shown by the Concrete Form and Engine Co.

Engineering instruments were shown by the Bausch and Lomb Optical Co., and Keuffel and Esser.

Laboratories were represented by Robert W. Hunt & Co.

Gasoline engines and pumping outfits were exhibited by the New Way Motor Co., Novo Engine Co., Original Gas Engine Co., and the Whitman Agricultural Co.

Orenstein-Arthur-Koppel Co. showed models of dump cars. Steam shovels were represented by the Marion Steam Shovel Co.

The Steel Protected Concrete Co. showed the Wainwright Corner Bar, and distributed literature of the new Guelich asphalt plant. The Tarrant Manufacturing Co. exhibited various tools and other appliances for paving work, as did the Iroquois Iron Works and the Anderson Tool and Supply Co.

The exhibit of miniature models by the Office of Public Roads of the United States deserves special mention. Models of roads from the early Roman roads to the present modern types were shown. There were also models of bridges, culverts and drainage structures, rollers, crushers, etc. The New York State Highway Commission chemists were present with considerable laboratory equipment, and gave out much useful information. The United States technical papers were well represented, eleven of them having booths.

The exhibition of machinery and materials formed only one part of the work of the Congress of course, great interest being shown in the large number of valuable papers read at the meetings. Some of these papers appeared in full in last week's issue and in this issue of *The Canadian Engineer*, and others may be printed during the next few weeks; but it is understood that a complete report of the proceedings of the Congress, together with all speeches in full, will be procurable within a few weeks, for a small fee, from the secretary of the American Highway Association, J. E. Pennybacker, Colorado Bldg., Washington, D.C.

The Fourth American Road Congress will likely be held at Atlanta, Ga. The executive committee are considering the advisability of holding the Congress about January, 1915, instead of late in the fall of 1914. Many road contractors and engineers are too busy in the fall to attend the Congress, and it is also thought that possibly the lessons learned would be better remembered if the Congress were held nearer the opening of the following construction season.

ESSENTIAL FEATURES IN GOOD BRICK ROAD CONSTRUCTION.

IN the course of the paper which he read before the American Highway Association at Detroit (American Road Congress), Mr. Jas. M. McCleary, road engineer of Cuyahoga County, Ohio, refers in an interesting manner to the various events in the process of evolution which road engineering has gone through in that county from the initial stages of highway improvement to the conditions which at present mark its roads as being worthy of praise. The paper deals largely with mistakes of early brick construction, and the methods whereby they were, and may be elsewhere, overcome. Cuyahoga County possesses no peculiarities of topography or soil that are not ordinarily found in other districts and countries, and for this reason the following points as disclosed by Mr. McCleary's paper are applicable, with almost equal weight, in Canada:

In the western part of Cuyahoga County the land is so level that drainage is a difficult problem and must be given much consideration. In the southern and eastern parts, the land is so broken that to secure a feasible grade without undue expense for excavation becomes the chief difficulty. The soil varies from a sticky yellow clay in the southern and eastern sections to a sandy loam at the west. The development of the brick road, therefore, was obstructed by all the probable problems to be found elsewhere: natural and artificial soil, grades, climatic influences and the opinion of the abutting property owner.

The first brick road in the county was started in 1893 and completed in 1895. It was located on what is known as the Wooster Pike, in the southwest portion of the county. The wearing surface was of standard size brick, eight feet in width, tar filled, placed between stone curbs, 3″ x 15″, and resting upon a six-inch broken stone base. The pavement was placed upon one side of the roadway with a graded earth drive occupying the balance of the width. No drainage was provided and really nothing of detail was taken into consideration. No requirement in the specifications dealt with the quality of the stone, and the result was that field stone was used for base, and of such consistency that, when the roller had done its work, one might think that sand ballast had been used. Upon this the cushion was placed without compression and then the brick. As to the filler, no one could have told its composition at the end of six years, so little of it could be found.

The pavement being but eight feet in width, all the traffic came in one place. Lack of bond and absence of uniform support caused a depression to appear. In the wet season this rut or groove filled with water which soaked through the base, creating a worse condition from day to day during the damp seasons. The colder weather brought upheavals and such havoc that many sections of the so-called improvement were a hindrance rather than an aid to the traffic.

These defects were not repaired, owing to the fact that the law under which these improvements were made permitted no expenditure for maintenance. In 1898 this legislative flaw was remedied, but for five years there was no chance to palliate the badness of our methods nor to interfere with the increasing delapidation which constituted the chief value of this road—the value of a horrible example.

The next road laid was South Woodland. This is in the eastern section of the country. Again the wearing surface was eight feet in width, tar filled, and placed be-