Henry Foeller, Architect

Waukesha Plant Expands

The Control of Sound in Buildings
THE SEVENTH ANNUAL
STATE ARCHITECTS' STAG OUTING
WILL BE HELD ON
SATURDAY AFTERNOON, JULY 16
AT U. F. DURNER'S SUMMER HOME, WEST SIDE OF
UPPER NEHMABIN LAKE
WAUKESHA COUNTY

WHAT TO BRING
• YOUR PERSON
• GOLF CLUBS
• SWIMMING SUIT
• OUTDOOR TOGS
• OWN SMOKES
• A BIG SMILE
• LARGE THIRST
• ONE DOLLAR

PROGRAM
1:00 to 2:00—Arrival and Parking
2:00—Grand Opening of the Kegs
2:30—Games
3:00—Bridge
    Rowing and Canoeing
4:30—Swimming
    Ordinary Swimming
    Fancy Swimming
5:30—Supper
    Committee in Charge
6:00—Informal Talks, Officers
    Association Affairs
Evening—Launch Rides
    Cards and Smoker

A full afternoon and evening of enjoyment
in the society of your fellow
architects. One dollar covers cost of
everything, including the supper and ref-
The most important of the public structures designed by Mr. Foeller was the hospital for the criminal insane and the southwest wing of the state prison at Waupun. He also designed St. John’s church, Kellogg public library, East High school, Columbia Community club, St. Vincent and St. Mary’s hospitals and many other buildings in Green Bay and other buildings in various parts of the state.

Surviving Mr. Foeller are his wife, two sons, a daughter, a brother, J. N. Foeller, a Green Bay contractor, and six sisters.

Waukesha Plant Expands

The Federal Steel Sash Co., Waukesha, Wis., has acquired the exclusive American manufacturing rights of Crittall Manufacturing Company, Limited, of England. Federal is taking over the facilities of the former American Company and moving the stock and machinery to its plant in Waukesha. The Company name is being changed to Crittall-Federal, Inc., to conform with the broader scope of this business.

This company will now add to its original line of steel industrial windows and doors a complete line of steel casements, including Light and Intermediate types in standard industry sizes, together with Custom Built casements in the Intermediate and Heavy classifications.

In keeping with this expansion, Mr. Clark M. Robertson, President, has announced the appointment of Ralph H. Sartor, commissioner of the Metal Window Institute since 1929, as Sales Manager.
The Control of Sound in Buildings

It is the business of engineering science to leave nothing to guesswork or chance. The planning of a modern building demands precise, definite knowledge on scores of details that the old-time builder never admitted to his program. Ventilation, lighting, heating, transportation and sanitation must all be taken care of in the architect's drawings, and by methods based on accurate scientific data.

The control of sound in a building is as important to the comfort and the health of its occupants as are any of the other features for which the architect must provide. The nervous tension and irritation resulting from prolonged effort to hear under poor hearing conditions, the wear and tear on nerves of the intolerable racket of a modern office are just as destructive to human efficiency as is improper lighting or poor ventilation. Nervous fatigue results just as surely from a constant assault upon the auditory sense as upon any other of our perceptible faculties. Office managers, in large numbers of cases, have found that errors are surprisingly reduced, and nervous fatigue among typists and machine accountants are almost eliminated by reducing the noise in large office units. An auditorium in which people cannot hear and understand is a sheer contradiction in terms.

