

BUILDING MATERIALS FROM WATER WASTE



Spent sulphite liquid (left) and common clay (with foaming agents) produced the foamclay brick shown at right.

Pulp-and-paper industrial processes pose a major unsolved problem to "environmentalists" seeking ways to reduce the pollution of Canadian waterways.

Each day that a typical 200-ton sulphite pulp mill operates, it produces, as an unwanted by-product, 400,000 gallons of waste liquor, a crude calcium lignosulphonate, which contains about 200

tons of solids. Only a fraction of these wastes is converted into useful by-products, the rest being dumped into the nearest body of water. Each year, liquid containing about 3 million tons of solids is discharged from pulp-and-paper plants in Canada. The liquid is a particularly bad pollutant, since it greatly depletes dissolved oxygen in rivers or lakes.

During a study of the acoustic properties of liquid foams, Gavin Macaulay, an engineer of the National Research Council of Canada, discovered that a remarkably stable foam could be made by whipping common clay with spent sulphite liquor. Air drying and firing of the mixture resulted in a permanent low-density ceramic foam product or "foamclay". Foamclays have been made before, but not with low-grade clays and so cheap a foaming agent.

Canada has large deposits of low-grade clays, which, though varied in composition, are typified by a rather low fusion point, short firing-range and high shrinkage. Because of these qualities, most of these deposits are of little commercial value.

Mr. Macaulay examined the possibility that, by suitably treating a mixture of common clay with spent sulphite liquor, useful and commercially attractive building materials might be produced. Ideally, these would be in the form of large, lightweight building blocks or panels with structural strength and thermal insulation provided by the porous body.

A long series of exploratory experiments has been made in an attempt to improve the casting and drying properties of the wet foamed clay so that large blocks can be made. Two further ingredients were found which, when added in small percentages to mixtures of clay, water and spent sulphite liquor, greatly improved the setting or thixotropic properties



Gavin Macaulay pours a mixture of clay and spent sulphite liquor into a metal mould - one of the final steps in producing foamclay bricks.