the surface, and a stronger flood than ebb at the bottom. Waves entering through the entrance can complicate the events further by generating their own flow oscillations and associated sediment transport.

From an engineering point of view, it is convenient to approach the problem of inlet hydraulics with reference to the simplest possible system, i.e., an inlet connecting the ocean to a well defined bay, as shown in Fig. 1. The inlet is assumed to have a certain bottom friction, but sedimentary aspects will not be considered in what follows. Salinity induced stratification of the flow is also ignored. Some of the major contributors to the development of the hydraulics of such a system are - Brown (1925), O'Brien (1931), Keulegan (1951), Baines (1957), Keulegan (1967), van de Kreeke (1967), Mota Oliveira (1970), Huval and Wintergerst (1972), Dean (1971), O'Brien and Clark (1973), King (1974) and Escoffier (1975).

Returning to Fig. 1, it is noted that most inlets have a well defined throat section, i.e., a minimum flow cross-sectional area. This is analogous to the Vena Contracta of such flow measuring devices as the venturi meter. O'Brien (1931) and others have shown that the throat section is a characteristic feature of an inlet, and that measurement of the current at the throat can yield information on the size of the throat and also on the relationship between the flow and the ocean and bay tides. Another important aspect of an inlet is the fact that its cross-section resembles a wide channel, such that the hydraulic radius can be approximated by the depth. This fact is generally lost when one looks at the commonly distorted depiction of the cross-section. This is illustrated by the example shown in Fig. 2.

II. HYDRAULICS OF A SIMPLE INLET-BAY SYSTEM

Problem Formulation

The governing equations for a simple inlet-bay system will be derived