It seems to the writer that the average structural engineer in the consideration of his structures, is more inclined to feel that he is dealing with a mere problem of static equilibrium than to consider the structure as a true machine in which all of the elements are put in motion by every change of load.

Looking at it in the true light of its operation as a machine, or mechanism, the theoretical error of disregarding the vital elements or parts of the machine in treating its operation becomes apparent. We would not consider it practical to expect satisfactory operation of an engine with the connecting-rod left off, and why should we consider any theory as applicable to the operation of the flat slab in which the connecting link between the concrete and the steel is left out of consideration? Such a theory must evidently be as unsatisfactory in application as the engine with the connecting-rod removed.

Failure to consider the continuous flat slab as a mechanism accounts for the strange misconception of its character by the great majority of the engineering profession. They look at the commercially successful flat slab as one which is merely flat on top and bottom. Certainly the writer was not a pioneer in flat-slab construction of this ancient and useless variety.

In the construction of the reservoir at Bridgewater, Mass., a slab flat on top and bottom was used, and strips of expanded metal marked "lintels" on the working drawing were stretched from column to column in two directions and expanded metal was spread in the bottom layer. The operation of this structure as a machine, however, would not be the mode of operation which I have outlined by the preceding theory of work. It is a different mechanism entirely. No useful circumferential action could occur in the upper zone about the column, while the difference in rigidity of the expanded metal in the two directions, longitudinally and transversely, would prevent any material circumferential resistance in the bottom between columns. The performance of other slabs, flat in form as machines, may be referred to here.

Mr. George Hill, of New York, in the "Architectural Record" of September, 1902, described the construction of a warehouse with columns 16 feet centres, slab 11 inches thick, designed to carry 400 pounds working load, or 52 tons per panel. Failure occurred under approximately half this supposedly safe load, and the floor is now supported on alternate brick piers and concrete posts 8 feet centres, or nine times as many points of support per panel, 16 feet square about the column, as originally designed.

A reservoir roof on a similar plan was attempted, with columns about 22 feet centres, slab between seven and eight inches thick. Instead of seven posts it now rests securely on somewhat over forty posts.

The performance of these structures as machines when the thickness of the slab is reduced so that stability must depend on the slab action was unsatisfactory, for the reason that the general laws necessary to secure satisfactory results were not complied with. The type of flat slab outlined in Taylor and Thompson's work would come somewhat under the same category as regards width of belt and proper distribution of the material over the columns, to secure the most effective reduction of the radial moment by circumferential action. Its glaring defects in this respect the writer has noted with surprise, but they seem not to be generally appreciated by the profession at large.

To undertake in a short paper the discussion of wall panels, column flexure, and other more intricate phases of the flat slab problem, while as yet the simplest and most elementary form of the problem, the interior panel, is not generally understood, would be, as the writer views it, a waste of effort. When there is more general agreement on the simplest form of the problem, then the more complex and interesting phases of the question are in order for discussion.

OPPORTUNITIES FOR CANADIAN PRODUCTION.

The following is a partial list of articles not manufactured in Canada, but all of which are imported. It has been compiled by the Department of Trade and Commerce, Ottawa, and may serve as suggestions to manufacturers of engineering machinery and equipment.

Asbestos pipe coverings; carbons, electric light; copper tubing, seamless; galvanized wire netting, 14 x 15 gauge; galvanized wire netting, any gauge, ¾ mesh and smaller; miniature electric incandescent lamps; pipe coverings of cork for cold storage insulation; rolled edge steel plates; safety fuses, not metallic; seamless steel boiler tubes; oil engines; sheet copper and seamless copper tubing; sheets, Bessemer; slag trucks; sockets, incandescent for street lamps, 1½-inch inside diameter and over; steam steering engines for equipment of ships; steel squares; telephone carbon protector blocks, carbon discs and glass lenses used in manufacture of telephone; tubing, seamless steel.

PROPOSED EXHIBIT OF U.S. STEEL CORPORATION AT PANAMA PACIFIC INTERNATIONAL EXPOSITION, 1915.

The announcement is made that the United States Steel Corporation and subsidiary companies propose to have a comprehensive exhibit of their operations at the Panama-Pacific Exposition in San Francisco in the year 1915. It will begin with the ore fields and carry on an educational picture of operations in ore mining, rail and water transportation, dock operations, coal, coke and pig-iron production, steel manufacturing in its various lines, and will also present in a displayed way the processes of manufacturing many of the subsidiary companies' products, also how their by-products are utilized, and the display of many of the uses in which their general products are employed, typifying the advancement in the uses of this country's resources. In addition to the material exhibits before mentioned the corporation intend to illustrate in a comprehensive manner, by moving pictures, their operations throughout all departments, showing the ramifications of the processes of the corporation's operations. It is proposed as well to set forth to the world the work which the United States Steel Corporation has done towards the social welfare of its employees and dependants. The corporation will also exhibit many forms of safety devices that have been conceived by its officials and employees, and in the installation of which large sums have been and are being expended. In this social welfare department will also be shown the methods employed by the corporation in the aid and care for the injured, and the welfare of employees' conditions at work and the benefits that are aimed to be afforded to employees at their work and in their surroundings.

MATERIALS AND SUPPLIES FOR SOUTH AMERICA.

United States Consuls reporting on the immediate necessities of Latin countries state that there will be opportunities for the sale of the following: Para, Brazil=cement and manufactured iron; Rio de Janiero, Brazil=cement, hardware, iron and steel wire; Montevideo, Uruguay=cement; Lima, Peru=cement, steel rails, tools, machinery, explosives; Bogota, Colombia=machinery, railroad supplies, engines, cars, rails, bridges.