

## Knudsen Says Good Acoustics Are Important In School Room

### U.C.L.A Professor Speaks At Convention Of Public School Business Officials On Building Construction

The acoustics of the schoolroom are more important than the problem of the illumination, and come on a par, at least with the heating and ventilation of the school building. Such is advice given to public school officials by Prof. Vern O. Knudsen of the University, in his article on the subject just published from the proceedings of the National Association of Public School Business Officials. Prof Knudsen was invited to speak before the recent convention of the officials held in Denver, and he presented some new and important ideas with reference to construction of school plants.

#### INSTRUCTION IMPORTANT

"The chief function of a school is instruction, and instruction comes and likely will continue to come, by word-of-mouth and listening," declares Dr. Knudsen in his article. "I do not believe it is over-rating the importance to state that acoustics in school buildings come before illumination, and it is at least on a par with heating and ventilating.

"Yet in most instances the illumination, heating and ventilation of a school building are planned and executed in a accordance with the best obtainable scientific and engineering knowledge, and matter of acoustics is left to luck or guesswork."

#### BUILDING ACOUSTICS

There is no mystery about providing good acoustics, although the layman has always shrouded the subject with mystery and uncertainty, according to Dr. Knudsen. The acoustic outcome of a building can be determined in advance of construction, and with proper design and engineering, the acoustics of any room can satisfy the most exacting requirements.

The two outstanding requirements for good acoustics in school buildings are silence and the absence of excessive reverberation, he points out. All interfering noise, either of outside or inside in origin should be reduced to the utmost. Even very slight noises may interfere with the hearing of soft consonantal sounds.

This consideration entails attention to selection of the site; the use of heavy, rigid walls and ceilings; tight fitting doors and windows; soft floor coverings, and the treatment of the interior of rooms with sound absorptive material.

#### STOP REVERBERATION

"The persistence of sound in a room after the source of the sound has been stopped is a familiar phenomenon and is called reverberation," continues Dr. Knudsen. "The time of reverberation is a measure of how long a sound of standard loudness will persist. Thus, in an empty, large room, with hard walls and ceiling, the time of reverberation may be of ten seconds duration, or more. Obviously hearing conditions in such a room are very poor because the separate sounds in articulate speech or music persist so long that they confuse into an indistinct 'hodge-podge' or sound. It is this very same phenomenon which accounts for at least 90 per cent of all defective acoustics in buildings."

**"The School was established to promote learning, which is acquired largely by word of mouth and listening. Therefore, acoustics is one of the most important physical properties that determine how well the school building can serve its primary function. Thus the exclusion of noise and reverberation are indispensable in adapting classroom to the function of oral instruction"**

**1950 Cyril Harris PhD  
Vern Knudsen PhD  
Authors: Acoustical Designing In Architecture**

## Physics

THE U.C.L.A campus has had more than it's share of influence in the new American craze for talking pictures that has turned Hollywood inside out and threatens to create something in the nature of a revolution in the motion picture industry. Dr. Vern Knudsen, associate professor of physics in the University at Los Angeles, spent the entire summer months in the construction of sound stages, essential in the production of "talkies."

Dr. Knudsen, who has acted in a consulting and engineering capacity at the studios of Metro-Goldwyn-Mayer, First National, Metropolitan, Paramount-Famous Players-Lasky, Universal, and Untied Artists, characterizes the construction of adequate sound stages as one of the most important problems that the industry is facing as a result of the new trend in pictures.

The three obstacles that the designer and engineer of sound stages must surmount have to do with noise, vibration, and acoustics. All extraneous sounds must be completely shut out. Street and studio noises cannot be allowed to penetrate to the stage. Outer walls of concrete, tile, or masonry layers have been found the best by Dr. Knudsen after considerable experimentation. Mechanical vibration must be entirely eliminated. Accordingly, recording equipment, and sometimes the entire building, is mounted on great slabs of cork. Deep beds of sand, when used to support buildings, are good insulation from outside disturbance.

Stage linings, an important factor in acoustics, were the subject of particular study and experiment. DR. Knudsen came to the conclusion that multiple layers of soft porous materials separated by air spaces would serve best. Felt, balsam wood, and fiberboard are preferable because of their qualities of equal absorption. These absorb all pitches and tones alike, whereas most materials are absorbent selectively.

Because of his successful experimental work and construction, Dr. Knudsen is a recognized authority on sound stages. In his recent paper read before Technicians Branch of the Academy of Motion Picture Arts and Sciences, he declared that as in other industries, the course of the motion picture industry was determined by research, discovery, and invention.