In penetrating and traveling through this maze, the sound wave encounters just enough resistance to create friction which transforms the acoustic energy into heat.

Practically, the sound is "soaked up" by the material rather than reflected back into the room.

## 15 How does Sound Conditioning "stop" noise?

Sound Conditioning in itself does not stop noise; a cough, a typewriter, a dropped tray, a bookkeeping machine, a ringing telephone bell, a punch press, a band saw or any other noise source generates as much acoustic energy in one location as another.

The loudness is lessened in a sound conditioned room because the original sound dies out faster. It is not amplified by repeated reflections from ceiling to floor and wall to wall as it is in an average room.

Sound is reflected from a hard surface just as light is reflected by a mirror. In the average room with hard plaster walls and ceilings, the sound traveling at an approximate speed of 1120 feet per second, will bounce around the room in all directions many times before the energy it contains is dissipated, or absorbed.

The acoustical material used for sound conditioning absorbs far more of this energy than do ordinary materials, thereby hastening the silencing of the sound.

## 16 How is "Adequate Absorption" determined for a room?

If your car travels 14 miles on one gallon of gasoline and you now have five gallons in the tank, with a journey of 182 miles before you—you can easily calculate that eight gallons more will be required to make the trip.

Likewise, the Sound Conditioning Engineer knows the present absorption capacities of the materials and furnishings in a room, and how far present average noise levels can be profitably lowered by additional absorption. From this he can easily calculate how much additional absorption is required to bring a satisfactory result.

## 17 Is it possible to calculate the length of time sound will remain audible in an auditorium after the source has ceased?

Yes, the period of reverberation can be mathematically determined by means of the Sabine Formula:

$$\frac{T = .05\,V}{a}$$

T equals reverberation time measured in seconds.
V equals volume of room expressed in cubic feet.
a equals all existing sound absorbing units.

## 18 If the period of reverberation is too long, what are the effects?

If a single sound remains audible too long after it has been stopped at its source, it combines with the following sound, or sounds, from the same source, creating a complex mixture of the several sounds. When this effect is pronounced, the ear cannot distinguish clearly between the individual sounds. For instance, a speaker's words will telescope with those previously spoken making entire prases "blurred," "fuzzy" and unintelligible.

Music is scrambled in the same way by the "echoes" in an excessively reverberant room. In rehearsals, the conductor or instructor finds difficulty in locating and correcting mistakes.

## 19 Is Reverberation the sole cause of poor acoustics?

In the majority of instances it is. With few exceptions, removal of excessive reverberation will create good hearing conditions.

In occasional cases the shape of a room or unwisely placed curved surfaces which focus sound at specific points will interfere with satisfactory sound distribution.

## 20 Is all Reverberation undesirable?

No. A certain amount is essential if speaking and music are to have a pleasing "live" quality.

## 21 Can Loud Speakers overcome faulty hearing conditions in an auditorium?

As a general rule, no. If reverberation is excessive, speech can not be understood no matter how much it is amplified. The function of loud speakers is to increase the power of the natural voice, when necessary.

## 22 Is there a proper reverberation time for auditoriums of different sizes and capacities, and how is it determined?

Yes. This is known as the Optimum Reverberation time.

Through painstaking experiment and years of experience and observation, the most satisfactory length of time, in seconds, for sounds to die out in auditoriums of various sizes has become known. This is a matter of record and is used as a base in correcting auditorium acoustics.

## 23 Does Acousti-Celotex Sound Conditioning cost more to install in existing school buildings than in new ones?

No, in most installations the cost is the same.

## 24 Does installation of Acousti-Celotex require structural changes in existing buildings?

No, absolutely no structural changes are required.

## 25 Who applies Acousti-Celotex Sound Conditioning?

Only approved distributors who have organizations trained for accurate engineering and expert application. These distributors are selected by The Celotex Corporation and given thorough training in Acousti engineering and Sound Conditioning practices. See back page of Celotex Sound Conditioning Service.