ASTRONOMY

American Planetaria to Test Theories of Acoustics

THOUSANDS of Americans are enjoying their ventures into artificial star-gazing made possible by the two existing planetaria in Chicago and Philadelphia, and in the future Los Angeles and New York will have synthetic "vaults of heaven" upon which glorified light projection will recreate the starry night skies.

In the Griffith Observatory and Planetarium, now building at Los Angeles, the stars are to be projected on a smooth white dome perforated with innumerable small holes, and the dome is to be made of specially treated celotex. This was planned by the late Dr. E. H. Kurth, director of the planetarium.

The Los Angeles plan is a modification of that adopted at the recently completed Fels Planetarium of Philadelphia. There the inner dome is made of stainless steel, also perforated with innumerable small holes. The object of these arrangements is to reflect the light and to allow the sound to pass through.

Methods Used

In the older planetaria this object was secured by making the projection surface of cloth stretched on frames. This has the disadvantage that the dome becomes a series of plane facets, or, as in the Chicago Planetarium, of conical zones one above the other. In the Fels Planetarium the material is formed to the proper curvature so that a truly hemispherical dome is produced. The same will be true at Los Angeles.

The reason why direct reflection of sound from the inner dome must be avoided is that the curved surface would produce focussed echoes. All sounds, disturbing sounds as well as the speaker's voice, would be concentrated at particular points. The same would be true of light if the dome were optically smooth or mirror-like. Each star image would be reflected in one particular direction and could be seen from that direction only. In order that each star projected on the dome may be seen equally well from all parts of the room, the light must be reflected diffusely—equally in all directions. To secure this the surface must be optically rough. But light waves are measured in hundred-thousandths of an inch, so that an "optically rough" surface is exceedingly fine grained and appears quite smooth to the eye. A sheet of paper, for example, is optically rough.

Really Rough

Not so with sound. Sound waves are measured in feet. To avoid mirror-like reflection of sound, the surface must have a roughness measured in feet. This condition is secured in the older planetaria by putting baffle plates behind the cloth so that the sound reflected from the walls beyond is broken up, is reflected in all directions, and more or less evenly distributed. This is the characteristic of a good auditorium. The reflected sound reinforces the speaker's voice.

A different ideal is aimed at in the Fels Planetarium. Sound reflection from the back walls is suppressed by padding, so that the auditorium effect is eliminated, and the spectator has the illusion of being out in a vast open space under the stars. He only hears the speaker's voice direct.

The same illusion is aimed at in the Griffith Planetarium, but it is believed that it will be more effectively secured. Celotex is itself a good sound absorber, so that any sound that may be reflected from the back walls despite padding, will be stopped in its attempt to get through the holes. Indeed, no padding may be required. The space between the two domes thus forms a sort of sound trap. Sound can get in but cannot get out.

This is the theory; but only experience can show whether it is desirable to suppress all auditorium effect. At any rate, we shall soon have in the United States three planetaria using three different methods of treating the sound problem. It will be interesting to see how they work out in practice.

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ZOOLOGY

Water Supply Furnished For Grand Canyon Deer

AMPLE WATER supply for present and future game needs is being provided on the semi-arid south rim of the Grand Canyon through the efforts of the Federal Government in building 15 tanks for storing water. Already five of these tanks have been constructed, the largest being over 200 feet long.

Construction of the tanks, plus a large-scale fencing project already under way, will tend to make the south rim country of the Grand Canyon National Park a more secure haven for all forms of native wild life than has heretofore been possible.

The semi-tame herd of deer, the nucleus of which was introduced from the north rim of the canyon by truck and airplane transportation at different periods, is one of the principal beneficiaries of these game-protective measures. Each of the three does that remain from the original north rim shipment in 1927 raised two fawns last year, making a total of nine fawns raised by each of them. Between 45 and 50 fawns born in 1933 increased the band to about 120. For the first time on record, some of the deer gave birth to their young among the houses of Grand Canyon Village.

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