INTRODUCTION

The petroleum industry in recent years has altered its "structure and closure" thinking to thoughts of stratigraphic petroleum accumulation. Through the use of clastic ratio and lithofacies studies, etc., the geologist of today has entered the competitive hunt for stratigraphic traps or "traps of varying permeability" as defined by Landes (1959). This paper illustrates by the use of hypothetical examples, a tool that can be useful in the determination of traps of varying permeability. This tool is "framework to primary void-filler relationship," the factors of which can be determined only by the examination of well cuttings. The resulting factors or numbers are mappable for definite lithologic units and will be illustrated later.

Good mechanical logs, i.e., electric, radioactive, sonic, etc., are an essential part of any subsurface study. Such logs will express actual bed or unit thickness and an accurate record of depth. They will allow porosity and permeability calculations and indicate possible fluid content and saturation. Good well samples are even more important. Good samples will allow determination of exact rock types, rock constituents for environmental and sedimentation studies, positive oil shows, exact porosity types, visual estimate of amounts of porosity, secondary and primary cements, and the actual relationship of framework to primary void-filler. The geologist who is open minded and constructive in his thinking knows how essential it is to have good well samples and good mechanical logs and how each supplements the other. The task of obtaining the best quality of these materials is the important responsibility of the drilling operator. Future prospecting for stratigraphic oil cannot take place without good samples and logs.

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RELATIONSHIP OF FRAMEWORK TO PRIMARY VOID-FILLER

The relationship of framework to primary void-filler is essentially a clastic ratio. Nanz (1954), in writing of the "Genesis of Oligocene Sandstone Reservoir, etc., Texas," suggested the terms "framework" and "interstitial detritus." He states that the well sorted sand of a rock unit is the framework. The silt and clay in various amounts within the framework are interstitial detritus.

Pettijohn (Second Edition, 1957), in discussing textures of sandstones, defined framework as the detrital sand fraction formed of sand-sized material of 1/16 to 2 millimeters. The voids are defined as the pores or empty spaces in the framework. These voids form 30-35% of the normal sand and can be filled with finer silt, clay and precipitated cements. The finer material occupying the voids was termed void-filler.

Both Nanz (1954) and Pettijohn (1957) emphasized the importance of the relationship of these two basic textural factors in sandstone studies. This importance was also recognized by Mitchell (1958) in presenting the American Stratigraphic Company's "New Method of Recording and Presenting Stratigraphic Data." Since framework and primary void-filler are essential characteristics of a sandstone unit, the first practical application of this number system to commercial stratigraphic logs was made in 1957 by the American Stratigraphic Company. These numbers afford a method of consistently describing a sedimentary rock characteristic that is considered to be of equal importance with color, porosity, grain size, shape, and other descriptive characteristics. These numbers are applied to most sedimentary rock types and can be maintained with the sample study log for future reference purposes.

Determination of $F/Vf^2$ Relationship

For the purpose of this paper the definitions of framework and primary void-filler are as follows:

1. Framework (coarse fraction) is formed of the detrital material greater than 1/16 mm. in diameter. Lithic types which have this framework are conglomerates, gravels, detrital breccias, ortho-quartzites, arkoses, graywackes and the calcareous fragmental sands—calcarenites, calcirudites, oolites and pellites.

2. Void-filler (primary) is defined as that material of a grain size less than 1/16 mm. in diameter which infills the voids of the framework and destroys or reduces the primary porosity. Silts,