Only in very recent years, however, have architects considered that acoustic conditions are a part of their problem. This state of affairs has been due not to failure to recognize that good acoustic conditions are essential so much as to lack of knowledge of what to do to secure such conditions. Only within the last twenty-five years has the subject been scientifically investigated. Before that time, the literature on the subject contained only unsupported opinion based on limited observation and inadequate theory. Nobody knew anything more about the control of sound in buildings than did the old Greeks and Romans: Architectural Acoustics as an accredited branch of engineering science had not arrived. Rules of thumb for what were considered ideal proportions, acoustically "good shapes" deduced from inapplicable optical analogies, general conclusions based on isolated cases are the sort of things considered that acoustic conditions are essential so much as to lack of knowledge of what to do to secure such conditions. Only within the last twenty-five years has the subject been scientifically investigated. Before that time, the literature on the subject contained only unsupported opinion based on limited observation and inadequate theory. Nobody knew anything more about the control of sound in buildings than did the old Greeks and Romans: Architectural Acoustics as an accredited branch of engineering science had not arrived. Rules of thumb for what were considered ideal proportions, acoustically "good shapes" deduced from inapplicable optical analogies, general conclusions based on isolated cases are the sort of things which older books on the subject contain. The stringing of absurd lengths of wire, the weaving of invisible silken webs, the use of so-called resonators were proposed as cures for acoustic defects.

As Americans, we may well be proud that this hodgepodge of guesswork has been replaced by a real science as a result of the work of American physicists. The pioneer work of Wallace Clement Sabine in Architectural acoustics is an outstanding contribution to science.

Even a brief summary of his work would surpass the limits of this pamphlet. Perhaps the most important general conclusion to be drawn from this work is the fact that, while shape is a factor in the acoustics of a room, it is not the most important factor. Doubtless, to the average person, good acoustics suggests the elliptical dome of the Salt Lake Tabernacle or the paraboloid reflector of an outdoor band-stand. The result of this recent work indicates that while good acoustics is possible with such shapes, it is equally possible with more common architectural forms. A second fact of great importance is that the character of interior surfaces is of prime importance in determining acoustic condi-
tions, and that these conditions can be controlled by providing surfaces having the proper physical properties. In other words, the absorption of excess sound is the most effective means of controlling sound within a room. By absorption is meant the physical process by which the energy of alternate condensations and rarefactions which constitute sound are converted into other forms of energy. Thus when sound energy is incident upon a surface, a part of that energy is reflected as sound, the balance is converted into heat by doing work against non-elastic forces, either frictional or viscous in the reflecting surfaces. The fraction of the energy thus converted has been called the Coefficient of Absorption of the particular surface in question. It is a matter of common experience that audience rooms may present undesirable acoustic conditions with a small audience, and yet be entirely satisfactory when filled. This is explained by the fact that the clothing of the audience absorbs a large fraction of the sound that strikes it and reflects very little. An audience thus constitutes an almost perfect absorber. On the other hand, ordinary masonry walls are almost perfect reflectors, absorbing only from 1.0 to 3.5 per cent of the energy that falls upon them. This means that such surfaces are better reflectors of sound than the best mirrors are of light.

Consequently, on account of the relatively small velocity of sound, as compared with light, if sound energy is produced within a closed space, it persists for an appreciable length of time after the source has stopped. This persistence is called Reverberation, and in rooms in which it is excessive, causes the overlapping of the separate elements of speech or music with resultant confusion and lack of intelligibility. For the same reason, the single click of a typewriter, in an office room of modern construction, say thirty feet square, may persist as audible sound for four or five seconds. Hence if a machine is operated at an ordinary rate in such a room, the residual sound from twenty to twenty-five blows will be present at one time, so that the actual amount of sound within the room will be four or five times that produced by a single blow. Street noises coming in at an open window may thus be actually louder in the room than in the open air outside. Modern school rooms with hard walls and ceilings and composition floors increase the noise of restless children and decrease the clearness of the teacher's words. Hospital rooms with their meager furnishings become sound traps, and corridors with their sound-mirror walls convey undiminished the cries of patients and the clatter of dishes.

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The Helms Bakeries building on Washington Boulevard, Los Angeles, affords another example of how concrete combines structural and architectural functions. The monolithic concrete walls are finished with stucco. Lintels, window and door trim, coping and other details are cast stone, set in the forms and concreted in place. Both stucco and cast stone are made with white portland cement. Grant & Bruner, Ltd., Los Angeles, were the architects. Write us for helpful manual, "Forms for Architectural Concrete."

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