main roads, cities must share the burden as with any other department of transportation.

Correlation of Facts.—The number of elementary materials used or dealt with in road-making is strikingly few, and, with minor exceptions, these materials are included in a brief list—sand, clay, gravel, broken stone, asphalt, tar, oils, vitrified brick, creosoted wood, stone setts, and Portland cement.

To these may be added a few materials of local service, such as oyster shells; or proprietary binders, such as Rocmac or Glutrin. While the elementary materials are few in number, the range in quality is wide, their combinations are many, conditions of traffic are of varying degree, and such factors as climate, workmanship and cost must be considered.

In the solution of road problems, at the present time, effort should be largely given by scientific engineers to the accumulation of facts respecting road materials and their action under climate and traffic. Much has been done in the past five years in this regard, and it is confidently expected that the next five will do more. Experience will then more nearly approximate the anticipated life of new materials and new methods. The status of knowledge respecting road construction in the next five years will largely depend on the care and thought with which we, at the present time, assemble and correlate obtainable facts. This is a matter which should be especially impressed upon municipal bodies, and co-operation with their engineers obtained, in order that experiment, test, and the collection of data may be effectively carried out.

Roads should be built according to traffic. To a proper solution of the problem of road construction and maintenance, there is much need of the general acceptance of uniform traffic standards. Traffic, in relation to the results from a paving material, is sometimes loosely described as "light," "medium" or "heavy." These terms have all grades of meaning according to locality. In one district 200 vehicles a day would be considered heavy traffic, while in another 2,000 vehicles might be medium traffic. When traffic standards have been clearly defined, and data is accumulated as to behavior and cost of a material under definite degrees of traffic, our experience can become of much greater usefulness. What is needed is a greater accumulation of fact, correlated with definite standards of traffic.

Work Should Not be Delayed.—Road-building is a slow process. In the northern States and Canada there are only about one hundred actual days in the year to be fully depended on. A mile a month for six months of the year is reasonable progress for one outfit of machinery.

There are limitations as regards labor and material which cannot be exceeded without greatly increasing the cost of the work. If a community needs a good general system of roads to-day the work should have been commenced twenty years ago. If a system is needed twenty years hence, it should be commenced now.

Permanent Roads.—The term "permanent" as applied to roads is somewhat misleading, and is not always appreciated by the general public. In the full sense of the word, there is no such thing as absolute "permanency." It is merely a relative term. But it is important, in making safe provision for financing road undertakings, that the matter be clearly understood. For all practical purposes, expenditure for the purchase of road allowance may be regarded as permanent; earthwork and certain drainage of an adequate kind may be regarded as permanent; substantial concrete culverts and bridges may be regarded as permanent; heavy road foundations may be permanent. But there is no such thing as a permanent road surface. Traffic and natural disintegration cause the wear and decay of any road surface that can be employed, and adequate provision should be made for the repair and renewal of the surface.

To meet the immediate needs of traffic throughout the United States and Canada, a large amount of construction must necessarily be carried on that cannot be considered of a "permanent" kind. To attempt the task of immediately building, for all traffic, roads that would have a maximum of permanence would be as impossible as it would be economically unwise. A large part of the farm traffic can, for the present, be best served by roads of moderate cost, lightly surfaced with broken stone or gravel, but carefully graded and drained. In many localities even good earth roads (but well graded and drained) maintained by use of the log-drag must be depended upon to meet the needs of traffic, owing to sparse population or the absence of local gravel, stone, or other suitable surface material.

The most unfortunate results have, however, arisen in the treatment of main roads on which, though expensively built, an effort has been made to maintain a heavy bituminous or other high-class surface on a totally inadequate foundation.

Much discussion has taken place during the past year on the subject of road foundations, and has arisen largely from those who attended the International Road Congress in London last year, as a result of their observation of practice in Great Britain and in Europe. European practice in all classes of permanent road construction has undoubtedly in the past tended to greater mass in the foundation than has been generally adopted on this continent. If past practice abroad has proven the need for the massive foundation, it would seem that, on this continent, the use of light foundations should be critically considered, with a view to the adoption of a greater depth of stone and the more general use of Telford or equivalent foundations, particularly for main roads, on which heavy traffic is assured. In the construction of strong foundations there is opportunity for permanency, which will at the same time reduce the cost of repair, for a large outlay may readily arise from attempts to maintain a good surface on an insufficient and yielding foundation.

Fair Distribution of Cost.—A fundamental necessity in creating a system of roads is that the cost shall be fairly and equitably levied on those who benefit. Failure to do so has done much to retard road-building in the past. If the general public feel that the cost of roads is borne in a reasonable degree by those who should contribute, much opposition will vanish. If the farmer feels that he is being asked to build roads for motorists of the cities, he is naturally opposed to proposals for road development on such a basis. Out of this has grown much of the opposition in some localities to the construction of trunk and State roads. A close study of the farmer's viewpoint by advocates of trunk roads will throw light on the road situation as a whole, and will indicate that a successful road policy in any province or state should make provision for the improvement, if not of all roads, at least of those more directly serving farm traffic. Broadly, trunk roads run from city to city, and are commonly parallel to the steam railway. The market roads on which rural traffic most frequently concentrates, radiate from the station, villages and shipping points, and are, in general, at right angles to the trunk roads so often advocated for motor traffic.

Trunk roads are a necessary adjunct of any system of roads. They are desirable, and should be built. They