

On the other hand, in coloring concrete through the aggregate all such restrictions are removed, and colors may be obtained from white to black through all the range of possible aggregates. An examination of drawings done in hard pastelles and of paintings of the impressionist school suggests a technique in coloring which is peculiarly adaptable to the coloring of concrete by means of aggregate. In the pastelles, tones are produced by hatching and cross-hatching with lines of pure color without blending on the surface of the drawing; in the paintings, by spotting with pure colors one beside the other, and without blending. In both cases the tones are effected by the blending of the light rays reflected from the picture to the observer. Wonderful depth and clarity of tone are characteristics of this school of coloring, and in it are to be found a great deal of exact knowledge and valuable precedent.

When this knowledge is translated in terms of concrete aggregates, it is obvious that if the aggregates are carefully selected and carefully placed, all the elements are present for the successful coloring of concrete surfaces. The results obtained in practice bear out the theory given above, and there is every reason to believe that the aggregate is the proper source of color for concrete.

#### Plasticity Practically Ignored

Hence it was a most important conception that a similar result might be obtained with stucco. The success of this depended, first, upon securing a suitable gradation of the stucco aggregate, and, second, upon being able to apply such a mixture, once it were satisfactorily compounded. It was known at the outset that these mixtures would be harsh, therefore, plasticity no longer played any part in the calculations.

The laboratory program was fairly simple. The plan consisted simply in working first with concrete mixes in miniature, in which the sizes of cement particles, sand particles and coarse aggregate particles were reduced from the normal sizes in the ratio of about 1:10, this being taken as the approximate ratio of the size of particles passing a No. 8 sieve to pebbles one inch in diameter. It was assumed that the density of such mixes would depend mainly on relative sizes of the component particles, with due allowance for the water content. If these mixes appeared to be satisfactory for the purpose, it was assumed that any reduction within the 1:10 ratio would also be satisfactory, and the actual reduction to be employed in compounding any given stucco mixture of this type would be as slight as the requirements of texture and the difficulties of application would permit.

To make a long story short, these experiments in the laboratory with the miniature concretes were very successful. Not the least important part of the laboratory work was the microscopic examination of the structures of these little concretes, which yielded many valuable suggestions for the gradation in size of particles, and for the proper proportions of the various sizes, to yield the desired effects in the treated surfaces.

#### New Stucco Applied Commercially

The first attempt to apply the new product to a vertical wall was not wholly discouraging. Small areas were treated successfully, and eventually a terra cotta tile pent house on one of the new laboratories of the Bureau of Standards was coated with the exposed aggregate stucco. This example, while not as free from imperfections as the more recent work, has attracted most favorable notice.

Fortunately, the mechanics who were selected for this work developed a real interest in the new type of finish, and subsequently a pride in the results of their work, which made for very rapid progress in the development of the methods of application and treatment. New requirements in thoroughness of mixing, consistency, and control of the absorption of the undercoats were met, and other improvements in the general process were gradually introduced as essential parts of the routine. Not all of the problems have been solved, but there has been very gratifying progress in the comparatively short time that the new stucco has been applied commercially.

The new type of exposed aggregate finish can not fail to arouse new interest in stucco as a product, regardless of the nature and treatment of the finishing coat. The product should be more widely used, and the reason it is not more widely used is that it has too often been applied by contractors or mechanics who consider it only as an outside plaster. This paper has attempted to convey the impression that cement stucco is more like concrete than plaster, and that plasticity is not essential. The point the writers wish to emphasize is that the art of applying durable stucco is very different from the art of plastering, and in their opinion, stucco will take the place it deserves among building products only when this fact is generally recognized.

#### JUDGE FINES CITY OF HULL

JUDGE CHAUVIN has delivered judgment in the case of the Quebec Board of Health vs. the city of Hull, Que. He fines the city \$200 for neglecting to obey the board's orders to instal a filtration plant. "Regarding the merits of filtration and chlorination," said the judge, "I am not here to discriminate, and further, it is not in my jurisdiction to do so. The defence has raised the point of its inability to pay the cost of a filtration plant, the approximate cost as estimated being in the neighborhood of \$400,000. I find, after a careful study of the figures produced, that the finances of the city were able to obtain the amount required, as the government would give the necessary authority to borrow the money." The instructions given to the city of Hull by the provincial board, said the judge, were "perfectly in its jurisdiction," and the city should have obeyed the order. He commented on the fact that the Hull water was unfit to drink in 1915 and that a chlorinator was not installed until 1916.

#### STEAM RESERVE FOR ONTARIO HYDRO

ESTIMATES and plans are being prepared by the engineers of the Hydro-Electric Power Commission of Ontario for a steam reserve plant, which will be located in Toronto, Hamilton, Windsor or Niagara Falls. The plant will require 15 or 20 acres, and negotiation will be conducted with the above cities before decision is made regarding location. Sir Adam Beck states that the first unit of the plant will generate 50,000 h.p. and will turn over by the fall of 1921.

#### MAY DELAY QUEENSTON-CHIPPAWA DEVELOPMENT

DEMANDS for greatly increased wages have been presented to the Hydro-Electric Power Commission of Ontario by the laborers on the Queenston-Chippawa power canal. The officials of the commission have vainly endeavored to effect a settlement, and declare that it is impracticable to meet the demands. A mass meeting of the workmen is to be held to-night and a strike vote will be canvassed.

Large extensions are being made at the Angus shops of the Canadian Pacific Railway Co. These extensions will add 250,000 sq. ft. to the available floor area and will cost approximately \$1,000,000.

Announcement has been made of the reorganization of the Rust Engineering Co., of Pittsburgh, which is represented in Canada by F. H. McKechnie, of Montreal. The partnership formerly existing between S. M. Rust, of Pittsburgh, E. J. L. Rust, of Birmingham, and E. M. Rust, of Washington, has been dissolved and three separate firms have been incorporated, viz., the Rust Engineering Co. of Pittsburgh, the Rust Engineering Co. of Birmingham and the Rust Engineering Co. of Washington. The three former partners will form the majority of the directorate of each of the three companies.