When the available and seemingly desirable pavement surfaces have been thus compared it will be possible to reject those which do not meet requirements and thereby reduce the field of investigation. With those which are considered suitable the final test will be that of economy. Careful estimates should be made of the initial cost, the annual cost of maintenance and the life of each. Then, using the prevailing rate of interest with the amount of capital required to do the work, we can soon determine which is the most economical material to use.

A vital feature in street design from the aesthetic point of view is the parking treatment. There is no doubt that the average engineer would benefit exceedingly in collaboration with the landscape architect in this phase of the work, when this is possible. Certain elementary considerations, however, may be kept in mind, and a careful study of this question should not be dispensed with.

It is desirable to have residential streets planted with trees and grass in the strips reserved for parking purposes. Ordinarily the most suitable plan to follow is to place these spaces between the sidewalks and curbs, between portions of the roadway pavement where the space is available and, where the building line is at or near the street line, to have a space between this and the sidewalk. Trees should be planted in straight lines as a rule, twenty to thirty feet apart in a row, and the grass should manifestly be carefully cultivated. The selection of the kind of trees will be governed by local conditions, but the rapidly growing varieties are generally preferable. Low, dense growing trees, such as evergreens, are not often suitable for the purpose. They should produce a good shade and be shapely, the size being regulated by the available space and the proximity of buildings. It will be understood that certain varieties of trees will be unsuitable for urban planting on account of the condition of the atmosphere and the environment of surrounding improvements.

No one who is familiar with the methods of dealing with the various phases of the problem of street design as has been outlined will gainsay that no small amount of detailed effort will be involved in proceeding along these lines. It will be evident, however, that the results of the investigation of certain points will be applicable to the design of all streets in one town or city. Still other features will be similar when they apply to streets of like use throughout the municipality, and a majority of the results will coincide when relating to all of the streets of one classification within a limited territory. It should be borne in mind that the design of a street, when once executed, will be in a large measure permanent, and that countless numbers of users far into the future will suffer from any of the original defects. The economical side of the problem alone should appeal to all citizens, for not only will traffic be inconvenienced and made more costly, but abutting and nearby property values will be affected, and the community as a whole will be the loser in proportion to the enormity of the defects.

After all, the principal considerations are practically fundamental. When the reconnaissance and the preliminary surveys have been made, and the observations taken and data collected for determining width, limiting gradients, kind of paving materials and parking treatment, the sound judgment and knowledge of the competent designer, gained from study and experience, enable him to evolve a correct, scientific plan. There can be no excuse for any other.

A USEFUL ADDITION TO INDUSTRIAL MATERIALS.

A remarkable new material to take the place of hard fibre, glass, porcelain, hard rubber, built-up mica, pressboard, rawhide, moulded compounds, etc., has been developed by the Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. It is known as Micarta.

It is used for commutator bushings and brush-holder insulation, as noiseless gear blanks, as conduit for automobile wiring, as spools for sparkcoil and magnet windings, for refillable fuse tubes, for wireless coil separators, for arc shields in circuit-breakers, for water-meter discs, etc.

Micarta is a tan-brown colored, hard, homogeneous material having a mechanical strength about 50 per cent. greater than hard fibre. It can readily be sawed, milled, turned, tapped, threaded, etc., if a sharp pointed tool is used and the work done on a lathe. It can be punched only in thin sheets and cannot be moulded. Micarta is not brittle and will not warp, expand, or shrink with age or exposure to the weather but takes a high polish, presenting a finished appearance.

Two grades of the material are made. The grade known as Bakelite Micarta will stand a temperature of 150 degrees C. (300 degrees F.) continuously, or 260 degrees C. (500 degrees F.) for a short time. It is infusible and will remain unaffected by heat until a temperature sufficient to carbonize it is reached. Heat will not warp bakelite Micarta, and it will stand an electric arc better than hard fibre, hard rubber, built-up mica, or any moulded insulation containing fibrous or resinous materials. Its coefficient of expansion is low, being approximately .00002 per degree C.

Bakelite Micarta is insoluble in practically all of the ordinary solvents such as alcohol, benzine, turpentine, and weak solutions of acids and alkalis, hot water and oils. It is indifferent to ozone—an advantage over hard rubber, resins, etc., for electrical purposes. It is non-hydroscopic and impervious to moisture.

The other grade, designated as No. 53 Micarta, has the same mechanical and electrical properties as the Bakelite Micarta, but differs in its chemical and thermal properties. The plain Micarta behaves towards chemicals and heat very much as an ordinary resin. This grade is not used in plate form.

INFLUENCE OF METALLOIDS ON CAST-IRON.

A paper by H. I. Coe before the Iron and Steel Institute shows tests of 54 alloys, containing carbon 3.0, silicon from 0.4 to 2.24, manganese from 0.14 to 2.22, sulphur from 0.11 to 0.45, and phosphorus from 0.30 to 2.88 per cent. The author's conclusions are:—

Silicon decreases the strength and hardness of cast-iron, owing to its effect in promoting the decomposition of iron carbide.

Manganese to the extent of 0.5 per cent. softens silicious gray irons, owing to its effect on the condition of the carbon; the strength is increased by the addition of manganese.

Influence of sulphur is largely determined by the silicon present. Carefully controlled, it should be of considerable value to the iron founder in mixing his iron for any particular purpose.

In the absence of manganese, and with about 2 per cent. silicon present, very strong gray irons may be obtained if the percentage of sulphur be judiciously raised.

Phosphorus, up to about 1 per cent., is useful. It gives fluidity, slightly increases the strength, and also slightly diminishes the hardness of the metal. A higher percentage gives a hard, brittle material.